May 28, 2023

International Medical Informatics Association Yearbook: Returning to Europe for Editorial Presentations in 2023

Bonjour de Bordeaux France! In this blog, we have talked about the IMIA Yearbook before in 2019 , 2020 and in 2021. Every year, the International Medical Informatics Association (IMIA) produces a yearbook of the best medical informatics journal articles from around the world. This year (2023), the senior editors felt that we needed to return to the live editorial meeting where we choose the best papers. We were very fortunate that our chief co-editor Prof. Fleur Mougin arranged for our meeting at her institution, L'Institut de Santé Publique, d'Epidémiologie et de Développement, the school of public health at the University of Bordeaux France. As talked about before in this blog, the IMIA Yearbook is made up of 12 sections covering the different subfields of biomedical informatics and a keynote survey paper. Each year there is a special section and for 2022 the special section is One Health. The philosophy of One Health emphasizes collaboration across three primary fields of study (animal, human, and environmental) with the hopes of producing the most effective health outcomes for all beings and the broader ecosystem.[1] Since 2019, Kate Fultz Hollis, MS, MBI of DMICE has been one of the senior editors for IMIA Yearbook and she oversees editors for the Signals, Sensors, and Imaging Informatics, Consumer Health Informatics, Clinical Research Informatics, Decision Support, Bioinformatics and Translational Informatics (BTI), Human Factors, and Cancer Informatics.


IMIA YB Editors at Bordeaux

The chief editor of the IMIA Yearbook is Lina Soualmia, PhD (pictured here in green dress). Dr. Soualmia is Professeur des universités (PU) at the Université de Rouen en Normandie. She has been focused on knowledge engineering ("ingénierie des connaissances"), ontologies, indexing and general medical informatics research. The editors of the Yearbook come from many countries in Europe and from the United States. The two US editors in the picture are from the right to left Kate Fultz Hollis and next to her Mary Benton Lauren, PhD from Baylor University (she co-edits BTI section). In addition to senior editor Fultz Hollis, Meryl

Bloomrosen from Washington DC, is a DMICE graduate and she is the editor of Health Information Management Section.

 After three years of meeting for the Yearbook on Zoom or other web meeting software, it was very nice to see everyone in a room that we picture here. This year 11 editors attended the editorial meeting and each section editor team provided 15 papers for best paper and then the group chose for each section up to 4 best paper selections for the Yearbook. We also had the editors who did not attend the meeting present their best paper selections via teleconference on a big screen and that was very useful (as opposed to doing everything on a computer). Bordeaux is a very lovely mid-sized town with a university and of course a very large wine and agriculture industry. Dr. Mougin arranged a lovely dinner for all IMIA editors attending and the wine and 4 course meal were exceptional. We always need more reviewers to help with all the sections of the yearbook and please contact Kate at fultzhol@ohsu.edu if you are interested in providing reviews for the IMIA Yearbook.

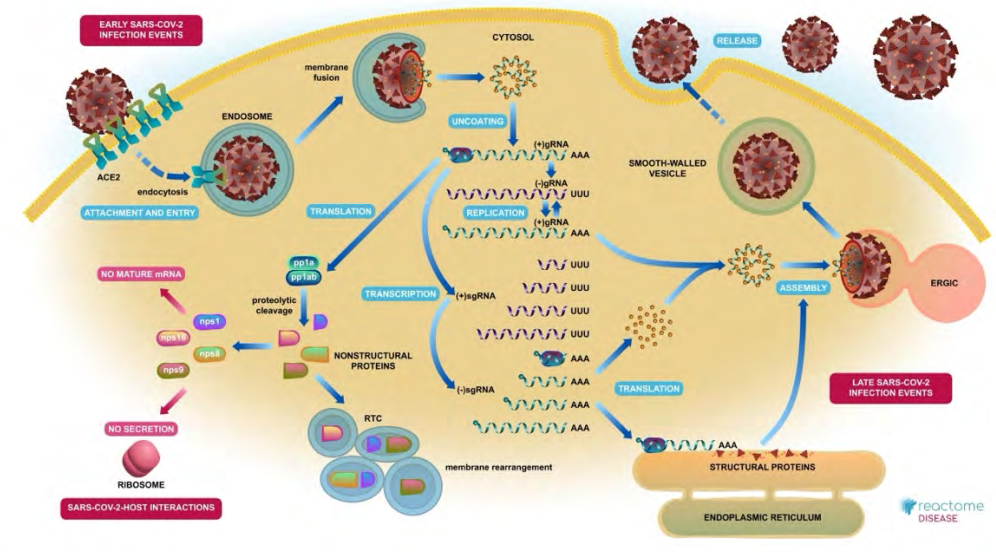
[1] Hardy E, Standley CJ. Identifying intersectional feminist principles in the One Health framework. One Health. 2022 May 31;15:100404. doi: 10.1016/j.onehlt.2022.100404. PMID: 35677572; PMCID: PMC9168527.

December 16, 2022

Reactome Resource of Faculty Guanming Wu on First List of Global Core Biodata Resources

 The Global Biodata Coalition (GCBR) of research funders has recognized the Reactome Knowledgebase as one of just 37 resources worldwide whose long-term funding and sustainability are critical to life science and biomedical research. Reactome is a widely used online resource with over 14 million hits per month. It contains human cellular processes annotated at the molecular level coupled to cutting-edge tools for data analysis. Reactome is developed and managed by Guanming Wu, PhD and his group from the Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE) in collaboration with teams at the Ontario Institute for Cancer Research, NYU Langone Health, and the European Bioinformatics Institute (EMBL). In addition to the Reactome Web site, more information can be found on its Twitter feed. The GCBR also provides a succinct summary of its scope and plans.

The figure below shows an example Reactome entry for the SARS CoV-2 virus.



October 9, 2022

Department Awarded NLM R25 Grant to Support College Undergraduate Summer Internship Program

The Department of Medical Informatics & Clinical Epidemiology (DMICE) of Oregon Health & Science University (OHSU) has been awarded a new R25 grant to fund its Biomedical Informatics and Data Science College Undergraduate Summer Internship Program for another five years. The grant is among 12 awards issued by the National Library of Medicineto prepare historically underrepresented students for biomedical informatics and data science graduate studies and research careers.

The goal of the DMICE program is to provide a rich, full-time experience to students to graduate study and careers in biomedical informatics and data science. In addition, the program aims to motivate students to pursue doctoral training in biomedical informatics and data science that leads to research careers in academia, government, healthcare, and industry. The funding from the R25 grant will be used to support summer experiences for students with backgrounds that have been historically underrepresented in biomedical informatics and data science. With assistance and coordination from the Portland State University BUILD EXITO Program, the grant will support nine students per summer in an experience that includes:

- Knowledge of the motivations, activities, and challenges for the biomedical informatics and data science field
- Skills development in data science through the use of data sets and standard tools
- Participation in a faculty-led research project
- A student-led and faculty-facilitated health data ethics and equity seminar
- Scientific, career, and near-peer mentoring

The Principal Investigator (PI) of the R25 grant is William Hersh, MD, and summer interns will work under the mentorship of faculty and students from the OHSU Biomedical Informatics Graduate Program.

July 11,2022

Alumni Appointed to Positions of Prominence in Biomedical Informatics

Three alumni of the OHSU Biomedical Informatics Graduate Program and its National Library of Medicine-funded T15 training grant have been appointed to positions of prominence in the field.

Peter Embí, M.D., M.S., FACP, FACMI, FAMIA, FIAHSI, (OHSU postdoc with M.S., 2002) was recently appointed professor and chair of the Department of Biomedical Informatics (DBMI), professor of medicine, and senior vice President for research and innovation at Vanderbilt University Medical Center, roles he began on Jan. 1, 2022. He was previously president and CEO of the Regenstrief Institute of Indiana University and recent chair of the American Medical Informatics Association Board of Directors.

Dr. Embí is an internationally recognized researcher, educator and leader in biomedical informatics. He literally invented the field of clinical research informatics, which is the application of informatics to clinical research, and remains an accomplished researcher and thought leader in this area. Dr. Embí has held research grants from the National Institutes of Health National Center for Advancing Translational Sciences, the NLM, the National Institute for Drug Abuse, and the Agency for Healthcare Research and Quality, as well as numerous nonprofit foundations and public health agencies.

Jayashree Kalpathy-Cramer, Ph.D., M.S., (OHSU postdoc with M.S., 2009) has been appointed chief of the new Division of Artificial Medical Intelligence in Ophthalmology at the University of Colorado School of Medicine. In her new role, Dr. Kalpathy-Cramer will translate novel artificial intelligence methods into effective patient care

practices at the Sue Anschutz-Rodgers Eye Center. She was previously director of the Quantitative Translational Imaging in Medicine Lab and the Center for Machine Learning at the Athinoula A. Martinos Center for Biomedical Imaging at Massachusetts General Hospital and associate professor of radiology at Harvard Medical School.

Adam Wright, Ph.D., FACMI, FAMIA, FIAHSI is professor of biomedical informatics at Vanderbilt University Medical Center and has been appointed director of the Vanderbilt University Clinical Informatics Center. He has led projects funded by NIH, the Agency for Heathcare Research and Quality and the Office of the National Coordinator for Health Information Technology on clinical problem lists, malfunctions in clinical decision support systems, approaches for sharing clinical decision support nationally, and adverse event detection using machine learning. Dr. Wright directs clinical decision support operations at VUMC and previously served as clinical lead for clinical decision support and clinical informatics at Partners HealthCare in Boston. He is also a founding member and director of research for the Clinical Informatics Research Collaborative.

Dr. Wright won numerous awards while a trainee, including the AMIA Student Paper Competition and the OHSU School of Medicine John A. Resko Award for Best Dissertation in 2007. He has subsequently won additional awards, including the AMIA New Investigator Award in 2010 and the Early Career Achievement Award from OHSU in 2015.

July 11, 2022

Thirty-Eight Students Receive Informatics Degrees and Certificates in 2022

As another academic year ends, it is time to reflect over the past academic year and celebrate the successes in the biomedical informatics program at Oregon Health & Science University.

Thirty-eight students completed their degrees in either Health & Clinical Informatics or Bioinformatics and Computational Biomedicine. Three HCIN and one BCB students were awarded the Doctorate of Philosophy, 17 HCIN and seven BCB students received their Master of Science (M.S.) degree, and 10 HCIN students completed the graduate certificate program.

Since inception of the program in 1996, it has awarded a total of 941 degrees and certificates, including 36 Ph.D. degrees, 422 M.S. degrees, and 483 graduate certificates.

After two years of virtual celebrations, on Sunday, June 5, 2022, OHSU held an in-person convocation at the Oregon Convention Center in Portland, OR. Along with DMICE faculty (Drs. William Hersh, Karen Eden, Michelle Hribar, Shannon McWeeney, and Nicole Weiskopf), 19 DMICE students also attended the ceremony, including several distance-learning students from around the country. For those unable to attend, OHSU provided a live-stream of the convocation ceremony. Hooding was also live-streamed as well as available for later viewing.

Several DMICE students and faculty received awards this spring.

Congratulations to Sarah Florig, M.S., who received the School of Medicine Best Thesis Award for her master's thesis, Assessing How Chart Closure Time Changes When Physicians Use Medical Scribes. This award is given to recognize an outstanding journal article authored or co-authored by an OHSU SOM graduate student. Sarah also won the Student Paper Competition at the AMIA Annual Symposium in the fall of 2021.

Rose Goueth, Ph.D., received the Assistant Dean's Award for Exemplary Contributions to the Graduate Program Award. This award recognizes Rose's contribution to DMICE and the OHSU community at large. She co-founded and served as a committee member of the Graduate Student Peer Network, which pairs incoming graduate students with senior graduate students. Rose also received the Best Open-Mic Presentation Award at the 2021 Annual NLM Training Meeting.

Kirsten Stevens, M.D., Ph.D., became the second MD/PhD graduate of our program and is now a resident in internal medicine at the University of Washington.

Associate Professor Vishnu Mohan, M.D., M.B.I. received the SOM Excellence in Education Award. The award recognizes his leadership in enhancing student education and advancing education (for graduate students and clinical informatics fellows) through development and creation of new curricular designs and his service as an outstanding educator and mentor for students.

DMICE also held its annual spring banquet for the first time since 2019. The banquet was held at the McMenamins Cornelius Pass Roadhouse in Hillsboro, OR, with more than 80 faculty, staff, students graduates, and guests in attendance. The 15 graduates who attended the banquet were honored there as well. Thanks to Lynne Schwabe and her hard work in organizing a successful event! It was great to see everyone in person again.

May 4, 2022

National Library of Medicine T15 Training Grant in Biomedical Informatics and Data Science Renewed

The Department of Medical Informatics & Clinical Epidemiology (DMICE) is pleased to announce that our National Library of Medicine (NLM) T15 Training Grant in Biomedical Informatics and Data Science has been renewed for another five years through 2027. The NLM training grant funds predoctoral (PhD) and postdoctoral trainees in the OHSU Biomedical Informatics Graduate Program.

The grant has been funded continuously at OHSU since 1992. This renewal marks the seventh consecutive five-year cycle of funding for this award. The grant's completion of 30 years makes it the second-longest-running training grant at OHSU. The grant's total funding over that time of $21,912,538 make it the largest training grant ever at OHSU.

Over 30 years, the grant has funded 131 trainees, including those currently in the program. Funding has included stipends, tuition, and other expenses for 46 predoctoral (PhD) and 61 postdoctoral students. Many of these trainees are among the 943 degrees and certificates that the OHSU Biomedical Informatics Graduate program has awarded since its inception in 1996. For part of its duration, the grant funded for two other types of trainees, librarians (8) and short-term positions (STTP) for internships for college undergraduates (16).

The picture shows the Principal Investigator of the Training Grant and Program Director William Hersh, M.D. with T15 and other trainees in one of the first in-person meetings, in the spring of 20022, since the COVID-19 pandemic began in 2020.

Associate Directors of the program include Karen Eden, Ph.D. and Shannon McWeeney, Ph.D. Dr. Hersh stated, “I am gratified for OHSU to receive another round of funding for this award that maintains our program as one of the most accomplished academic informatics programs in the country. This grant also has a great deal of personal importance to me. Not only has it been one of the key grants for our most accomplished students over the years, but I am a product of the NLM biomedical informatics training program myself, with my own career in the field launched when I was funded as a postdoc at Harvard University from 1987 to 1990.”

April 12, 2022

Department Data Science Team Earns Honorable Mention in the Nationwide Pediatric COVID-19 Data Challenge


Lorne Walker, MD, PhD

A team of faculty and a student from the Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE) was awarded an Honorable Mention in the Pediatric COVID-19 Data Challenge, sponsored by the Biomedical Advanced Research and Development Authority (BARDA) in partnership with the National Institute of Health (NIH) National Center for Advancing Translational Sciences (NCATS), the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), and Health Resources & Services Administration (HRSA) Maternal & Child Health Bureau.

The DMICE team – Lorne Walker MD, PhD, Ben Orwoll MD, MS, and Meenakshi Mishra MSc, MPH, and PhD candidate – competed with over 200 participants on 88 teams, and were among three teams recognized with Honorable Mentions in addition to the two winning groups.

 Meenakshi Mishra MSc, MPH, PhD Student

This nationwide data science competition utilized the COVID-19 data enclave maintained by the National COVID Cohort Collaborative (N3C), a data repository containing electronic health record (EHR) data from over 4.5 million SARS-CoV-2 positive patients from health systems across the US, including OHSU. Participants in the Pediatric COVID-19 Data Challenge were asked to use EHR data to predict two key outcomes in children with COVID-19: 1) hospitalization after testing positive for COVID-19 and 2) the need for advanced respiratory or cardiovascular support after hospitalization. Severe COVID-19 is rare in children but can have significant health impacts on the most vulnerable. This presents a challenge to pediatric clinicians who must counsel patients and families and apportion drugs and other therapies to the patients who will benefit most. Accurate predictions of disease severity may better inform these key decisions amidst a global pandemic.

 Ben Orwoll, MD, MS

The OHSU DMICE team was specifically recognized for feature interpretability and design. The team used a common set of predictors, including demographics, laboratory values, and associated diagnosis codes, to inform an ensemble classifier that combined individual predictions from logistic regression, random forest, gradient-boosted trees, and artificial neural network models. They used Shapley Additive Explanations to provide individual-level and population-level explanations for model predictions. This high-performing approach provides clinicians with an outcome prediction and an individualized explanation with predictors for intervention. The DMICE team is interested in exploring the ways this pediatric

COVID-19 model could be used at the bedside to help providers better care for the children of Oregon and southwest Washington.

March 18, 2022

Clinical Informatics Subspecialty Practice Pathway Extended for Three Additional Years – Master's Degree Continues as an Option For Now

A three-year extension to the Practice Pathway of board certification eligibility for the clinical informatics (CI) subspecialty has been approved by the American Board of Medical Specialties (ABMS) for the American Board of Preventive Medicine (ABPM). This is the second extension of the so-called "grandfathering" pathway that allows physicians with a primary boarded specialty to achieve CI board eligibility without formal fellowship training through 2025. This means that physicians who aim to become board-certified in CI will be able to qualify to sit for the board examination by time working in the field or completing "non-traditional" training, the latter of which may consist of a master's degree from universities with programs approved by the ABPM. This includes our online Master of Science (MS) in Health & Clinical Informatics at Oregon Health & Science University.

Our MS program can be an excellent way to acquire the knowledge and skills for CI practice, especially when an internship or capstone project is pursued that provides experience in real-world CI projects and complements online coursework. The program has a process to pursue and obtain credit for such internship or capstone projects, including in remote settings. For more information about the program and applying, visit our Web site or contact our Admissions Coordinator.

OHSU also offers an ACGME-accredited Clinical Informatics Fellowship that leads to board eligibility as well, which also includes the option of obtaining an MS degree.

Finally, we note that the OHSU Biomedical Informatics Graduate Program is open to all students who are eligible for graduate study (i.e., have a baccalaureate degree), and not only physicians. Our students come from many different backgrounds and our 800+ alumni work in many different careers in healthcare systems, industry, research institutes, government, and more.

March 10, 2022

Department Chair William Hersh Elected to Honorific Computer Science Academy

William Hersh, MD, Professor and Chair of the Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE), has been elected to the SIGIR Academy.

The Special Interest Group on Information Retrieval (SIGIR) is part of the Association for Computing Machinery (ACM), which is the academic society for the field of computer science. SIGIR focuses on research and development of information retrieval (IR, also know as search) systems. Dr. Hersh's research over the decades has focused on IR methods applied in biomedicine.

Dr. Hersh is also an elected member of the national (American College of Medical Informatics, ACMI) and international (International Academy of Health Sciences Informatics, IAHSI) honorific societies for the field of biomedical and health informatics. He currently serves as President of IAHSI.

Dr. Hersh's research accomplishments include 167 peer-reviewed papers, with a Google Scholar H-index of 74 that ranks 25th all-time among IR researchers. He is author of the book, Information Retrieval: A Biomedical and Health Perspective (4th edition, Springer, 2020). Dr. Hersh has organized a number of challenge evaluations in the biomedical domain under the guise of the Text Retrieval Conference (TREC). His current research, funded by an R01 grant from the National Library of Medicine, focuses on IR methods applied to EHR data for use in cohort discovery.

Dr. Hersh will be inducted into the SIGIR Academy at the SIGIR 2022 meeting in Madrid, Spain this summer.

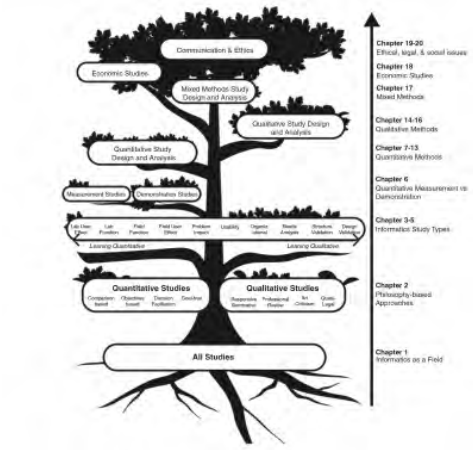
February 28, 2022

Department Faculty Joan Ash Co-Authors New Book on Evaluation Methods in Biomedical and Health Informatics

Joan Ash, PhD, Professor, Department of Medical Informatics & Clinical Epidemiology (DMICE) is co-author of the new 3rd edition of the book, *Evaluation Methods in Biomedical and Health Informatics*. Published in the Spring Health Informatics Series, the new volume is a major update of the 2006 2nd edition that has been cited over 1000 times. The photo shows Dr. Ash holding the book, which is also available as an e-book. Her co-authors include Charles Friedman, PhD of the University of Michigan and Jeremy Wyatt, MD of the University of Southampton.

Some significant changes in the 3rd edition include:

- First and foremost, the addition of Dr. Ash as a co-author, who amplified the coverage in her area of expertise in qualitative evaluation methods applied to biomedical and health informatics research
- New chapters on study examples, study planning, studies using real world data, and mixed methods studies
- Extensive revisions of 2nd edition chapters to clarify points that students have found to be challenging
- Updated references and examples, while preserving a focus on classic studies that are also good teaching cases
- Hyperlinking in the online version
- A metaphoric “Tree of Evaluation” that organizes the content of the book (see below)



The 3rd edition shares with its predecessors a primary intended use as a textbook. To this end, each chapter includes learning objectives, examples and scenarios, self-test problems with answers, and "Food for Thought" questions. Learners at institutions with Springer site licenses such as OHSU can access the online edition free of charge.

Dr. Ash notes, "We hope this volume proves to be a useful addition to our field, and in particular a valuable resource to our learners."

DMICE Chair William Hersh, MD adds, "Evaluation is a critical aspect of the work of academic biomedical and health informatics, as we must know if, how, and why informatics interventions improve outcomes for patients, clinicians, technologists, and society. This book is an encyclopedia of the various methods used to better understand the impact of informatics." Dr. Hersh also has a book on the topic of information retrieval in the Springer Health Informatics series.

February 1, 2022

Applied Data Science and Machine Learning Course to Continue for OHSU Health & Clinical Informatics Major

We are pleased to announce that the course, *Applied Data Science and Machine Learning*, will be offered again in the Oregon Health & Science University (OHSU) Spring Quarter of 2022. The course, which now has the official OHSU course number BMI 527/627, is designed for students in the Health & Clinical Informatics (HCIN) Major of the OHSU Biomedical Informatics Graduate Program.

The course provides an overview of the application of data science, machine learning, and artificial intelligence (AI) in health care settings. Students are introduced to a wide range of machine learning topics, including identifying health care issues that can be addressed with

machine learning solutions, machine learning model development and data source identification, machine learning model implementation, critical appraisal of machine learning literature, and ethical considerations for the application of machine learning and AI in health care. Students also identify an issue in health and develop their own machine learning model to address this issue. With some constraints, they are welcome to use their own data set.

The course is particularly aimed at HCIN students who will need to implement and critically evaluate the impact of AI systems in health care. It is designed for those who may not have the math background that is required to develop machine learning applications. The course has a prerequisite of BMI 540, which covers computer science and Python programming.

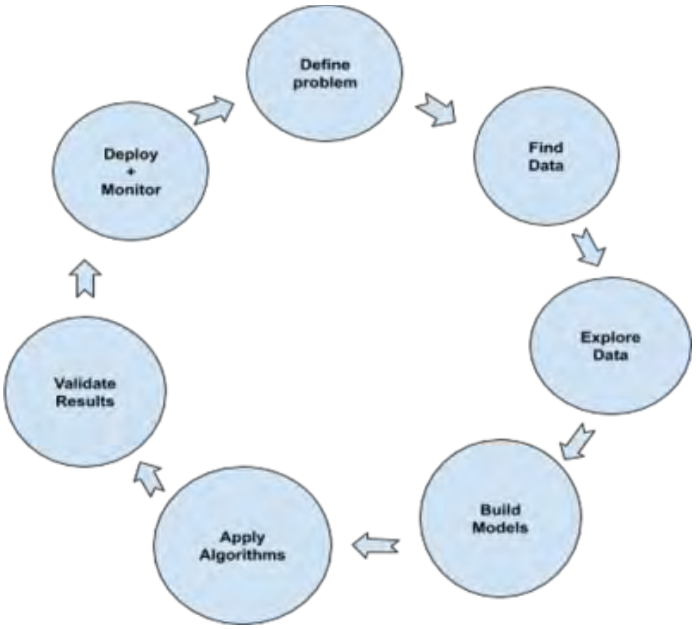
The topical outline of BMI 527/627 includes:

- Overview of biomedical data science
- Overview of biostatistics, machine learning and artificial intelligence
- Critical assessment of machine learning literature – both development and implementation
- Introduction to data sources and programming languages
- Data preparation
- Data exploration
- Using automated model development software (e.g., RapidMiner or Orange) to evaluate strengths and weaknesses of different machine learning algorithms (e.g., kNN, logistic regression, decision trees, random forest, support vector machines and simple neural networks)
- Model implementation
- Ethical considerations

Reading assignments for the course come from two volumes:

- Hoyt R and Muenchen R, Introduction to Biomedical Data Science, Lulu.com, 2019
- Hoyt R and Muenchen R, Data Preparation and Exploration: Applied to Healthcare, Lulu.com, 2019

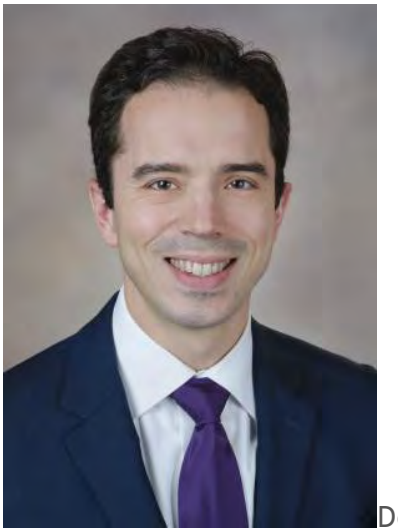
The course includes content providing programming and modeling skills development. There are weekly assignments in Python or use of automated model development software, such as RapidMiner or Orange. The course aims to give students the necessary skill development for application to each phase of the class project. The figure below depicts the model development process followed by the course.



The course will continue to be taught by Steven Chamberlin, ND and William Hersh, MD. Additional program faculty may also participate. The syllabus from the 2021 course is available.

December 21, 2021

Department Faculty and Research Highlighted in Recent Report From ONC Workshop on Write-Back APIs



Department of Medical Informatics & Clinical Epidemiology (DMICE) faculty Ben Orwoll, MD, MS, (pictured) along with research led by himself and faculty Karen Eden, PhD, were highlighted in a report from a recent academia-industry

stakeholder workshop hosted by the Office of the National Coordinator for Health Information Technology (ONC) focusing on write-back application programming interface (API) functionality using the Fast Healthcare Interoperability Resources (FHIR) standard. The workshop was organized to gather insights and experiences from leaders and researchers on the topic of writing data into the electronic health record (EHR) and other clinical information systems, with presenters representing perspectives from multiple populations that interact with the health care system. Attendees represented many of the country's foremost companies, universities, and multiple US federal agencies.

Presentations from members of the ONC including the National Coordinator Micky Tripathi, PhD opened the meeting, and were followed by several presentations from the perspectives of research (Patricia Brennan, PhD, Director, National Library of Medicine), technology (Josh Mandel, MD, Chief Architect, Microsoft Healthcare), Providers (Dr. Orwoll), Patients (Donna Cryer, JD, CEO and President, Global Liver Institute), and FinTech (Markos Zachariadis, PhD, Professor of Financial Technology and Information Systems, University of Manchester). Each presenter highlighted the potential impacts and challenges of write-back API technology on their areas as well as issues for future development and improvement. This was followed by breakout sessions and discussion among the entire group with development of specific use-case examples.

During his presentation on the provider perspective, Dr. Orwoll highlighted his and Dr. Eden's work on the MammoScreen Breast Cancer Screening App, funded by the Agency for Healthcare Research and Quality (AHRQ) as an example of the complex ways that interoperable health care applications need to interact with the EHR in the course of clinical care. MammoScreen relies on write-back API technology to allow patients to enter data into a breast cancer risk screening application for shared decision making and allows seamless integration of those data into the EHR for later review by clinicians. He also discussed extensions of current write-back technology that will hopefully allow even more and better functionality in the future.

November 4, 2021

Awards and Honors for OHSU at AMIA 2021

Informatics faculty, students, and alumni from the Oregon Health & Science University (OHSU) informatics program were delighted to attend the AMIA 2021 Annual Symposium, held in person in San Diego from October 29-November 3. The in-person conference attendance was about half its usual level due to the pandemic, but there were many presentations and awards, including a number involving OHSU faculty, students, and alumni.

The awards included OHSU informatics graduate student Sarah Florig (see right), who won the Student Paper Competition for her paper, *Chart Completion Time of Attending Physicians While Using Medical Scribes*. Her research assessed a purported benefit for the use of scribes in outpatient settings to increase completion of patient documentation by physicians. She found that there was a high level of variability among physicians and their specialties in rates of chart completion when scribes were available to them. Faculty mentors for Ms. Florig's work include Nicole Weiskopf, PhD, Jeffrey Gold, MD, and Vishnu Mohan, MD, MBI.

Recent postdoc graduate Adam Rule, PhD was a finalist for the Distinguished Paper Award for his paper, *Comparing Scribed and Non-scribed Outpatient Progress Notes.* Dr. Rule was mentored by faculty Michelle Hribar, PhD.


A program alumnus, Adam Wright, PhD (see right), now a Professor in the Department of Biomedical Informatics at Vanderbilt University, was awarded the AMIA Donald A.B. Lindberg Award for Innovation in Informatics. Of note, DMICE Chair William Hersh, MD won this award in 2008.

Finally, Joan Ash, PhD was honored as a Distinguished Fellow of the American College of Medical Informatics (ACMI), the honorific society for the academic informatics field.

"It was so wonderful to be back in person with our best professional colleagues and friends for the first time in nearly two years," said Dr. Hersh. "I am also proud of the awards won by our faculty, students, and alumni."

OHSU also hosted its usual Dessert Reception, with 18 faculty, students, and alumni in attendance shown in the group photo below.

Below is a list of all presentations by OHSU faculty and students at the conference.

Friday October 29
Steven Chamberlin, ND, MS
Teaching applied data science and machine learning model development and implementation to health and clinical informatics students

Saturday, October 30
Nicole Weiskopf, PhD
Exploring mechanisms to examine racial biases within a LHS framework
William Hersh, MD
10×10 with OHSU In-person Session (10×10 students only)

Sunday, October 31
Sarah Florig
Chart Completion Time of Attending Physicians While Using Medical Scribes
Wei-Chun Lin, MD
Extraction of Active Medications and Adherence Using Natural Language Processing for Glaucoma Patients
Adam Rule, PhD
Comparing Scribed and Non-scribed Outpatient Progress Notes

Monday, November 1
William Hersh, MD
Panel – Career Development Issues for Women in Biomedical Informatics within Professional Organizations

Tuesday, November 2
David Dorr, MD, MS
Panel – Stewardship Considerations in the Development and Implementation of Shareable SMART on FHIR Applications: Case Studies on Multiple Chronic Condition Care Planning and Chronic Pain Management

Wednesday, November 3
Benjamin Collins, MD
Examining the Sociotechnical Process of Clinical Photography to Encourage Photo Diversity in Medical Education

September 10,2021

Clinical Informatics Fellows Play Pivotal Role in Provider Redeployment Training as Part of Oregon's COVID-19 Surge Response

Authors: Da Jin, MD; Roheet Kakaday, MD (@thebiopsy); Sunil Samuel, MBBS, MBA (@sunylsam); Chengda Zhang, MD; Vishnu Mohan, MD, MBI; Jeff Gold, MD (@ohsupulmccm, @jgold10529jeff)

As the COVID-19 pandemic surged in the United States in the summer of 2021, by mid-August many regions faced soaring COVID-19 hospitalizations, primarily driven by the Delta variant. Oregon was predicted to have a shortage of 400-500 hospital beds by the peak of this surge. When hospitalizations rose, first in southern and eastern regions of the state, OHSU activated the Emergency Operations Center (EOC) to rapidly implement surge plans to address the influx of patients into Oregon's only academic medical center. Part of this plan included the redeployment of providers into acute care and critical care areas.

It became quickly clear that these redeployed providers needed to be ready to effectively take care of COVID-19 patients from day one and a key element to ensuring their success would be their ability to use the EHR efficiently. This necessitated training them to best use the EHR, within the context of the workflows that they would encounter in the clinical care setting.

Dr. Jeff Gold, former Director of OHSU's Simulation Center and lead investigator of a research team that has extensively used high-fidelity simulations to investigate EHR use, rapidly galvanized into action with a plan to quickly train outpatient internists for the care of

hospitalized patients – a task that some internists have not done for a while. And to achieve this goal, an interdisciplinary team of clinicians, EHR trainers, and clinical informatics fellows were assembled.

“The clinical informatics fellowship at OHSU is a subspecialty of all medical specialties, and since the program was accredited by ACGME in 2014 our fellows have participated in many operational informatics projects at OHSU. But the COVID-19 pandemic has placed some unique stresses on the system, and CI fellows have risen to the challenge to help OHSU fight the pandemic.” said Dr. Vishnu Mohan, program director of the OHSU Clinical Informatics (CI) Fellowship.

The team included CI fellows Dr. Da Jin and Dr. Roheet Kakaday, NLM fellow Dr. Sunil Samuel, senior certified Epic trainers Jane Coffey and Gretchen Scholl, and educational instructional designer Katherine Forney. They quickly developed and delivered training materials in collaboration with OHSU’s Healthcare Epic Applications Training (HEAT) team led by Cassaundra Adams-Murphy. They established learning objectives in partnership with subject matter experts in the Division of Hospital Medicine, developed lesson plans and educational materials for in-person training sessions, and deployed an entirely asynchronous online virtual training program.

Given the success of the acute care training for internists, the Department of Anesthesiology and Perioperative Medicine approached the team with a request to train Certified Registered Nurse Anesthetists (CRNAs) on critical care workflows. OHSU was quickly preparing to convert the Post Anesthesia Care Unit (PACU) into an intensive care unit (ICU) within five days. CRNAs are advanced practice nurse providers who provide anesthesia care to surgical patients, but many of them have had prior experience in the ICU as nurses. Over the next few days, the same team, along with ACGME Clinical Informatics fellow Dr. Chengda Zhang, crafted new learning objectives for this unique cohort of learners, as well as additional lesson plans and educational materials for in-person training sessions and online video modules. The training focused on practical use of EHR in simulated ICU patients, covering efficient information retrieval, user interface customization, and strategies to ensure ICU patient safety. These sessions were then offered daily for a week.

The attendees from these training sessions unanimously rated them as “very” or “extremely” useful. Most attendees report that the training sessions prepared them for new workflows. These sessions continue to be offered through the surge, to support our healthcare staff at OHSU in service of Oregonians across the state.

September 9, 2021

OHSU Informatics Researchers Team with Mayo Clinic and UTHealth on New Grant to Advance Patient Cohort Discovery

Many clinical research studies fail to reach patient enrollment goals, leading to their not enrolling sufficient numbers to meet study goals or achieve adequate statistical power. One way to increase enrollment is identify individuals who might be candidates for such studies by processing the data in their electronic health record (EHR). This research problem has driven the work of two Department of Medical Informatics & Clinical Epidemiology (DMICE) faculty – Steven Bedrick, PhD, Associate Professor and William Hersh, MD, Professor – who have been collaborating with colleagues from Mayo Clinic (Hongfang Liu, PhD) and University of Texas Houston Health Science Center at Houston (Kirk Roberts, PhD).

These researchers were recently awarded a 5-year, $3 million grant from the National Library of Medicine (NLM) to develop and evaluate new methods to identify patient cohorts for clinical research studies based on patient data in the EHR. The new grant builds on their previous work and adds a new dimension to make their methods more generalizable across institutions by adhering to the data being in a common data model. While actual patient data will not leave the premises of the participating institutions, each will maintain their own data in the Observational Medical Outcomes Partnership (OMOP) Common Data Model so that algorithms can be developed and trained in a more generalizable manner.

Once the foundational systems and OMOP-formatted data are in place, each site will use common information queries and evaluate the output of their systems internally. Different methods, including those applying machine learning, will be applied across the different sites and compared for their efficacy. Other sites will be able to implement, train, and use these models at their own sites.

This work started a decade ago, when Dr. Hersh and others used a small set de-identified records in the Text Retrieval Conference (TREC) challenge evaluation sponsored by the National Institute for Standards and Technology (NIST).(1) This led to the initial NLM grant, which increased the size of the collection and resulted in publications from Mayo Clinic(2) and Oregon Health & Science University.(3)

Drs. Roberts and Hersh continue to lead other TREC challenge evaluations, such as this year's TREC 2021 Clinical Trials Trackthat uses patient data for a clinical trials search task. In this effort, the search topics are (synthetic) patient descriptions and the retrieval corpus is a large set of clinical trial descriptions from ClinicalTrials.Gov.

References

1. Voorhees EM, Hersh W. Overview of the TREC 2012 Medical Records Track. In: The Twenty-First Text REtrieval Conference (TREC 2012) Proceedings. 2012.
2. Wang Y, Wen A, Liu S, Hersh W, Bedrick S, Liu H. Test collections for electronic health record-based clinical information retrieval. JAMIA Open. 2019 Oct 1;2(3):360–8.
3. Chamberlin SR, Bedrick SD, Cohen AM, Wang Y, Wen A, Liu S, et al. Evaluation of patient-level retrieval from electronic health record data for a cohort discovery task. JAMIA Open. 2020 Oct;3(3):395–404.

July 20, 2021

Department NLM Postdoc and Faculty Publish Ten-Year Study of Note Bloat

A postdoc and several faculty from the Department of Medical Informatics & Clinical Epidemiology (DMICE) at Oregon Health & Science University (OHSU) recently confirmed what many clinicians have long suspected: *clinical notes are getting longer*. In a study of nearly 3 million notes written across a decade, the team found outpatient progress notes written at OHSU grew 60% longer between 2009 and 2018, reaching an average length of 650 words by 2018.

After nearly every outpatient encounter, clinicians write a progress note describing the visit. The primary purpose of these notes is to tell clinicians taking care of the same patient in the future what happened during the visit, though such notes are now used for a variety of other purposes such as to justify billing or provide data for quality improvement.

Many clinicians have observed that clinical notes seem to be getting longer over time, a phenomena widely referred to as “note bloat”. Some have suggested that note bloat may be the result of overly prescriptive documentation requirements or the widespread use of tools such as copy-paste to write notes in electronic health records. Yet, according to the team’s paper, the reasons for note bloat may be more complex.

Looking at notes written in 2018, the team found only 30% of text in the typical note had been manually written, with 56% coming from note templates and just 14% from copy-paste. While notes that had more of their text come from templates and copy-pasting tended to be longer, medical trainees (i.e., residents and fellows) and more recent hires also wrote longer notes. For example, after controlling for other factors, clinicians hired in 2018 were found to write notes that were 26% longer than those written by clinicians hired in 2005.

These findings provide quantitative evidence for the widely observed but poorly measured phenomena of note bloat. While longer notes may provide useful information about a patient's care, there is concern that many notes may be full of unnecessary text included primarily to meet billing or regulatory requirements. Some notes may now be too long for providers to meaningfully review during already packed clinic days. However, recent changes to regulation—such as the Center for Medicare and Medicaid Services reducing their documentation requirements for outpatient visits—may be providing clinicians with an opportunity to rethink what they include in their notes.

See the team's paper in JAMA Network Open for full details.

We are also pleased to report that the lead author of the paper, Adam Rule, PhD, recently finished his two-year postdoctoral fellowship with DMICE, funded by our National Library of Medicine T15 training grant. Dr. Rule will be joining the Information School at the University of Wisconsin-Madison as an assistant professor this fall.

July 1, 2021

Clinical Informatics Fellow Da Jin, MD Awarded Fellowship in Diagnostic Excellence by Society to Improve Diagnosis in Medicine

 One of our Oregon Health & Science University (OHSU) Clinical Informatics Fellows, Da Jin, MD, has been selected as a Fellow in Diagnostic Excellence by the Society to Improve Diagnosis in Medicine.

Dr. Jin is one of 8 fellows selected nationally, and she is one of 3 fellows to be selected for funding through the Gordon and Betty Moore Foundation. The funding includes a $35,000

stipend that can used towards tuition, project expenses, and salary, as well as travel expenses to the Diagnostic Error in Medicine Conference.

This fellowship will complement her OHSU Clinical Informatics fellowship. Her didactic and research project will focus on reducing diagnostic error. Dr. Jin's particular research project will focus on the use of analytics and machine learning to identify opportunities to diagnose cardiovascular disease in patients who present with symptoms that are "atypical" – applying informatics knowledge and skills toward a real-world clinical problem.

Dr. Jin will also make connections with the other SIDM fellows and also with research faculty from other institutions, which will help broaden her network.

June 4, 2021

Congratulations to 2021 Graduates of the OHSU Biomedical Informatics Graduate Program

Congratulations to this year's graduates of the OHSU Biomedical Informatics Graduate Program! The OHSU Convocation and Hooding Ceremony will again be virtual this year and take place on Sunday June 6, 2021. The virtual ceremony can be joined that day at 10 am Pacific time. After the university-wide Convocation at 10 am and the School of Medicine Hooding Ceremony at 11 am, the Department of Medical Informatics & Clinical Epidemiology (DMICE) will host an informal gathering for graduates and their families and friends along with other faculty, staff, and students. Details have been provided in an email from Program Coordinator Diane Doctor. There is also a pre-recorded message to graduates from Program Director, Dr. William Hersh (transcript available in his blog).

This year, we have 33 graduates joining our program alumni. Since the inception of the program in 1996, we have awarded 905 degrees and certificates to 815 people. We are proud of all graduates who have gone on to prominent positions in academia, industry, government, and other settings.

Here are the 2021 graduates with their respective thesis or capstone topics:


Some of our 2021 graduates from left to right; top to bottom: Patty Langasek, Daniel Sobieski, Jennifer Rosenbaum, Suku George; Bryan McConomy; Rick Mah, Chionye Ossai, Chris Loo; Noah Finkel, Derek Richardson, Barrett Campbell, Amelia Drace

Doctor of Philosophy (PhD) in Biomedical Informatics

Julian A. Egger
Network-based Alternative Splicing Signatures of Drug Response in AML

Aaron S. Coyner
Machine Learning for Disease Detection and Prediction in Retinopathy of Prematurity

Joshua G. Burkhart
Reticula: A Project to Improve Reactome Tissue Specificity via Machine Learning Approaches using RNA-Seq Data

Master of Science in Bioinformatics and Computational Biomedicine

Justine V. Nguyen
Novel Discovery of Bacterial Ovarian Tumor Deubiquitinases from Primary Amino Acid Sequence

Jacob C. Gutierrez
DNA Methylation Analysis of Bicuspid Aortic Valve in Turner Syndrome

Daniel Sobieski
Knowledge Management System Development for Precision Oncology Products

Christopher P. Loo
Neoepitope Landscape in Acute Myeloid Leukemia

Patty L. Langasek
Data Quality and Investigation Practices

Dan Fischer
Leveraging Knowledge Graphs in Multi-Omic Data Visualizations

Joshua Braunstein
A Deep Learning Approach to Chromosomal Structural Variant Detection and Labeling using Hi-C Heatmaps

David P. Ross
Data visualization app for spatial transcriptomics

Master of Science in Biomedical Informatics

Samantha Lawson
Predicting Ferroptosis Susceptibility in Renal Cell Carcinoma

Eric Leung
Urinary and Vaginal Microbiome Community Structure in Women with Urgency Urinary Incontinence

Master of Science in Health and Clinical Informatics

Amelia G. Drace
A Reward System Polygenic Risk Score for Predicting Obesity and Substance Addiction

Noah Finkel
Venous Thromboembolism Prophylaxis Electronic Health Record Implementation Toolkit and Sample Project

Derek Richardson
Remote Patient Monitoring Programs to Reduce Congestive Heart Failure Readmissions with a Cost-Benefit Analysis Tool to Model Expected Economic Impacts

Caroline C. Wright
Analysis of the Feasibility of and Framework for Establishing an ACGME accredited Clinical Informatics
Fellowship at Children's National Hospital in Washington, DC

Barrett H. Campbell
Integration of Military Pediatric Immunization Records into a State Immunization Information System

Sarah T. Florig
Examining Physician Documentation Timeliness and the Use of Medical Scribes

Chionye R. Ossai
Using Publicly Available Reddit Data to Understand How Parents Choose Pediatricians

Frank Longano
Using Machine Learning to Predict Health Care Outcomes Among Patients Incarcerated in a State Correctional System

Jennifer Rosenbaum
Evaluating Efficacy of Telemedicine for Diabetes Care

Jonathan Sachs
Disparities in Telephone and Video Telehealth Engagement During the COVID-19 Pandemic

Master of Biomedical Informatics

Matthias Kochmann
The FHIR HIEdrant

Jay M. Pleyte
Optimisation of Bioinformatics Utilities at Omics Data Automation

Rick Mah
Pattern of Emergency Department Use by Short-term Geriatric Frequent Attenders

Graduate Certificate in Health and Clinical Informatics

Suku George
Jennifer Lamberg
Christopher L. Tenore
Bryan C. McConomy
Adam Rule
Tony Zhou

May 20, 2021

New Video Series Showcases Diverse Career Opportunities in Biomedical Informatics

 OHSU NLM Biomedical Informatics Training Program Director William Hersh, MD (left) and distinguished alumnus, Peter Embi, MD, MS (right)

New video series profiles unique career paths of graduates of biomedical informatics programs, including OHSU alumnus Peter Embi, MD, MS

America's biomedical informatics training programs are preparing individuals from diverse personal, educational, and professional backgrounds for a broad range of meaningful career opportunities. These opportunities enable program graduates to leverage biomedical informatics in basic research, medicine, healthcare systems, and other increasingly data-driven areas.

Among these training programs are Oregon Health & Science University (OHSU) and 15 others funded by the National Library of Medicine (NLM), including Columbia University, Harvard University, Indiana University, Rice University, Stanford University, State University of New York at Buffalo, University of California San Diego, University of Colorado, University of North Carolina Chapel Hill, University of Pittsburgh, University of Utah, University of Washington, University of Wisconsin Madison, Vanderbilt University, and Yale University.

At each program, individuals from diverse backgrounds come together for a distinct moment in time. These include computer scientists, statisticians, engineers, and data scientists who are interested in learning about and contributing to biology, medicine, and healthcare. There are also individuals from across healthcare—physicians, clinical scientists, biologists, healthcare administrators, and entrepreneurs—who want to gain data-related skills to improve health and advance their careers.

Program participants are excited to be exposed to individuals from very different backgrounds, learn together, and work collaboratively to improve health.

Yet, even as biology and medicine become more data driven, many talented people from wide-ranging backgrounds are not familiar with biomedical informatics and are not aware of the vast opportunities available for individuals with biomedical informatics training. Nils Gehlenborg, PhD, and Alexa McCray, PhD, from Harvard Medical School's Department of Biomedical Informatics, want to change that. In serving as co-principal investigators and

producers of *Connections: Career Paths in Biomedical Informatics* (http://connections.careers), they have led creation of a video series highlighting the personal and professional journeys of graduates from each of the 16 NLM training programs, including Peter Embi, MD, MS, who completed his informatics training at OHSU.

In short videos and accompanying case studies, trainees describe their backgrounds and interests, and what drew them to biomedical informatics. Each trainee discusses why they entered a biomedical informatics program, how they chose their specific program, and memorable program experiences. They detail the skills they gained, research they conducted, and the most rewarding aspects about their program—which was often getting to work with a collection of amazing colleagues.

Each participant also describes the opportunities that have transpired since completing their program, including working in research, medicine, healthcare systems, industry, entrepreneurial startups, academia, government, and more. These trainees explain what they are doing now, how they are applying their biomedical informatics training each day, and how their participation in a biomedical informatics program has affected their career path and their life.

“Our goal in creating this video series,” said Alexa McCray, “Is to inspire people from very different situations to learn what this field is all about.” Nils Gehlenborg concurred, explaining, “The video series is about showing people from diverse backgrounds who go on to very diverse places. It is about showcasing the diversity of the field, the collaborative nature of these programs, and the meaningful contributions that trainees are making.” Gehlenborg believes some students and professionals will see these videos and say, “Wow, I didn’t know this field existed. It is a perfect fit for me.”

Featured as part of this series is Peter Embi, MD, MS, who enrolled in our fellowship and master’s program in informatics after completing his residency in internal medicine at the OHSU. Peter’s master’s thesis was about the transition from paper-based documents to computer-based records. Peter went on to Cleveland Clinic for a fellowship in rheumatology while also conducting research in clinical informatics. He stayed in academia at the University of Cincinnati and then at Ohio State University as vice chair of the Department of Biomedical Informatics. While at OSU he became the country’s first CRIO—chief research information officer. In 2016, Peter was selected as president and CEO of the Regenstrief Institute. He is active on Twitter and can be found at @embimd.

Each participant in this video series is motivated by the opportunity to use data and biomedical informatics to make a positive difference in an area of personal and professional interest, which is different for each person but might be in academia, industry, or the public sector. Without exception, these individuals encourage others to join them in this exciting, collaborative field, where the possibilities are endless.

To learn more:
• View all 16 videos in the series at http://connections.careers
• See the video about Dr. Embi and his experiences at OHSU and at the Regenstrief Institute at http://connections.careers/11/
• Contact Ms. Lauren Ludwig about biomedical informatics educational programs available at OHSU, including our NLM training program

This project was funded by the National Library of Medicine Administrative Supplement Funds to the Harvard Medical School Biomedical Informatics and Data Science Training program 3T15LM007092-26S1.

May 15, 2021

International Medical Informatics Yearbook 2021: Editorial Meeting Including DMICE Editors During Pandemic (Again)

C'est la deuxième fois sur Zoom. Last year, we reported that the International Medical Informatics Association (IMIA) Yearbook meeting was virtual and as we continue to be safe in 2021 in regards to the pandemic, the editorial meeting happened again on Zoom on April 30, 2021. Before 2020, this meeting had taken place in Paris, France for a few years. As previously reported, IMIA produces a yearbook of the best medical informatics journal articles from around the world. The IMIA 2020 Yearbook was made up of 12 sections covering the different subfields of biomedical informatics and a keynote paper. In 2021, we were very fortunate to have Department of Medical Informatics & Clinical Epidemiology (DMICE) faculty and alumni editors help with the 2021 theme, Managing Pandemics with Health Informatics – Successes and Challenges. In the picture below is Kate Fultz Hollis, MS, MBI 2016, Chief Editor (all chief editors on first row); Michelle Hribar, PhD, DMICE Assistant Professor and co-editor of Human Factors (4th row left), and DMICE alumnus Damian Borbolla, MD, MS 2012, Assistant Professor University of Utah, co-editor Decision Support section (5th row bottom right).

IMIA Yearbook 2021 Editors at 4/30/2021 Meeting

As Dr. Borbolla commented during the April 30 meeting, “Starting my first Zoom meeting of the day at 6 AM, for an event I should be attending in Paris. How is your Friday going?” Yet we still had as productive a meeting as we could in the virtual environment. Some of us on the US west coast started at 4:50am and went on until 10am (Paris time 1:50pm to 7:00pm). All section presentations were lively and all editors have chosen excellent representative papers and produced survey papers for their respective sections (there are 12 sections of the Yearbook covering various specialities in medical informatics). The section editors conducted searches using PubMed, Cochrane and other sources and search data was displayed at the meeting. The editors were not surprised by the significant amount of references on the YB topic of pandemics as well as more information about research in the subject area.

The keynote paper on pandemics and working group papers for IMIA Yearbook 2021 are now available online in the eFirst website of the publisher. In addition, William Hersh, MD, DMICE Chair, is currently President of the International Academy of Health Sciences Informatics (IAHSI) and a co-author of the IAHSI report in the IMIA Yearbook eFirst website.

February 24, 2021

New Course in Applied Data Science and Machine Learning for Health & Clinical Informatics (HCIN) Students

We are pleased to announce the launching of a new course, *Applied Data Science and Machine Learning*, for Health & Clinical Informatics (HCIN) majors in our Biomedical Informatics Graduate Program. While the course will be given a general number (BMI 507/607) initially this year, it will be given a permanent number starting next year.

The goal of this new course is to provide a conceptual understanding of the application of data science and machine learning in health and clinical medicine. While the course will have some programming activity (requiring Python programming as a prerequisite), it will focus on a hands-on, high-level view of the different types of machine learning methods and their applications. It will also cover the topics of data management and exploration, pitfalls in building and deploying models, and critical appraisal of clinical machine learning literature. The course will aim to provide an in-depth understanding of the broad issues related to machine learning for both those who will develop machine learning models as well as those who will work alongside those who do. It is our intent that this course will help students understand the process of creating, implementing, and evaluating machine learning applications in health and clinical settings.

The textbook for the course will be: Hoyt, R. and Muenchen, R. (Eds.), 2019. Introduction to Biomedical Data Science, Lulu.com. The course syllabus provides further details on the topics to be covered.

The content of the course will be derived from faculty discussion as well as a survey that was distributed to students. Among the topics to be included are:

- Data sources – electronic health records, registries (e.g., N3C, AllOfUs), patient-generated, social media, public health
- Data preparation (wrangling) – cleaning, quality analysis, feature selection, de-biasing
- Exploratory data analysis – summaries, correlations, visualizations
- Machine learning approaches and models – supervised, unsupervised, reinforcement, deep learning
- Software and tools available
- Common pitfalls and misunderstandings of applying machine learning
- Critical appraisal of clinical machine learning literature
- Ethical issues and challenges

The course will culminate in a project developing and evaluating a machine learning model based on a clinical data set.

The 3-credit course will be taught in the OHSU spring academic quarter, which runs from late March to early June. The lead instructors will be Steven Chamberlin, ND and William Hersh, MD, with other department faculty contributing. As with all courses in the HCIN major, it will be mostly online and asynchronous, with some option synchronous activities (which will be recorded for those not able to attend). This course will be complementary to other data science-related courses in the HCIN major, including:

- BSTA 525/625 – Introduction to Biostatistics

- BMI 540/640 – Computer Science and Programming for Clinical Informatics
- BMI 544/644 – Databases
- BMI 524/624 – Data Analytics for Healthcare
- BMI 516/616 – Standards/Interoperability in Healthcare
- BMI 537/637 – Healthcare Quality
- BMI 525/625 – Principles and Practice of Data Visualization

The course is not meant to be a substitute for the sequence of courses available in the other major in our program, Bioinformatics & Computational Biomedicine (BCB), whose offerings include:

- BMI 551/651 – Statistical Methods
- BMI 531/631 – Probability and Statistical Inference
- BMI 543/643 – Machine Learning
- BMI 525/625 – Principles and Practice of Data Visualization
- (Course Number TBD) Data Science Programming

(All of these courses are described further in our online course catalog.)

The BCB courses are focused on more technical aspects of data science, as well as applications within genomics and computational biology. We anticipate that there will be students in both majors who will take this new course, and will be inspired to take further technical courses in the BCB sequence.

January 25, 2021

Sophiya Rajbhandari Awarded 2020-2021 Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Endowed Scholarship for Biomedical Informatics

 The OHSU Biomedical Informatics Graduate Program is pleased to announce that the *2020-2021 Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Endowed Scholarship for Biomedical Informatics* has been awarded to Sophiya Rajbhandari. Ms. Rajbhandari is a first-year student in the Bioinformatics & Computational Biomedicine Major of the Master of Science program. Her project for the scholarship will focus on the use of controlled terminology and machine learning for maintenance of health and early detection of disease.

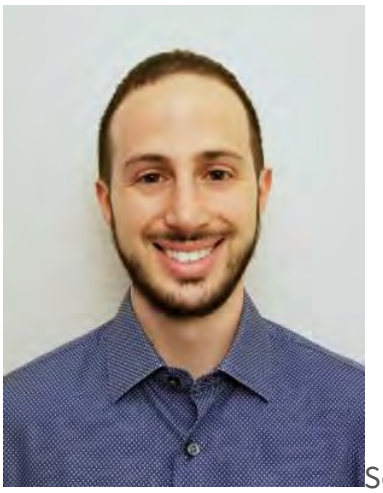
Ms. Rajbhandari is originally from Kathmandu, Nepal, and was awarded a BS in Biotechnology from Purbanchal University in 2017. Her undergraduate research thesis focused on methodology to minimize carbon footprint by recycling urban debris as biochar integrated biofertilizer. Following her graduation, she briefly worked as a Research Assistant at a Biotech firm in Kathmandu. She relocated to the US in late 2017. Her general research interests lie in applying predictive capabilities of machine learning to healthcare sector, in particular disease diagnosis and prognosis. Sophiya loves dogs and enjoys watching animal videos in her spare time.

The previous recipients of the scholarship have both obtained their Master of Science degrees and graduated from the program: Raja Cholan (2019) and Patty Langasek (2020).

November 12, 2020

Clinical Informatics Fellow Wins Award in OHSU Invent-a-thon

The Department of Medical Informatics & Clinical Epidemiology (DMICE) was a co-sponsor of the OHSU Invent-a-thon, a virtual health care hackathon. Developed in partnership with MIT Hacking Medicine and supported by over 50 academic and industry partners, the OHSU Invent-a-thon convened innovators from industry and health care, to identify the biggest problems in delivering health care and think outside traditionally siloed research facilities and industries to develop innovative solutions.

 Several DMICE students and fellows took part. One was Jonathan Sachs, MD, MPH, Clinical Informatics Fellow. Dr. Sachs reported the following:

At the end of October, I joined hundreds of others from around the world at the OHSU/MIT Invent-a-thon. We were all united by a desire to innovate solutions to modern day healthcare problems. This particular event was unique in that it was entirely virtual – the original Inventathon was scheduled for April in-person. The organizers did a fantastic job putting the entire conference online.

The entire conference took place from Friday evening to Sunday afternoon. I had not previously experienced a Hackathon, and I didn't expect the intense situation I was about to find myself in. After the opening talks, we joined one of four tracks. I had applied to be in the chronic disease track because of my background in public health, and because it drives so many of the care challenges faced by healthcare organizations in today's world. The problem pitches started, where individuals had only a minute or two to explain a healthcare issue that required creative solutions.

I decided to pitch the problem of seniors and telehealth access. The COVID-19 pandemic has forced healthcare providers to find new ways of reaching patients, and telehealth was a natural solution. However, many patients have trouble accessing it. Seniors especially can experience barriers that range from a lack of computer or smartphone ownership, tech literacy, a lack of social support, and impaired vision or hearing.

After the problem pitches, I was approached virtually by a diverse group of folks interested in working on the topic. Our team ended up as an incredible group of physicians, healthcare quality experts, health marketers, and entrepreneurs. Over the next 12 hours (literally, as we worked late into the night) honing our problem and crafting a potential solution. We decided to focus our efforts on asynchronous communication between providers and patients. Typically, a patient can log in to a patient portal and send electronic messages to their established providers, who can write back. This type of communication is meant for low acuity discussions of symptoms and management that do not necessitate a full appointment.

The hope is that regular communication with a provider can prevent patients from delaying their care and/or ending up in an emergency room.

Our team came up with the idea of a voice assistant skill for a platform such as Alexa, Google, or Siri. It essentially would act as a voice interface for the patient portal, such as Epic's MyChart. A patient at home could ask Alexa to send a message to their doctor, which would then be transcribed and sent to the provider's inbox. The software would then be able to read the provider's response back to the patient. Further on, the product could be expanded to include other functions of the patient portal, such as making appointments and checking lab results.

Over Saturday night and Sunday morning, we met with multiple mentors to help us with our pitch. These were industry and academic experts that were chosen to connect with us based on our topic. We received some excellent advice and cautions about some of the barriers we would expect in development. At the same time, we grinded away on research, script writing, and PowerPoint designing over multiple-hour video conferences. I can't stress enough about how impressed I was with our team's dedication.

Sunday afternoon arrived. We had 3 minutes to present. One second longer, and we would be cut off coldly by the moderator. Nervousness was apparent but our confidence was boosted by one simple fact – we were incredibly well prepared. We had practiced our scripts and pre-written answers to several expected questions from the judges. Our slide deck was fantastic and our team did a great job in their voiceovers. We even had an Oscar-worthy performance by our British teammate who played the part of the voice assistant.

ASK: Asynchronous Senior Kare
A voice interface for the patient portal that empowers older adults to take charge of their own healthcare

Our pitch ended up winning second place in the chronic disease track. All of us were thrilled that our hard work had paid off. We definitely want to take this idea further and are continuing to meet on a regular basis. I came away from the weekend exhausted but thrilled to have taken part. I'm already looking forward to the next hackathon.

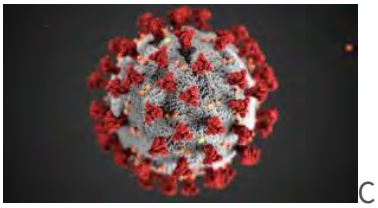
Another DMICE participant was Benjamin Collins, MD, also a Clinical Informatics Fellow. Dr. Collins reported the following:

The OHSU Invent-a-thon was a virtual blast! It provided a great learning experience on top of being an engaging event. The weekend was packed with great ideas and efficient productivity by people coming together online from many locations and all walks of life. And these weren't simply aimless ideas. They addressed real problems of importance with actual, potential solutions.

Participants formed groups and worked diligently on problems of surgical care, rural health, chronic disease management, and early disease detection. I participated in the chronic disease tack and joined a group aiming to improve health literacy as an avenue to better chronic disease care. Our group of six included a neurology, anesthesiologist, pharmacist, engineer, and a biochemist, in addition to myself, a clinical informatics fellow. We came together to tackle the problem of insufficient health literacy with enthusiasm. We were guided by excellent mentors with a breadth of different experiences. During the weekend, I pushed the limits of my knowledge as an informatics fellow, learning and growing from the experience. By the end I came away with more concrete knowledge about the business of informatics and health policy that will certainly aid me in my future career.

October 22, 2020

Papers in the Pandemic: 2020 Informatics Publications from DMICE


CDC image of novel coronavirus

The COVID-19 pandemic of 2020 has been a major public health problem and a tremendous disruption to many academic fields, including biomedical informatics. However, Department of Medical Informatics & Clinical Epidemiology (DMICE) faculty and trainees have been very productive during the move to virtual work and this post shares some papers and conference proceedings with comments from the authors who have published them.

Hribar M, Dusek HL, Goldstein IH, Rule A, Chiang MF. Documentation Composition and Efficiency During Scribed and Non Scribed Ophthalmology Visits. Investigative Ophthalmology & Visual Science. 2020;61(7):1587.

Prof. Michelle Hribar notes, “This was a poster abstract for a conference that was cancelled because of the pandemic! The conference was held virtually, but the poster sessions were asynchronous and I opted not to participate. Many of us had to forgo traveling to conferences and instead presented papers and posters in virtual conferences (using Zoom, WebEx, or other video interfaces).” Prof. Hribar also had an AMIA Symposium paper written at the start of the pandemic but wound up having extra time to revise it because conference submission deadlines were delayed: *Hribar MR, Dusek HL, Goldstein IH, Rule A, Chiang MF. Methods for Large-Scale Quantitative Analysis of Scribe Impacts on Clinical Documentation. AMIA Annual Symposium Proceedings 2020. To appear.*

Womack DM, Hribar MR, Steege LM, Vuckovic NH, Eldredge DH, Gorman PN. Registered Nurse Strain Detection Using Ambient Data: An Exploratory Study of Underutilized Operational Data Streams in the Hospital Workplace. Applied Clinical Informatics. 2020;11(4):598-605.

Prof. Dana Womack states that she "used early days of the pandemic to complete a paper that has been in draft form for some time. The 'new normal' of remote work has set in, but even that has hidden benefits of reduced time commuting that can be leveraged to advance work."

Cohen AM, Chamberlin S, Deloughery T, Nguyen M, Bedrick S, Meninger S, Ko JJ, Amin JJ, Wei AJ, Hersh WR. Detecting rare diseases in electronic health records using machine learning and knowledge engineering: Case study of acute hepatic porphyria. PLoS ONE. 2020;15(7):e0235574.

Prof. Aaron Cohen remarked about his PLoS ONE paper, "Our work on detecting undiagnosed patients with the rare disease acute hepatic porphyria (AHP) using the electronic health record is just the 'tip of the iceberg' in using the EHR in novel ways to improve clinical care. In the future, we will extend this method to more rare diseases that often remain undiagnosed until young adulthood or later."

Chamberlin S, Bedrick S, Cohen A, Wang Y, Wen A, Liu H, Hersh W. Evaluation of patient-level retrieval from electronic health record data for a cohort discovery task. JAMIA Open. 2020:ooaa026.

Chamberlin SR, Bedrick SD, Cohen AM, Wang Y, Wen A, Liu S, Liu H, Hersh W. A query taxonomy describes performance of patient-level retrieval from electronic health record data. CEUR Workshop Proceedings. 2020;2551(June):27-33.

Several DMICE faculty collaborated on these publications, and senior author and Prof. William Hersh noted, "Many academic medical centers offer EHR-based patient cohort discovery tools to their researchers, yet the performance of systems for this use is not well characterized. The objective of our research is to assess patient-level information retrieval methods using EHRs for different types of cohort definition retrieval."

When ask about publishing during the pandemic, Postdoc Steve Chamberlin said, "I didn't find it that much different! Our work is all data related and somewhat 'virtual' anyway. Half of our co-authors work at Mayo Clinic so our interactions have always been virtual. But these projects did start before (the pandemic), then ended once the pandemic had started. It is interesting the taxonomy paper was presented at the Web2020 conference I believe in the end of January, so we still traveled there to present live in Houston. But there were already presenters that could not show up because of the travel restrictions that had already started at that time.

Hersh W. Information Retrieval: A Biomedical and Health Perspective. Switzerland AG: Springer; 2020.

Prof. Hersh also saw the publication of the fourth edition of his textbook on information retrieval, noting, “I had been working on the book since late 2019 and fortunately was able to complete the writing early on in the pandemic, and then went through the usual proof and production process with the publisher, with the book published in September.”

There are a number of other papers and conference proceedings whose authors included since the pandemic began. Among these include:

Ash JS, Chase D, Baron S, Filios MS, Shiffman RN, Marovich S, et al. Clinical Decision Support for Worker Health: A Five-Site Qualitative Needs Assessment in Primary Care Settings. *Applied Clinical Informatics*. 2020;11(4):635-43.

Ash JS, Corby S, Mohan V, Solberg N, Becton J, Bergstrom R, Orwoll B, Hoekstra C, Gold JA. Safe use of the EHR by medical scribes: A qualitative study. *Journal of the American Medical Informatics Association*. In press.

Haendel MA, Chute CG, Gersing K. The National COVID Cohort Collaborative (N3C): Rationale, Design, Infrastructure, and Deployment. Journal of the American Medical Informatics Association. 2020: ocaa196.

Hollis KF, Roberts K, Bedrick S, Hersh WR. Addressing the Search Challenges of Precision Medicine with Information Retrieval Systems and Physician Readers. *Studies in Health Technology and Informatics*. 2020;270:813-7.

Roberts K, Alam T, Bedrick S, Demner-Fushman D, Lo K, Soboroff I, Voorhees E, Wang LL, Hersh WR. TREC-COVID: rationale and structure of an information retrieval shared task for COVID-19. Journal of the American Medical Informatics Association : JAMIA. 2020;27(9):1431-6.

Vasilevsky N, Hosseini M, Teplitzky S, Ilik V, Mohammadi E, Schneider J, et al. Is authorship sufficient for today’s collaborative research? A call for contributor roles. *Accountability in Research*. 2020:1-21.

Womack DM, Warren C, Hayes M, Stoyles S, Eldredge DH. Evaluation of Electronic Health Record AQ1 –Generated Work Intensity Scores and Nurse Perceptions of Workload Appropriateness. *Computers in Nursing*. 2020; in press.

The clinical epidemiology half of DMICE has also been highly productive and will be profiled in a future posting.

October 20, 2020

Come One, Come All to Study Informatics at Oregon Health & Science University

Student recruitment for academic programs in 2020 has gone mostly virtual due to the COVID-19 pandemic. As such, many universities have created videos to inform prospective students about their programs, including Oregon Health & Science University (OHSU).

Our Master of Science (MS) program offers thesis and non-thesis options for two majors: Health & Clinical Informatics and Bioinformatics & Computational Biomedicine. This program trains individuals to pursue a wide variety of professional careers in healthcare, industry, research, public health, and other settings.

The OHSU Biomedical Informatics PhD program prepares individuals for careers in research also in two areas: Health & Clinical Informatics and Bioinformatics & Computational Biomedicine. Most students in the program are supported through our NIH National Library of Medicine T15 Training Grant. (This training grant also offers funded postdoc positions for those seeking research careers who already have a doctoral degree in other field.)

Our Clinical Informatics Subspecialty Fellowship trains physicians aiming to become board-certified in the new subspecialty of clinical informatics. The ACGME-accredited fellowship requires certification in a primary specialty and offers the option of pursuing the MS degree.

OHSU also offers continuing education, both in a continuing-education annual update (with CME and MOC-II for physicians) and at the introductory level in the 10×10 program in partnership with the American Medical Informatics Association (AMIA).

All of these programs are part of the biomedical informatics education family of programs at OHSU. These videos are on our YouTube channel, which also includes videos of presentations at our weekly research seminar, which has also continued during the pandemic.

October 24, 2020

DMICE Faculty Help Lead Development of National COVID Cohort Collaborative (N3C) Data Resource

Two faculty in the Department of Medical Informatics & Clinical Epidemiology (DMICE), Professor Melissa Haendel, PhD and new Instructor Anita Walden, MS, are among the leaders of the National COVID Cohort Collaborative (N3C), an open-science community focused on analyzing patient-level data from many clinical centers to reveal patterns in COVID-19 patients. The grand opening of the N3C Data Enclave took place in the first week of September 2020. To create N3C, all parties involved had to overcome technical, regulatory, policy, and governance barriers to sharing patient-level clinical data from many institutions. In months, they developed solutions to acquire and harmonize data across organizations and created a secure data environment to enable transparent and reproducible collaborative research.


DMICE Instructor Anita Walden, MS

The N3C Data Enclave supports collaborative analytics across a broad range of clinical and translational domains related to COVID-19 infection, such as acute kidney injury, diabetes, pregnancy, cancer, immunosuppression, social determinants of health, and many other conditions to target mechanism, drug discovery, and best care practices for COVID-19. Currently, the Enclave contains 304,000 persons and 25,905 COVID-19 cases documented from 11,000 visits, with these numbers growing rapidly given the 59 clinical centers that have now signed regulatory agreements to submit their data. This effort has approximately 900 members across 260 organizations in 47 states and 14 countries, according to Ms. Walden. She also noted, “people with various expertise and experience coming together to collaborate on such an effort is one of the most significant examples of team science and is remarkable to witness.”

Dr. Haendel remarked, “The regulatory work (and data harmonization) was such a lift that we often were not sure if we would be able to make N3C happen. So it is very exciting to finally be able to provide critical data access to everyone.”

OHSU Chief Research Information Officer and DMICE Professor David Dorr, MD, MS described the advantages of N3C, “One of the most appealing aspects of N3C is the ability to get synthetic data extracts to train models that then can be used to improve our understanding of the disease; these models can then be tested and applied both within the Enclave and even at local health systems to predict outcomes and reduce the harm from this terrible pandemic.”

The N3C Data Enclave is anticipated to be one of the largest collections of data on COVID-19 patients in the United States. Data analysis within the Enclave is supported by a myriad of tools such as R, Python, the most widely used open-source platforms for statistical analysis and data science (Watch a demonstration of the platform). Researchers requesting access to, or working within, the enclave are encouraged to assemble collaborative teams with diverse expertise in such areas as clinical research, statistical analysis, and informatics to make the best use of the N3C Data Enclave. “One of the most exciting things about the N3C Enclave is its ability to track the provenance and contributions, and thereby provide robust attribution to all,” said Prof. Haendel. This is especially nice for early-career and non-traditional contributors.

Researchers interested in accessing the data will need to register with N3C and submit a Data Use Request for review by the N3C Data Access Committee. Learn more about the process and requirements, including data security training, for data access.

July 8, 2020

DMICE Researchers Publish Application of Machine Learning to Detection of Rare Disease

A group of researchers from the OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE), collaborating with clinical experts, has demonstrated an approach to detect possible cases of a rare disease by applying machine learning to patient data in the electronic health record (EHR). The approach developed has potential applicability to additional rare diseases that are often not diagnosed in a timely manner. The initial application of the methodology to one rare disease, acute hepatic porphyria (AHP), has been described in a paper published (this week) in the journal, PLoS ONE.

Occurring in about 1 per 200,000 people, AHP is characterized by a triad of intermittent and severe abdominal pain, neurological dysfunction, and psychiatric disturbances. Because the disease is uncommon, and the symptoms non-specific, diagnosis is often delayed and sometimes never made. Recently, a highly effective new treatment has become available, giving more impetus to identifying all patients with the disease.

Led by Aaron Cohen, MD, MS, professor of medical informatics and clinical epidemiology, the researchers applied machine learning to 200,000 OHSU EHR records to determine whether

this approach could be effective in identifying patients not previously tested for AHP, and who could be good candidates to receive a diagnostic workup for AHP. The algorithm "learned" from the 30 known patients in the OHSU system and identified 100 patients whose records indicated AHP might be present yet had never been considered as a diagnosis. Manual review of the 100 patients' records identified four patients where AHP diagnostic testing was likely indicated and 18 patients where AHP diagnostic testing was possibly indicated. Based solely on the reported prevalence of AHP, the analysis of manually reviewed patients would have expected to find only 0.001 cases, demonstrating the ability of the methodology to identify possible cases of this rare disease.

Senior author William Hersh, MD, professor and chair of medical informatics and clinical epidemiology, will extend the work in collaboration with Dr. Cohen and several OHSU clinical leaders to validate the output of the machine learning algorithm with the patients it has identified. The research team will also extend the work by manually reviewing more patients identified by the algorithm, assessing additional machine learning approaches, and applying this methodology to other rare diseases. The research was funded by Alnylam Pharmaceuticals.

June 30, 2020

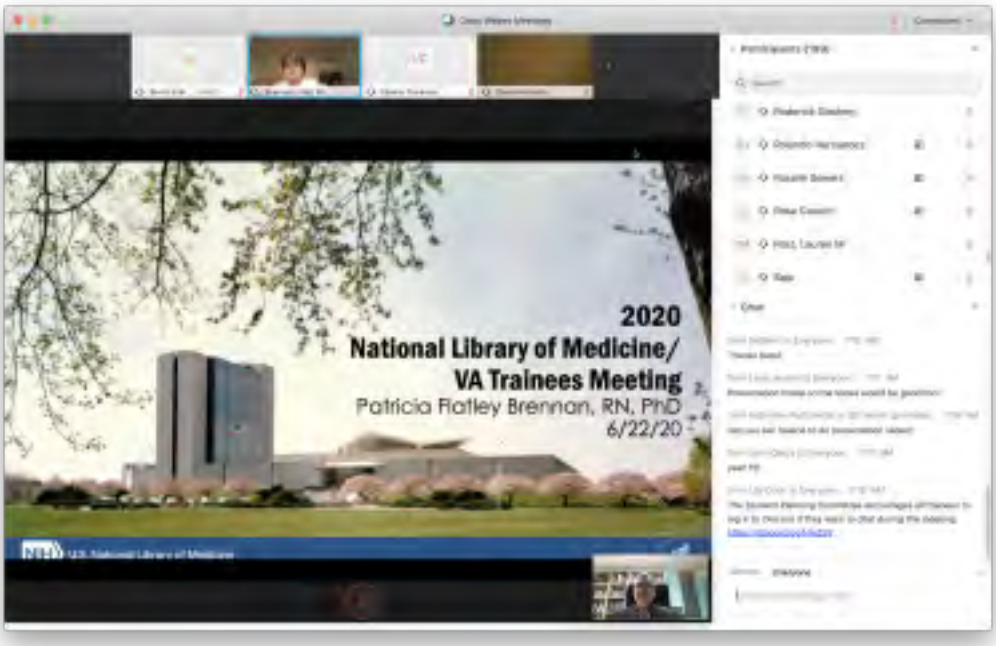
DMICE Hosts First-Ever NLM Virtual Informatics Trainees Conference

The National Library of Medicine (NLM) Informatics Trainees Conference is an important annual event for the academic programs that are funded by the NLM's University-Based Biomedical Informatics and Data Science Research Training Grant Program and a variety of funding initiatives from the NLM and the Veteran's Administration. The conference is hosted each year by one of the training grant sites, and this year OHSU volunteered to host the meeting. Never did we anticipate the emergence of a global pandemic and the need to move the conference to a virtual format.

When the decision to go virtual was made, we decided that the most important aspect to preserve was for trainees to get to present their papers, posters, and open mic presentations to their current and future colleagues. The move to a virtual format did allow us to revamp the schedule, and spread the conference over three days. This allowed us to account for time zone differences and took advantage of a day recovered that many attendees would typically spend traveling.

As done in past years, we established a Student Program Committee, co-chaired by Lily Cook and Meena Mishrah of OHSU, and asked them to develop the virtual conference schedule. They did an excellent job, organizing sessions thematically and even putting together a virtual social event for trainees. The rest of the organization of the event was capably led by

OHSU Educational Program Manager, Andrea Ilg, and the conference Web site was managed by Kate Fultz-Hollis.



The meeting was launched at 7 am Pacific time on Monday, June 22, 2020 by OHSU Program Director and Training Grant PI Dr. William Hersh, with an additional local welcome from OHSU School of Medicine Dean Dr. Sharon Anderson. After an introduction from NLM by Dr. Valerie Florance, NLM Director Dr. Patricia Brennan gave an update on recent NLM activities (see image to right), especially those related to the Covid-19 pandemic. In addition to academic presentations from the trainees, the meeting also featured sessions on careers in academic and industry, research funding opportunities from NLM, and the annual NLM Ada Lovelace Computational Health Lecture delivered by Dr. John Holmes of the University of Pennsylvania. The lecture was entitled, AI in the Age of COVID-19: Computational Tools for the Classification, Prediction, and Characterization of a Pandemic.

Additional conference information is available on the Web site, including the E-book of trainee presentation abstracts, opening session slides from Dr. Brennan, and more.

Many lessons were learned in putting on a virtual conference, but hopefully next year's conference, planned for Seattle, will take place in person.

June 8, 2020

Graduation 2020 for Biomedical Informatics Graduate Program Degree Candidates

Congratulations to all OHSU Department of Medical Informatics and Clinical Epidemiology (DMICE) graduates for the June 7, 2020 ceremony that was virtual this year because of the Covid-19 pandemic. They join our alumni include 782 individuals with 872 degrees and certificates dating back to 1998. The program has awarded 374 master's degrees and 31 PhD degrees.

Here are all the graduates with their respective thesis or capstone topics:

Doctor of Philosophy in Biomedical Informatics

Christopher Jae Hoekstra, National Library of Medicine Postdoctoral Fellow
The impact of context on the use of information systems to manage clinical quality

Kristen Marie Stevens, National Library of Medicine Predoctoral Fellow
A reward system polygenic risk score for predicting obesity and substance addiction

Ryan Michael Swan, National Library of Medicine Predoctoral Fellow
Development of a network-based measure of genetic risk and its application in preterm birth and retinopathy of prematurity

Master of Science in Bioinformatics and Computational Biomedicine

David Rath Ball
VarGraph: a decision support tool for variant classification using pathway databases

Megan Elena Grout
Internship at Phase Genomics: *Application of Hi-C technology to novel genome assembly and metagenomics annotation.*
Internship at Spiral Genetics: *Evaluating HLA variant recovery with BioGraph technology*

Alfonso Miguel Poire
Internship at J Craig Venter Institute: *Probing molecular interactions in the nitrogen- fixing cyanobacteria-feather moss symbiosis*

Benjamin Joseph Tate
Internship at OHSU, Dept. of Dermatology: *Towards clustering of user-submitted mole images*

Xiao Wang
Internship at Omics Data Automation: *Deep learning-based analysis of histopathological images of lung cancer*

Colleen Xu
Internship at Omics Data Automation: *Implementing and extending an algorithm to infer disease risk genes from multiomics data and GWAS*

Daniel Boyd Yaeger, National Library of Medicine Postdoctoral Fellow
Internship at OHSU, Dept. of Medical Informatics & Clinical Epidemiology: *Challenges and progress in applying machine learning to the diagnosis of a rare disease*

Master of Science in Biomedical Informatics

Carter Hoffman
Species level identification of the bladder microbiome

Benjamin Wilson Sanders, National Library of Medicine Postdoctoral Fellow
The informatics of early intervention referrals: a national nested mixed methods study

Master of Science in Health and Clinical Informatics

Abdulaziz Suliman A Alhomod
Women's cancer screening decision aid for Arabic-speaking women

Carrie K Baker
Internship at Kettering Health Network: *Medical resident clinical informatics curriculum*

Dave R Boston
Internship at OCHIN: *Impact of patient demographic variables on the success of specialist referral completion in the safety net*

Summer Eleanor Carrillo
Internship at Oregon Health Authority: *Early hearing detection and intervention information system*

Amelia Glatha Drace, OHSU Clinical Informatics Subspecialty Fellow
Inter-visit care in ambulatory clinics: a qualitative analysis

Coleman Hilton
Implementing biomedical query mediation for the Shriners Health Outcomes Network

Adarsha Kattaya Ramegowda
Evaluation of pain medication power plan implementation in Cerner

Barry Marc Newman
Strategic alignment and effectiveness of governance in healthcare informatics

Jennifer Allen Pacheco
Electronic health record phenotyping to facilitate the categorization of genetic variants of uncertain significance

Nhat Minh Pham, OHSU Clinical Informatics Subspecialty Fellow
Internship at OHSU, Dept. of Medical Informatics & Clinical Epidemiology: *The devel- opment of an informatics curriculum for quality improvement training in clinical settings*

Ngoc Thy Bao Tran, OHSU Clinical Informatics Subspecialty Fellow
Development and validation of an image analysis method for quantifying CD138 immunohistochemical marker in plasma cell neoplasms

Master of Biomedical Informatics

Chelsea Amanda Guest
Oregon's alternate medical home: evaluating successes and challenges of creating an integrated care setting in Oregon's certified community behavioral health clinics

Christopher Andrew Hollweg
Data-driven mobile medical care program using the replicating effective programs framework

Colton David Hood
An analysis of the delivery of maritime telehealth

Thad Patrick Jarmon
A review of current literature that measures agreement between patient self-report data and a reference standard

Kyle Austin Marshall
Comparison of ordering tools in compliance with treatment protocols in the emergency department

Swetha Yenduru
Patient bridge—major step towards full interoperability

Graduate Certificate in Biomedical Informatics

Adam Christopher Dziorny
Sowjanya Gowrisankaran
Richard Robert Hammel
Abigail Elizabeth Huang
Tamara Porter Miller
Eric Matthew Puster
Brian H Tran, OHSU Clinical Informatics Subspecialty Fellow

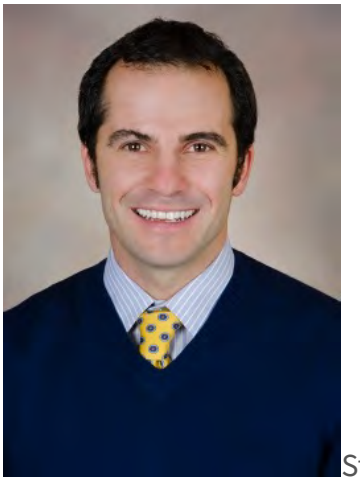
Graduate Certificate in Health and Clinical Informatics

Robby Emile Atala
Nicole Caitlin Bowman
Ryan O'Connell
Sandeep Regmi
Valerie Lockhart Welch

June 2, 2020

Telemedicine: From Perpetual Pilot to Full-Blown Transformation in Three Weeks

Posted by:
Steven Z. Kassakian, M.D., M.S., F.A.C.P.
Associate Chief Health Information Officer, OHSU
Assistant Professor, Department of Medical Informatics and Clinical Epidemiology


Steven Z. Kassakian, M.D., M.S., F.A.C.P.

COVID-19 has brought, and continues to bring, a tremendous amount of suffering and anguish. However, the acceleration of telemedicine clearly will be one of the silver lining stories to emerge. Like many healthcare organizations, Oregon Health & Science University (OHSU) has experienced a transformative acceleration in the use of telemedicine during COVID-19 (check out the following article from Willamette Week: The Future of Telemedicine Just Arrived at OHSU. Steve Kassakian Is Helping to Drive the Project). While telemedicine is a broad umbrella term, the term I think that resonates most with patients and provider is the ambulatory video visit where instead of going through the hassle of traveling to a clinic, being subjected to interminable waits (surrounded by other suffering folks and only dated copies

of *People* or *Golf Digest* to tide you over), your visit occurs via video within the comfort of one's home or wherever you choose. To give some sense of scale of change we at OHSU have seen in the months before COVID-19 caused profound disruption in the U.S., we averaged around **75 total video visits** delivered per week. That number has now been over **5300 video visits** per week for the last 4 weeks, an over 7000% increase. These kinds of numbers are echoed by colleagues around the country. To say it has been profound would be an understatement.

Prior to COVID-19, my experience with telemedicine has been typical for both my provider & informaticist roles. I helped lead our initial launch of virtual visits (aka, video visits) for our ambulatory care environment about 2 years ago. We had 3 phases: 1. development of an urgent care video visit; 2. primary care; and 3. specialty care offering. Urgent care made sense, many others had already gone down that path. While primary care seemed to intuitively make sense as it seemed that much chronic disease management could utilize the platform, I recall distinctly in my time spent talking with colleagues around the country the one thing I heard repeatedly that even once you built the platform, there was just no demand. In fact, I fell victim to the cobbler's kids have no shoes scenario and in my provider role as a primary care doctor, I didn't really see a compelling reason to use telemedicine. My patients were not clamoring for it, the hassle of interrupting my normal in person clinic workflow to see the odd video visits and the attendant hoops required to get credentialed-enabled just seemed too much. Plus I had the convenient excuse that I was too busy helping others.

When COVID-19 arrived, we were fortunate that we already had a platform in place. While we never really received a formal request from leadership to enable telemedicine for all faculty, it became obvious pretty quickly that telemedicine was what we had to do as the volume of calls, texts and emails from desperate providers, practice managers became completely overwhelming. Like many organizations, OHSU was actively trying to reduce the volume of patients being seen in person in addition to the concerns and fears from patients looking to avoid physical contact with healthcare but still in need of help. Telemedicine was exactly what was needed. It was such a profound shift from the prior state where we literally had to try to sell skeptical colleagues on the idea of telemedicine and benefits it would bring, to now a scenario in which the customers were lined up at the door ready to buy your goods that previously we had trouble giving away. Perhaps it will be looked back upon as telemedicine's Black Friday Sales Event. To facilitate the rapid scale required we developed an agile approach with our newly formed video visit "baby tiger team" and anointed a "baby tiger tamer," aka "scrum master." The team included all the needed resources from clinical informatics, telemedicine, revenue cycle, EHR analyst, integration engineers, compliance, scheduling. In a matter of three weeks, we enabled the entirety of our ambulatory clinical faculty to use telemedicine. This required non-stop work and in those three weeks we met daily, weekend included and calls, texts, ad-hoc meetings took place constantly.

As the enormity of what has occurred with telemedicine starts to sink in, there is lots of conjecture about what's next. Clearly, we aren't going back to where we were but how does

telemedicine shift from a necessity service during COVID-19 to being just the way we do business and what are the impacts both desired and the unintended consequences. As mentioned before the prior selling points on telemedicine were really about convenience and avoiding hassle. While those are still apparent, I've had numerous patients tell me they will never come back to the office unless I insist on it, and I'm starting to see there is perhaps a more compelling value proposition for telemedicine. I am hearing stories and personally experiencing with my own patients that the ability to be invited as a guest into their homes, and see the intimate portions of their lives both the positive, negative and in between, is providing a much deeper picture of who they are as a person, their values, their challenges, successes and failures, than we've ever been able to glean before from short office visits. One incredibly touching story from a pediatric neurologists involved in caring for a foster child with profound neurologic issues: this neurologist was finally able to see the things that concerned the foster parent, and to see the child interact in the natural environment, the home, with the siblings and caretakers and the video visits provided more insight than any office visit ever had. Further on the provider side colleagues have shared with me that when they are able to finish with their last patient on time, close their workstation down, and walk from their home office to their kitchen, it marked the first time they have been home for dinner with their families in years.

That said, there are likely challenges. Much of this was made possible by suspension of an arcane patchwork of regulatory requirements from Centers for Medicare and Medicaid Services (CMS), which if any of those previously stifling regulations will come back is an open question. As well, there exists a digital divide in the nation (smartphones, PCs and broadband access), some view it as so profound as to label it a social determinant of health. We must be honest and acknowledge this inequality and work diligently to ensure that technologies like telemedicine do not exacerbate it and strive to help overcome it. Educationally it is a challenging moment, as we work simultaneously to both use and understand the implications of this profound digital switch, while at the same time rapidly needing to teach the next generation of providers how to care for patients digitally.

Prior to COVID-19, I think many in health IT may have seen telemedicine as part of the tired theme of technology trying to find a problem to solve. However, with COVID-19 there is a real problem and telemedicine is clearly one of the solutions. The question is will telemedicine outlast the current crisis? For me, the answer is a resounding yes and the truly exciting part is it may actually turn out to be part of the solution for many problems in our healthcare system for which we did not even consider.

May 26, 2022

DMICE Clinical Informatics Fellow Elected to Journal of the American Medical Informatics Association Student Editorial Board 2020-2021


Jennifer Rosenbaum, MD, MEd, OHSU Clinical Informatics (CI) Fellow, has been appointed to the Student Editorial Board (SEB) of the Journal of the American Medical Informatics Association (JAMIA) for 2020-2021. Dr. Rosenbaum continues a tradition of OHSU biomedical informatics students who have served on JAMIA SEB. Previous student editors included PhD candidate Paul DeMuro (2013-2014); MD/PhD student Julie Doberne (2014-2015); and CI Fellow James Morrison (2016-2017). The SEB has been led by Michael F. Chiang, MD, JAMIA Associate Editor, Edwin and Josephine Knowles Professor of Ophthalmology, and Professor in the Department of Medical Informatics & Clinical Epidemiology (DMICE).

JAMIA is the scientific peer-reviewed journal from the American Medical Informatics Association (AMIA). The SEB is an opportunity to serve in an editorial position reviewing submissions and learning about the process of how a scientific journal works. The main responsibility of the student editorial board is to review journal manuscript submissions. This opportunity allows for scientific discourse around the most up to date research and improving critical scientific reading skills. Additionally, the SEB provides a chance to meet leaders in the field and stay on top of the latest research in clinical informatics. Beyond the editorial responsibilities, the student editorial runs the monthly journal club. This provides the opportunity to work with an even broader group to discuss the most current work in the field of informatics, learn how to question science, and build on skills of moderating groups.

Dr. Rosenbaum remarked on her appointment, “I am really excited about this opportunity. Staying on top of the most recent research and learning to read critically are foundational skills for being a good informaticist and physician, and this is a unique chance to develop those skills. I also think this is a wonderful opportunity to meet people in the field, both the esteemed established individuals on the board as well as my peers on the student editorial

board who I'm sure will end up being leaders in the field themselves.

"The DMICE Blog asked me for a photo and so as we are at home in the pandemic here I am (in picture above) finally getting to wear our snazzy informatics scrubs as well as the portrait from the AMIA announcement, and my dog (in photo on right) showing how we work from home together."

May 11, 2020

Biomedical and Health Informatics Career Search Today

Posted by Virginia Lankes, DMICE Career Development Specialist

In this exceptional time, one might wonder if a job search is futile, and the answer is a resounding "no." I am speaking from the perspective of one who reviews numerous job postings weekly, and the latest articles on career advice, and economic markets.

First, you have skills in research, data analysis, computational biology and machine learning, the demand for which are strong, and will continue to be critical in the coming years. I am seeing applicable postings on Glassdoor, which are labeled "Hiring Surge." These openings are specifically in response to COVID-19, and the immediate need for data scientists, in particular. Additionally, large organizations like Genentech, Gilead, Amazon, Pfizer are constantly posting and hiring, but mid-size and smaller companies also continue to list jobs. The volume of jobs may be less these days, but in your skill area the jobs definitely are out there.

 Virginia Lankes

The areas of high demand continue to be in California and Massachusetts, but local jobs here in Portland, from a variety of public and private organizations are available. A soon-to-be DMICE biomedical informatics graduate accepted an offer in late April, and the next day was contacted for his references by another group with whom he interviewed. The Portland VA just contacted us to recruit graduates because of "their caliber and performance." If you have the skills that are needed now, you will find opportunities.

All this leads us to the fact that: This is a great time to be networking. It will always be the best way to find a job – *upstream* of the job postings. Folks are working from home, often with time to spare, and, like most of us, in a helping frame of mind these days. Why not contact former teachers, colleagues, classmates, whomever, to give an update on your situation; ask for "information and advice" regarding your career path, or job search? Now is the time to share and stay in touch. It is the right time to reach out whether you are currently searching or expect to be in the next year or so.

As the job market will always be in flux, look instead to find security by keeping your skills current, and also by learning the skills of conducting an effective, strategic job search.

May 6, 2020

OHSU ClinfoWiki: 15 Years and 30 Million Views Later, A Top Internet Resource for Clinical Informatics

Posted by Vishnu Mohan, MD, MBI

One byproduct of a pandemic is that searching to find relevant sources of biomedical information on the Web can be overwhelming. One very valuable approach to organizing information is in wiki. Since the first one (WikiWikiWeb developed by Ward Cunningham in Portland, OR in 1994), the wiki has become a popular method to host and disseminate information, the most famous example being Wikipedia.

So what's a wiki? According to Wikipedia, a wiki is a knowledge base on which users collaboratively modify and structure content directly from a web browser.

OHSU ClinfoWiki is an implementation of a wiki devoted to biomedical informatics topics. It was created in 2005 by Dean Sittig, PhD. At the time, Dr. Sittig was faculty at DMICE, and wanted to provide clinical informaticians around the world a place to document and discuss many of the most important concepts and lessons they learned in their day to day activities.

When Dr. Sittig moved to the School of Biomedical Informatics at the University of Texas, Health Sciences Center at Houston, editorial responsibilities were assumed by Vishnu Mohan MD MBI, who is on the faculty at DMICE (and an alumnus of the DMICE certificate and masters programs). Dr. Mohan now serves as the Editor for OHSU ClinfoWiki.


Vishnu Mohan, MD, MBI

OHSU ClinfoWiki provides extensive information on many topics in biomedical informatics. Currently the wiki features 1,563 content pages that have been created and edited by 1,405 users. The resource is organized under multiple sections, including ***technologies*** such as the electronic medical record (EMR), clinical decision support (CDS), computerized provider order entry (CPOE), medical devices, personal health record (PHR) etc., and ***applications*** such as methodologies, frameworks, utilization of evidence-based medicine (EBM), government and private initiatives, training and support, terminology, workflows, usability, etc.

Since its inception, OHSU ClinfoWiki has had over 30 million page views, which is impressive for a user-driven online knowledge repository in a somewhat niche domain!

Anyone can browse the Clinfowiki, but to create a new article or edit existing pages, users need to sign up for an account. Since the site was launched, users have made over 33,000 page edits, with an average of 6.69 edits per page.

If you have not done so already, please take a moment to check out OHSU ClinfoWiki and consider signing up to contribute to this growing (and popular) body of knowledge for biomedical (and clinical) informatics!

April 28, 2020

International Medical Informatics Yearbook 2020: Editorial Meeting for DMICE Editor during Pandemic

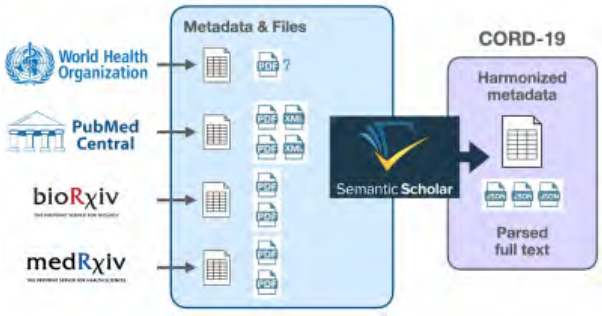
Bonjour de Zoom! Last year we reported on the International Medical Informatics Association (IMIA) yearbook meeting in Paris that included DMICE research associate Kate Fultz Hollis, MS, MBI as chief editor. This year the IMIA Yearbook team conducted its April 17 meeting for the 2020 edition from Paris France but by way of Zoom as all editors from Europe and the US must operate out of their home due to the Coronavirus pandemic. Once again, senior editor Brigitte Séroussi (top row of the picture left to right is senior staff Kate Fultz Hollis, Brigitte Séroussi, Lina Soualmia, Martina Hutter, and Adrien Ugon) ran an excellent all day meeting with over 20 section editors attending and choosing the best papers in their respective sections. Most editors started the day at 8:45am Paris time and so those of us in the US began at 11:45pm at night and Ms. Fultz Hollis stayed for the entire meeting until roughly 8am Friday morning. The picture below is a lovely compilation of Zoom pictures of all the editors who participated.

IMIA produces a yearbook of the best medical informatics journal articles from around the world. The IMIA 2019 Yearbook was made up of 12 sections covering the different subfields of biomedical informatics and a keynote paper. Each year there is a special section and for 2020, the special section is Ethics and Health Informatics. This year, a DMICE graduate, Carolyn Peterson, MS, MBI, oversaw the Special Section of Ethics for the Yearbook along with Vignesh Subbian, PhD of the University of Arizona. Ms. Fultz Hollis oversees section editors for the Ethics Special Section, Consumer Health Informatics, Clinical Research Informatics, Decision Support, Human Factors, and Public Health and Epidemiology Informatics.

The keynote paper on ethics and working group papers for IMIA Yearbook 2020 are now available online in the eFirst website of the journal. We also published an obituary of one of our best section editors Vassilis Koutkias and he is included here in our group picture of Zoom portraits (bottom row second from the right). The day was very productive, and the full issue of the IMIA Yearbook 2020 will be available in August 2020.

April 24, 2020

DMICE Researchers Organizing and Participating in Covid-19 Information Retrieval Challenge



One of the major challenges of the Covid-19 epidemic is managing the rapidly expanding scientific corpus that is published in journals, by health-related organizations, and on preprint servers. A new information retrieval (IR) research challenge aims to identify the best methods for retrieving scientific literature for the current and all future rapidly evolving pandemics. Researchers from the Department of Medical Informatics & Clinical Epidemiology (DMICE) are among the organizers of this new research challenge related to Covid-19. OHSU medical students overseen by DMICE are also annotating the output of systems for relevance to topics in the challenge.

The challenge is called TREC-COVID and aims to develop and evaluate methods to optimize search engines for the current and rapidly expanding number of scientific papers about Covid-19 and related topics. The challenge is being organized by a group of IR researchers from the Allen Institute for Artificial Intelligence (AI2), the National Institute of Standards and Technology (NIST), the National Library of Medicine (NLM), Oregon Health and Science University (OHSU), and the University of Texas Health Science Center at Houston (UTHealth). A press release and official Web site for the project have been posted. DMICE Chair William Hersh, MD is also maintaining a page about the project.

TREC-COVID applies well-known IR evaluation methods from the NIST Text Retrieval Conference (TREC), an annual challenge evaluation that evaluates retrieval methods with data from news sources, Web sites, social media, and biomedical publications. In an IR challenge evaluation, there is typically a collection of documents or other content, a set of

topics based on real-world information needs, and relevance assessments to determine which documents are relevant to each topic. Different research teams submit runs of the topics over the collection from their own search systems, from which metrics derived from recall and precision are calculated using the relevance judgments.

The document collection for TREC-COVID comes from AI2, which has created the COVID-19 Open Research Dataset (CORD-19), a free resource of scholarly articles about COVID-19 and other coronaviruses. CORD-19 is updated weekly, although fixed versions will be used for each round of TREC-COVID. It includes not only articles published in journals but also those posted on preprint servers, including bioRxiv, medRxiv, and others. A preprint about the dataset and an article describing it also mention OHSU.

Because the dataset (along with the world's corpus of scientific literature on Covid-19) is being updated frequently, there will be multiple rounds of the challenge, with later ones focused on identifying newly emerging research. There may also be other IR-related tasks, such as question-answering and fact-checking. The search topics for the first round are based on those submitted to a variety of sources and were developed by Dr. Hersh; Kirk Roberts, PhD of UTHealth; and Dina Demner-Fushman MD, PhD of NLM. Relevance judgments are being done by those with medical expertise, such as medical students and NLM indexers. Dr. Hersh is overseeing the initial relevance judging process, which is being carried out by OHSU medical students who are currently sidelined from clinical activities due to the Covid-19 crisis. DMICE faculty Steven Bedrick, PhD is helping to organize the technical and logistical aspects of the judging process.

April 22, 2020

DMICE Steps Up to Offer Virtual Teaching for Medical and Graduate Students

One of the consequences of the Covid-19 pandemic is its impact on medical and graduate education in academic medical centers. Medical students are sidelined from clinical experiences due to the need to protect their health as well as conserve personal protective equipment (PPE) for physicians, nurses, and others taking care of patients. Graduate students are likewise not able to pursue their laboratory research due to the need to preserve PPE and reagents that might be used in clinical care, and also to avoid social gathering that might spread Covid-19.

Both groups therefore need educational activities to maintain their academic progress, preferably of a virtual nature. Fortunately, the Department of Medical Informatics & Clinical Epidemiology (DMICE) has educational content as well as a long history of its virtual delivery to somewhat fill the gap for medical and graduate students.

One course offering is the long-standing Introduction to Biomedical & Health Informatics, taught as BMI 510/610 by DMICE Chair, Dr. William Hersh. This one-quarter academic course has 10 units of materials that consist of online voice over Powerpoint lectures and online discussion forums. The graduate version of the course is offered over 10 weeks of the academic quarter and includes a term paper and final exam. It is being offered to all OHSU graduate students from any program this term.

The course has also been organized into a 4-week block format for medical students. Students are required only to complete the weekly multiple-choice assessments and not a term paper or final exam. The course has been offered not only to OHSU medical students but also to any medical student from any US allopathic or osteopathic medical school. External students register for the course through their own institutions, who send us lists of students to enroll in the course, as described on the course Web page.

The medical student course has been offered in weekly waves. The first course started with 17 OHSU medical students. The second two offerings include 62 medical students from 11 different medical schools: Dartmouth College (2), Northwestern University (1), University of Iowa (6), University of North Dakota (2), University of Rochester (15), City University of New York School of Medicine (2), Emory University (12), University of Miami (3), Philadelphia College of Osteopathic Medicine (9), Quinnipac University (1), and Stony Brook University School of Medicine (9). We anticipate additional waves of students from additional medical schools over the next few weeks.

Other DMICE faculty are also offering other courses for basic science graduate students who increasingly need programming and data science skills to augment their laboratory work (of which they are currently shut out). The first of these is an adaptation of the DMICE graduate pre-requisite course, Introduction to Programming in Python, which is taught by Dr. Lisa Karstens. The course is being offered as a three-credit seminar course and has eight students enrolled.

The second additional course is Ready for R, an adaptation of the R Bootcamp course of Dr. Ted Laderas, which has seven students enrolled. Dr. Laderas is also offering his regular NEUS643 – Statistics for Neuroscientists this term.

Another DMICE course with non-DMICE enrollment this term is BMI 553 – Readings in Bioinformatics. The focus this term is Systems Immunology, and the course is being taught by Dr. James Jacobs. In addition to DMICE students are two non-DMICE students.

April 2, 2020

Department Offers a Virtual Course in Biomedical and Health Informatics for Medical Students

Medical students from around the US (and the world) have had their education displaced by the Covid-19 pandemic. In many places, there is either desire to keep them away from risk or to preserve personal protecting equipment (PPE) to physicians, nurses, and others directly involved in patient care. As such, the medical education community has worked to identify virtual educational experiences for medical students.

The contribution of the Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology is a virtual course in biomedical and health informatics. The content of the course comes from the introductory course in our Biomedical Informatics Graduate Program. This course is also used in OHSU's offering as part of the American Medical Informatics Association 10×10 ("ten by ten") program. The syllabus for the course details on how medical schools can enroll their students.

We are implementing the course as a 4-week medical student elective, which is awarded 2 credits at OHSU. The course has about 40 hours of lecture, and we anticipate another 40 hours spent on discussion forums, multiple-choice self-assessments for each unit, and optional readings. The course is graded as pass-fail, and passing requires completion of all of 10 units and their self-assessments over the 4 weeks of the course.

One new offering of the course will begin each week starting Monday, April 6. We will enroll as many students as we have in a single section, and make all of the content available to them for the duration of the 4 weeks. We will make use of the discussion forums built into our LMS to answer questions they have, and raise a few questions for them to answer. At the end of 4 weeks, the course will end, and those who have completed all of the work will receive a passing grade, which we will report back to the contact from each school.

We are asking each medical school handle student enrollment and credit themselves. In other words, we will make the course available through our learning management system (LMS) at OHSU, but we will ask each school to provide us a list of students to enroll and each will get a login to the course. After the course is done, we will report back to the schools on whether each student completed the course or not. We would like for medical schools that participate to handle giving students credit (probably through some sort of self-study elective).

We also prefer that there be a single point of contact for each school with which we communicate. To capture this information, we have created an online survey that asks for the point of contact (please use a university email address), estimated number of students (initially up to 20 per school – we may be able to accommodate more later), and preferred

dates (which we may need to change to balance load). After the survey is completed, someone from our staff will contact the schools to work out the details.

In addition, for those interested in less than a full course on informatics, we have an open Web site that provides some of the materials and is being used by some medical schools.

March 14,2020

DMICE Chair William Hersh elected President of International Academy of Health Sciences Informatics

William Hersh, MD, professor and chair, Department of Medical Informatics & Clinical Epidemiology (DMICE), has been elected President of the International Academy of Health Sciences Informatics (IAHSI), or the Academy for short. Dr. Hersh will take on the President role in September, 2020 and serve a two-year term.

The Academy was established in 2017 by the International Medical Informatics Association (IMIA). As noted on its Web site, the Academy "serves as an honor society that recognizes expertise in biomedical and health informatics internationally. Academy Membership is one of the highest honors in the international field of biomedical and health informatics. The Academy will serve as an international forum for peers in biomedical and health informatics. The Academy will play an important role in exchanging knowledge, providing education and training, and producing policy documents, e.g., recommendations and position statements."

"It is an honor to be elected to this role by my colleagues from around the world," said Dr. Hersh. "In countries across the planet, with different healthcare systems and differing amounts of resources to devote to them, there is a universal need to use data and information to improve individual and public health. I hope that the Academy can serve as an advocate for the contributions informatics can make to advancing research in the field and educating the next generation of professionals, academics, and leaders."

Dr. Hersh was among the group of 130 fellows elected to the inaugural membership of the Academy in 2017. Since then, an additional 26 members have been elected, including DMICE

professor and vice chair, Joan Ash, PhD. Dr. Hersh is also a Fellow of the American College of Medical Informatics (FACMI), the American Medical Informatics Association (FAMIA), and the American College of Physicians (FACP).

February 21, 2020

Assessing Physician Activity Using EHR Log Data

Post by Michelle Hribar, PhD, Assistant Professor, Department of Medical Informatics & Clinical Epidemiology

This month, a paper I co-wrote, Metrics for assessing physician activity using electronic health record log data, was published in the Journal of the American Medical Informatics Association (JAMIA). The paper was written by a workgroup of the National Research Network for Audit Log Data, a group of researchers who use audit logs as a data source in their work. For those of you interested in how this paper came about and how I came to lead the workgroup and be last author on this paper, this blog post provides the background and impetus for this work.

As electronic health record (EHR) adoption and use has become widespread over the past decade, so have complaints about its inefficiency and lack of usability. Concerned about how this may be contributing to burnout, researchers, informaticians, and healthcare administrators have attempted to measure providers' EHR use. The adage, "If you cannot measure it, you cannot improve it," is particularly true here; as informaticians we must be aware of how much time providers are using the EHR before and after attempting any improvements.

How do we measure EHR use? Ideally, we would like an objective measure of the time that users spend completing their work in the EHR. Traditional observational studies are time and resource intensive, and are limited to measuring EHR use at work (and often only during business hours). Self-reporting is an option, but humans are known to be inaccurate at estimating time, as well as potentially biased at reporting their EHR use. In addition, self-reporting adds administrative burden to already busy provider schedules.

An increasingly popular method for measuring EHR use is audit-log analysis. Since all EHR vendors must record data about EHR accesses in audit logs, this data provides a rough sketch of what users do and when in the EHR without the need for observation or self-reporting. While there are specific minimum data requirements for audit logs, EHR vendors implement them differently and commonly provide multiple granularity levels of access recordings—from low level mouse clicks and key stroke data to higher level accesses of screens or parts of the EHR system. These audit logs can be used to estimate all sorts of metrics related to clinical care: how long users are spending in the EHR system, which tasks they are performing and in what order, how long corresponding clinical workflows took, and how much teamwork was involved in patients' care.

Researchers, including myself, have been using audit logs in their research. My research group has used them to build simulation models of outpatient clinics and evaluate the effectiveness of new scheduling templates based on these models, for determining trends of EHR use over a decade, for studying chart review patterns, and for determining the impact of scribes on provider workflows (paper in progress). In addition, EHR vendors provide metrics based on these audit log entries; for example, OHSU EHR vendor Epic has productivity metrics such as Signal reports (previously PEP reports). Because the use of audit logs has significantly grown over the past several years, Julia Adler-Milstein, PhD started the National Research Network for EHR Audit Log Data in 2018 to provide a forum for researchers, vendors, and analysts to share projects and methodologies during monthly webinars. In 2019, we formed workgroups to focus on particular aspects of this work in an attempt to shape and further the field. The three workgroup areas are task identification, measure development, and standards development. I currently lead the measures workgroup, which has had a very active year.

One of the first things we did was to survey the existing literature to determine how EHR audit logs have been used in research. Adam Rule, PhD, who is a postdoctoral fellow in our department, led this effort and published the resulting systematic review in JAMIA this past November. He identified the different ways EHR audit logs had been used in 85 articles as of September, 2019. Details about the methods and their validation were not given in the majority of the articles, however, making comparison or meta-analysis impossible. This paper recommends the development of standardized and validated measures as a collaborative effort by vendors, healthcare institutions, and the audit log research community to improve the transparency, reproducibility, and comparability of studies using audit logs.

Not surprisingly, the next focus for the workgroup was the definition of standardized measures. Given the current interest in measuring physician EHR use and burnout, the workgroup developed a recommended set of seven standard measures of outpatient physician work using audit logs. The definition of this measure set was led by workgroup member and well-known thought leader on physician burnout and the role of the EHR, Christine Sinsky, MD of the American Medical Association (AMA). Guided by work she had been doing with the AMA on measuring burnout, the workgroup discussed which measures to

include along with their potential use cases and limitations. We hope the resulting paper will provide guidance for vendors, administrators, and researchers as they move forward with implementing audit log measures for physician work.

Interest in audit logs as a source of information about clinic work and timings is growing. Over 100 people participate in the NRN group, and there are over 35 people in the audit log measures workgroup. The NRN group had a panel presentation at the American Medical Informatics Association (AMIA) Annual Symposium in November, 2019. I also presented an overview of our work at the Office of the National Coordinator for Health IT (ONC) Annual Meeting in January, 2020. We still have much work to the accomplish; the other workgroups are continuing development of task definitions and standards, and the measures workgroup is pushing ahead with defining more standardized measures for inpatient settings and more clinician roles, implementing and validating the standardized measures, and documenting and mapping existing EHR vendor metrics to the standardized measures. We invite you to be part of this exciting new data and research area by participating in the NRN monthly webinars and/or one of the workgroups. Contact hribarm@ohsu.edu for more information!

January 14, 2020

Patty Langasek Awarded OHSU Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Endowed Scholarship for Biomedical Informatics

The Department of Medical Informatics & Clinical Epidemiology (DMICE) is pleased to announce that the 2019-2020 *Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Endowed Scholarship for Biomedical Informatics* will be awarded to Patty Langasek. Ms. Langasek is a PhD student in the Bioinformatics and Computational Biomedicine Major of the OHSU Biomedical Informatics Graduate Program.

A goal of Ms. Langasek's research is to improve sleep and circadian health by improving the capture of data from the electronic health record (EHR) related to sleep health for the diagnosis and treatment of sleep disorders. It has been well established that optimal sleep habits, including the diagnosis and treatment of sleep disorders, improve patient well-being,

reduce occupational accidents, and reduce the development and/or worsening of cardiac disease, stroke, diabetes mellitus, and other disorders. However, data related to sleep health and disease is often under-captured in the EHR in part due to the lack of standardized and controlled terminology.

Ms. Langsaek's work will enhance 1-2 sleep use cases focused on the most common sleep disorders (insomnia and sleep apnea) and develop related value sets for use in clinical sleep medicine. These will be generalizable enough that they can be used as a basis for both clinically related care activities such a resource planning and billing, but also as a basis for pragmatic research-based extraction of data from the EHR.

Dr. Naeymi-Rad is the founder of Intelligent Medical Objects (IMO), Inc. and an expert in the application of standards-based terminology solutions to problems in healthcare. Dr. Kepic is an Obstetrics & Gynecology physician. The scholarship will be awarded by the Leap of Faith Foundation, which was created by Drs. Naeymi-Rad and Kepic to accelerate informatics innovation and the distribution of terminology-enabled applications from academic centers across electronic health record systems. The $5000 scholarship will be applicable to program tuition.

November 15, 2019

Oregon Health & Science University at AMIA 2019 Annual Symposium

A number of Oregon Health & Science University (OHSU) faculty and students will be presenting at the American Medical Informatics Association (AMIA) 2019 Annual Symposium November 16-20 in Washington, DC. The table below lists the sessions, date, time and location where they will be participating.

Also of note, this is the 34th consecutive AMIA meeting for our Department Chair, Dr. William Hersh (dating back to 1986!). Our program will also be at Booth 314 of the Exhibit Hall Career Expo to provide materials and answer questions about educational programs. Dr. Hersh will be giving an overview of our program at the Educational Showcase at 5:45 pm on Monday, November 18.

Monday Nov 18, 2019			
START	FINISH	SESSION	SESSION PRESENTATION

			TYPE / MEETING PARTICIPANTS
8:30 AM	10:00 AM	**S20: Panel – Ten Years of CTSA Outputs and Moving Forward: How We Succeeded, What We Learned, and Moving Forward in the Open Science Environment** Presenters: Diane Keogh, Rose Revelo, Kristi Holmes, Juliane Schneider	Panel
1:45 PM	3:15 PM	**More Than Copy-Paste: Content-Importing in Clinical Documentation** Presenters: Adam Rule	Oral Presentations
1:45 PM	3:15 PM	**Towards augmenting structured EHR data: a comparison of manual chart review and patient self-report** Presenters: Nicole Weiskopf	Oral Presentations
3:30 PM	5:00 PM	**S52: Panel – Thriving in Your Biomedical Informatics Career While Balancing Work, Personal, and Family Life** Presenters: April Mohanty, PhD, Prof. William Hersh, MD, Gretchen Jackson, Qing Zeng, Lesley Clack, ScD, MS	Panel
5:00 PM	6:30 PM	**Board 077 – Discovery of Nurse-Patient Assignment in Medication Dispensing Data** Presenters: Dr. Dana Womack	Poster

5:00 PM	6:30 PM	**Board 108 – Improving Post-traumatic Stress Disorder (PTSD) Detection and Treatment After Traumatic Brain Injury (TBI)** Presenters: Christie Pizzimenti	Poster
5:00 PM	6:30 PM	**Board 163 – Supporting Clinicians with Changing Infectious Epidemiology's** Presenters: Stephen Lee	Poster
5:45 PM	6:05 PM	**The Full Spectrum Biomedical and Health Informatics Education at Oregon Health & Science University** Presenters: Prof. William Hersh, MD	Learning Showcase
Tuesday Nov 19, 2019			
START	FINISH	SESSION	SESSION PRESENTATION TYPE / MEETING PARTICIPANTS
8:30 AM	10:00 AM	**Predicting Wait Times in Pediatric Ophthalmology Outpatient Clinic Using Machine Learning** Presenters: WEI-CHUN LIN	Oral Presentations
1:45 PM	3:15 PM	**Clinic Characteristics Associated with Screening for Social Determinants of Health** Presenters: Dr Rachel Gold	Oral Presentations

Wednesday Nov 20, 2019			
START	FINISH	SESSION	SESSION PRESENTATION TYPE / MEETING PARTICIPANTS
8:30 AM	10:00 AM	**A Sociotechnical Multiple Perspectives Approach to the Use of Medical Scribes: A Deeper Dive into the Scribe-Provider Interaction** Presenters: Sky Corby	Oral Presentations
8:30 AM	10:00 AM	**S100: Panel – Educational Communities in the Academic Forum: Sharing Knowledge and Promoting Standards** Presenters: Prof. William Hersh, MD, Vishnu Mohan, MD, MBI, Suzanne Boren, Saif Khairat, Stephen Johnson	Panel

October 8, 2019

Application Opens for OHSU 2019 Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Endowed Scholarship for Biomedical Informatics

The Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE) is pleased to open applications for the 2019 *Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Endowed Scholarship for Biomedical Informatics*. Dr. Naeymi-Rad is the founder of Intelligent Medical Objects (IMO), Inc. and an expert in the application of

standards-based terminology solutions to problems in healthcare. Dr. Kepic is an Obstetrics & Gynecology physician.

This year's endowed scholarship provides an annual award of $5000 for tuition and fees for a student in the OHSU Biomedical Informatics Graduate Program to obtain his or her degree while gaining practical experience in applying standards-based terminology using tools such as HL7 FHIR to solve health-related patient and population focused problems.

The student must currently be enrolled full-time in the OHSU Biomedical Informatics Graduate Program. He or she must be a student in good standing in the program. The scholarship must be used for the student's tuition and fees.

The selection process will choose a student who is committed to the area of biomedical informatics focused on the application of terminology standards. The student will also serve as a resource for the standard terminology services and tools that are being provided for academic use to the OHSU Department of Medical Informatics & Clinical Epidemiology by the Leap of Faith Foundation.

Interested students are required to complete an application indicating their interest in standards-based terminology for solving problems in healthcare. The scholarship recipient will be selected by a committee of OHSU and Leap of Faith Foundation personnel, and designated as the *Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic OHSU Biomedical Informatics Scholar*.

The Leap of Faith Foundation was created by Frank Naeymi-Rad and Theresa Kepic to accelerate informatics innovation and the distribution of terminology-enabled applications from academic centers across electronic health record systems.

Students who are interested in applying should contact Andrea Ilg. More information about financial aid for the Biomedical Informatics Graduate Program is available.

September 4, 2019

International Biomedical Informatics Conference: Perspective on MEDINFO 2019 in Lyon, France

Posted by Kate Fultz Hollis, MS, MBI

MEDINFO 2019: The 17th World Congress on Medical and Health Informatics Health and Wellbeing e-Networks for All was held this past summer in Lyon, France from August 25-30, 2019. I wrote in this blog in May 2019 about my trip to Paris for the International Medical Informatics Association (IMIA) Yearbook. For MEDINFO Lyon, I was part of a panel of the

IMIA Yearbook 2019 on the best papers in the 2019 Yearbook and the editors presented almost 50 papers (average of 3 per 13 sections) to a large audience in the Cité Internationale Auditorium. Department of Medical Informatics & Clinical Epidemiology (DMICE) Chair William Hersh also led a standing room only panel, *What are the Optimal Data Science and Machine Learning Competencies for Informatics Professionals?*, and the panel included DMICE alumnus Sonia Benitez, MD, MS. Some interesting statistics about this conference too as there were a record number of submissions (1084), with an acceptance rate of 66% overall and 46% for oral presentations. A computer scientist I met at MEDINFO said that her conferences have a 3% acceptance rate but then with 10,000 submissions maybe MEDINFO acceptance rate is pretty good.


DMICE alumni Sonia Benitez, MD, MS and Charly Otero< MD, MS with Chair William Hersh, MD

MEDINFO 2019 is my first MEDINFO conference after many years editing the proceedings as a student, and I was very impressed. When I go to the domestic American Medical Informatics Association (AMIA) Annual Symposium, the first two days are busy and everyone is there and then everyone leaves after Tuesday. MEDINFO started on Sunday and didn't end until Friday, and the busiest day to me seemed to be Thursday. I was also extremely interested in the science at this conference and was told that keynotes (keynotes every day) and scientific content was very high quality compared to previous MEDINFO meetings. It was also nice that when they figured out we like coffee, there were many coffee breaks and there was lunch everyday (although somewhat of crush to get food as they didn't have enough food for the 1200 participants). I liked the idea of wine with one of the lunches.

I tried to attend as many sessions as I could in areas I do not know well. Social determinants of health, EHR record safety around the globe, data interoperability, and of course some of the more current topics like FHIR and blockchain. I found all of the sessions well managed and I was particularly impressed by the English spoken by most of the participants. IMIA also sponsored seven informaticians from Asia and Africa. I had a lovely conversation with Golo Seydou Barro from Burkina Faso, who won one of the best posters.

I would encourage everyone to apply to an international informatics conference. There is European Federation of Medical Informatics (EFMI) Medical Informatics Europe 2020 in Geneva from April 29-May 1 2020, with submissions due October 15, 2019. The next MEDINFO21 will be in Sydney, Australia from August 21-25, 2021.

IMIA Yearbook Panel with Senior Editor Brigitte Seroussi

July 15, 2019

New Annual Update in Clinical Informatics Continuing Education Course

The Department of Medical Informatics and Clinical Epidemiology (DMICE) of Oregon Health & Science University (OHSU) is pleased to announce a new annual continuing education (CE) activity in clinical informatics. With the first offering of the OHSU Annual Update in Clinical Informatics, a selection of important topics will be covered to provide an update for all clinical informatics professionals. For physicians, the course will provide continuing medical education (CME) credit. For physicians certified in the clinical informatics subspecialty, the course will provide MOC-II/LLSA credits.

The field of clinical informatics (and closely related health informatics) is a growing profession that plays an important role in healthcare and other health-related areas [1]. Informatics professionals insure that data and information are used most effectively to improve healthcare, public health, individual health, and research. The certification initially of physicians [2] and soon others in the field [3] requires that all informatics professionals maintain and expand their knowledge and skills.

This course builds off the extensive informatics education offerings of DMICE, from our biomedical informatics graduate program that has awarded 831 degrees and certificates over more than 20 years to our other innovative activities such as the AMIA 10×10 (“ten by ten”) program, the development of online learning in informatics, and launching one of the first clinical informatics subspecialty fellowships for physicians [4].

The learning activity consists of 7 modules that are estimated to take a total of 8 hours to complete. The activity is completely online, and consists of lectures and self-assessment quizzes. The topics for the 2019 annual update were selected by DMICE faculty. Topics for

future annual updates will be chosen with input from those who completed previous annual update courses.

After taking this learning activity, clinical informatics professionals will be able to (1) be aware of current advances in clinical informatics. (2) apply these advances to their professional practice, and (3) meet required competencies that are related to the domain of clinical informatics in the practice of their profession.

The activity will consist of a number of talks given by DMICE faculty that will focus on recent developments in the field. The activity will be hosted on OHSU's Sakai learning management system as enduring learning material. Once learners enroll in the activity, they will have access to Sakai and be able to complete the activity and evaluations at their own pace. Each talk will be accompanied by a post-test (multiple choice), and learners will also need to complete a course evaluation at the end of their learning. The 2019 course activities must be completed by June 30, 2020.

The topics covered in this year's offering of the course include:

- Operational Clinical Informatics
    - Patient Safety
    - Outcomes and Disparities
    - Clinician Satisfaction
    - The Way Forward
- Organizational Behavior
    - Collaboration
    - Communication
    - Multiple Organizational Issues
    - Teamwork
    - Leadership
- Data Science and Machine Learning
    - Definitions
    - Overviews
    - Applications
    - Results
    - Challenges
- Clinical Research Informatics
    - Biomedical research – who and where

    - Definitions
    - Motivations
    - Challenges
    - Solutions
- Informatics Education
    - What have we taught?
    - What have we tested?
    - What will we be testing?
    - What do doctors need to know about informatics?
    - Curriculum transformation case study – OHSU
    - Integrating informatics into curricula – strategies and methods
- SMART on FHIR
    - FHIR
    - SMART
    - SMART on FHIR
    - Future directions from 21st Century Cures
- Nursing Informatics
    - Interdisciplinary & cross-functional collaboration – trends
    - Emerging frameworks in nursing informatics
    - Case studies – benefits and challenges

Details of this online learning experience are available at: https://www.ohsu.edu/school-of-medicine/medical-informatics-and-clinical-epidemiology/ohsu-annual-update-clinical

This is not the only continuing education activity in clinical informatics that will be offered by OHSU. In the coming year, we will also offer for CME and ABPM MOC-II credit our monthly clinical informatics journal clubs and grand rounds.

Continuing education and lifelong learning information

OHSU School of Medicine Continuing Medical Education Credit

Accreditation: Oregon Health & Science University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Credit: OHSU School of Medicine designates this enduring material for a maximum of 8.0 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Maintenance of Certification Credit for Board Certified Clinical Informatics Physicians

The American Board of Preventive Medicine (ABPM) has approved this activity for a maximum of 8 LLSA credits towards ABPM MOC Part II requirements.

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June 10, 2019

End-of-Year Banquet and Commencement

The Biomedical Informatics Graduate Program had a strong turnout for its usual end-of-year festivities.

The annual department banquet took place on June 2, 2019. Below is a picture of graduates and some faculty who attended the banquet. In the front row (seated) are master's graduate Noellee Clark MD, faculty Ted Laderas PhD, program director William Hersh MD, clinical informatics fellowship graduate Thomas Frowhein MD, and master's graduate Barry Newman MD. In the back row (standing) are faculty Lisa Karstens PhD, master's graduate Leong Hui Wong (who came all the way from Singapore!), master's graduate Richard Friedman MD, master's graduate Connor Smith, faculty Karen Eden PhD, master's graduate Sean Babcock, master's graduate Ellen Provost MD, clinical informatics fellowship graduate Aziz Alhomod MD, and faculty Shannon McWeeney PhD.

The following day, graduates and faculty participated in the OHSU commencement. Below is a picture after the hooding ceremony that includes master's graduate Leong Hui Wong, master's graduate Deborah Woodcock, master's graduate Carol Heimann, master's graduate Stephen Pun MD, faculty Joan Ash PhD, faculty Karen Eden PhD, faculty Kathryn Pyle AMLS, master's graduate Gabrielle Choonoo, program director William Hersh MD, master's graduate Christopher D'Autremont, master's graduate Irfan Khawaja, master's graduate Raja Cholan, master's graduate Ghazal Irfan, master's graduate Mitchell Strauss MD, master's graduate Connor Smith, and master's graduate Ellen Provost MD.

With these addition of 45 graduates in 2019, the program has now awarded a total of 831 degrees and certificates dating back 22 years to the first graduates in 1998 (who started when the program launched in 1996). As some have completed more than one program degree or certificate (e.g., the Graduate Certificate and Master's or the Master's and PhD; one person has done all three!), the program has a total of 746 alumni.

May 30, 2019

OHSU Commencement to Bring Biomedical Informatics Alumni to 831 Degrees and Certificates Awarded to 746 People

Next Monday, June 3rd, a total of 45 new alumni of the Biomedical Informatics Graduate Program will be honored in the annual OHSU Commencement ceremony. (See follow-up post with pictures later next week!)

With the 2019 graduates, the program will now have awarded a total of 831 degrees and certificates dating back 22 years to the first graduates in 1998 (who started when the program launched in 1996). As some have completed more than one program degree or certificate (e.g., the Graduate Certificate and Master's or the Master's and PhD; one person has done all three!), the program has a total of 746 alumni.

The table below shows the degrees by each major (formerly track). The names of the Master's degrees offered have varied over the years, and they are all combined into a single row in the table. There are now two majors in the program, *Bioinformatics & Computational Biology* and *Health & Clinical Informatics*. A blog post from earlier this year provided a sampling of where some of our alumni worked and lived.

Degree or Certificate	Total	Bioinformatics & Computational Biology Major	HCIN Major
Graduate Certificate	455	0	455
Master's Degree (All)	348	46	302
PhD	28	9	19
Total	831	55	776

May 9, 2019

DMICE Presentations at OHSU Research Week

Many faculty, staff, fellows, and students associated with the Department of Medical Informatics and Clinical Epidemiology will be giving oral presentations or presenting posters at OHSU Research Week, May 13-15, 2019. Presentations and posters, with their first authors, are listed below. The poster session is in the BICC Library starting at 4:00 pm on Monday, May 13th.

Oral Presentations

Nathaniel Evans, pre-doctoral student

Identification of atypical dose-response curves and implications for drug sensitivity designations

Orals Breakout: Bioengineering/Physics/Biochemistry

Monday, May 13, 11:00 AM – 12:45 PM OHSU Auditorium 221

Adam Rule, Ph.D., post-doctoral fellow

Composition of Clinical Documentation

Orals Breakout: Sensory Neurosciences

Tuesday, May 14, 9:00 AM – 10:45 AM OHSU Auditorium 221

Gareth Harman, pre-doctoral student

Novel Metrics for Assessment of Image Quality and Repeatability in Adaptive Optics Retinal Imaging

Orals Breakout: Sensory Neurosciences

Tuesday, May 14, 9:00 AM – 10:45 AM OHSU Auditorium 221

Poster Session

Monday, May 13: 4:00-5:30 pm

OHSU Library (BICC third floor)

Tamara Cheney, M.D., research associate, Pacific NW Evidence-based Practice Center

POSTER: A Systematic Review of 38 years of PTSD Research: Groundwork for a Publicly Available Repository of Randomized Controlled Trials Data

Lily Cook, M.A., pre-doctoral student

POSTER: Quantifying the invisible: How clinical research informatics has shaped our knowledge of the health effects of wildfire smoke

Sky Corby, research assistant

POSTER: A Sociotechnical Multiple Perspectives Approach to the Use of Medical Scribes: A Deeper Dive into the Scribe-Provider Interaction

Benjamin Cordier, M.S., pre-doctoral student

POSTER: Quantum Algorithms for Biology and Medicine

Rose Goueth, M.S., pre-doctoral student

POSTER: Development of OHSU's mobile application to improve access to support resources and reporting options for those who experience harassment, discrimination, and violence.

France Hsu, M.S., senior research assistant, Pacific NW Evidence-based Practice Center

POSTER: Comparison of Pharmacologic and Nonpharmacologic Study Characteristics from the PTSD-Repository

Eric Leung, pre-doctoral student

POSTER: Co-occurring urogenital microbiota networks in overactive bladder

Wei-Chun Lin, M.D., pre-doctoral student

POSTER: Predicting Waiting Times in Pediatric Ophthalmology Outpatient Clinic Using Machine Learning

Meenakshi Mishra, M.S., M.P.H., pre-doctoral student

POSTER: Determining Risk for Opioid Abuse in Patients with Chronic Pain: Systems Approach

Benjamin Sanders, M.D., M.S.P.H., post-doctoral fellow

POSTER: A conceptual data model for child referrals to developmental services

Sumeet Singh, M.B.B.S., senior research assistant

POSTER: Using Natural Language Processing to Identify Patient with Social Determinants of Health Needs

Nicholas Solberg, research assistant

POSTER: Using Scribes To Document Encounters In The Electronic Health Record: Errors in Note Revision When The Note Is Closed – A Pilot Study Across Multiple Specialties

Kristen Stevens, M.D./Ph.D. student

POSTER: A Reward System Polygenic Risk Score for Predicting Obesity and Substance Use Disorders

May 7, 2019

Alumnus Appointed to Leadership Position at Mount Sinai Health System, New York, NY

Michael R. Berman, MD, MBI, FACOG (MBI, OHSU, 2014) has been appointed to the position of Chief Quality Officer at the Mount Sinai Downtown Campus of the Mount Sinai Health System in New York. Dr. Berman is the Associate Dean for Quality and Safety for Graduate Medical Education and Professor of Obstetrics, Gynecology and Reproductive Science at the Icahn School of Medicine at Mount Sinai.

 Prior to joining the faculty at Mount Sinai, Dr. Berman was in Clinical Practice in Obstetrics and Gynecology and Clinical Professor of Obstetrics, Gynecology and Reproductive Sciences at the Yale School of Medicine. Dr. Berman founded the Hygeia Foundation for Perinatal Loss and Bereavement (now Hope After Loss) and is the author of numerous poems and essays documenting the human condition. He is also author of the book, *Parenthood Lost, Healing the Pain After Miscarriage, Stillbirth and Infant Death*.

In his new role as Chief Quality Officer, Dr. Berman will oversee the Quality and Safety at Mount Sinai Beth Israel Medical Center, New York Eye and Ear Infirmary, the Mount Sinai Downtown Ambulatory Care and Surgery facility at Union Square and the The Blavatnik Family – Chelsea Medical Center.

Dr. Berman attributes his ability to transition to his current scope of work and appointments in Quality and Safety directly to his Master of of Biomedical Informatics degree from the Oregon Health & Science University (OHSU) under the leadership of Program Director, Dr. William Hersh. “What I am currently engaged in is developing and implementing software systems for Quality, Safety, Reporting, Security, and Labor and Delivery scheduling standardization. Additionally, I have been promoted to leadership roles in our health system. These changes in my career would not have been possible without the outstanding teaching I received in courses in the informatics program such as Computer Science, Database Systems, Organizational Management, Project Management, Scientific Writing, and others. My education at OHSU was instrumental for career growth and success.”

Dr. Berman joined the faculty and attending staff of the Mount Sinai Beth Israel Medical Center in 2012 where, as the medical director of the Labor and Delivery Unit, he implemented the hospital’s first full-time laborist program, which provided a structured, collaborative, patient-centric approach to improving the quality, safety, and patient experience on the labor floor. In 2017 he was appointed Chief Patient Safety Officer for Mount Sinai Beth Israel Medical Center and Associate Dean for Quality and Patient Safety in Graduate Medical Education. In this role, Dr. Berman has led efforts at the Icahn School of Medicine at Mount Sinai (ISMMS) and the Health System to meet the goals of the Clinical Learning Environment Review Program developed by the Accreditation Council on Graduate Medical Education. Dr. Berman also serves in the Ombuds Office for the Icahn School of Medicine at Mount Sinai and the Mount Sinai Health System, a resource for faculty and students in the Graduate Medical

Education programs, providing an impartial and informal venue for promoting fair and equitable conflict resolutions for those who have identified problems in their workplace or studies.

Dr. Berman is the recipient of several awards and honors for his work in healthcare quality and safety, the most recent being the United Hospital Fund Award for Quality and Safety which recognizes quality improvement champions, celebrating the "New York metropolitan region as a center of excellence and honors extraordinary personal leadership to improve quality of care, patient safety, and patient experience of care." Dr. Berman earned his MD at New York Medical College and completed his residency in Obstetrics and Gynecology at Yale New Haven Hospital.

May 3, 2019

International Medical Informatics Association Yearbook 2019: DMICE Editorial Leadership

Bonjour de Paris! Every year the International Medical Informatics Association (IMIA) produces a yearbook of the best medical informatics journal articles from around the world. As noted in the IMIA website, "IMIA is the world body for health and biomedical informatics. As an 'association of associations', IMIA acts as a bridging organisation, bringing together the constituent organisations and their members." The IMIA Yearbook is made up of 12 sections covering the different subfields of biomedical informatics and a keynote paper. Each year there is a special section and for 2019, the special section is Artificial Intelligence (AI). This year, Kate Fultz Hollis, MS, MBI of DMICE has been appointed one of the senior editors for IMIA Yearbook, and oversees editors for the AI Special Section, Consumer Health Informatics, Clinical Research Informatics, Decision Support, Human Factors, and Public Health and Epidemiology Informatics.

The chief editor of the IMIA Yearbook is Brigitte Séroussi, MD, PhD, Associate Professor at the Pierre and Marie Curie University in Paris, France and a member of the Decision Support group of the LIMICS (Laboratoire d'Informatique Médicale et d'Ingénieurie des Connaissances en e-Santé). Dr. Séroussi arranges a one day meeting every April for editors to meet and choose the best papers of the 12 sections and

choose next year's special topic (to be announced at MEDINFO 2019 in Lyon France in August). The editors of the Yearbook come from many countries in Europe and from the United States. In addition to senior editor Fultz Hollis, Meryl Bloomrosen from Washington DC, is a DMICE graduate and is editor of Health Information Management Section.

 This year over 20 editors attended the editorial meeting and each section editor team provided 15 papers for best paper and then the group chose for each section up to 5 best paper selections for the Yearbook. The meeting took place at the Université de Paris in the 6th Arrondissement on the left bank of Paris. This area is known for its universities and many antique and book shops.

March 31, 2019

Upcoming Listening Sessions in Portland, OR to Inform the New Electronic Health Record (EHR) Reporting Program

Stop by an upcoming public listening session here in Portland, OR to provide input on the new EHR Reporting Program, which will provide publicly-available, no-cost, comparative information on certified health IT available on the market.

In the 21st Century Cures Act of 2016, Congress directed the US Department of Health and Human Services (HHS) to establish a new EHR Reporting Program, which the Office of the National Coordinator for Health IT (ONC) is currently developing. The goal of this program is to provide publicly-available, comparative information about certified health IT features related to security, usability, interoperability, conformance to certification testing, and other areas in order to improve transparency of the market.

The federal Office of the National Coordinator for Health IT (ONC) has contracted with the Urban Institute and its subcontractor, HealthTech Solutions, to obtain stakeholder input on how to develop the EHR Reporting Program through public listening sessions across the country. Input from people like you will help determine:

- What information should developers of certified health IT report? What information from users could be made available?
- How that information is collected
- How this information will be disseminated to the public (for example, would you prefer a product comparison website, data in a spreadsheet, or something else?)

Upcoming Listening Sessions:

Wednesday, April 10th

Focus: **Integrated Care Providers/Behavioral Health**

Time: 2:30 – 4:30 PM PDT

Location: Five Oak Building, Suite 775 Transformation Training Room

421 SW Oak St., Portland, OR 97204

Parking Option: 322 SW 4th Ave, Portland, OR 97204

Focus: **FQHCs/Providers Serving Underserved Populations**

Time: 6 – 8 PM PDT

Location: Collaborative Life Sciences Building & Skourtes Tower, Room 1A001

2730 SW Moody Ave, Portland, OR 97201

Parking Option: South Waterfront Campus, CLSB garage located off of S.W. Moody Avenue at S.W. Meade Street on the north side of the building

Thursday, April 11th

Focus: **Digital Health Startup Community**

Time: 9 – 11 AM PDT

Location: Five Oak Building, Suite 775 Transformation Training Room

421 SW Oak St., Portland, OR 97204

Parking Option: 322 SW 4th Ave, Portland, OR 97204

Focus: **Certified Health IT Implementers**

Time: 2 – 4 PM PDT

Location: OCHIN

1881 SW Naito Pkwy, Portland, OR 97201

Parking Option: 1925 SW 1st Ave Portland, OR 97201

Focus: **General Public Forum**

Time: 6 – 8 PM PDT

Location: Collaborative Life Sciences Building & Skourtes Tower, Room 1A001

2730 SW Moody Ave, Portland, OR 97201

Parking Option: South Waterfront Campus, CLSB garage located off of S.W. Moody Avenue at S.W. Meade Street on the north side of the building

Friday, April 12th

Focus: **Office Hours**

Time: 10 AM – noon PDT

Location: Five Oak Building, Suite 850 Abraham Room

421 SW Oak St., Portland, OR 97204

Parking Option: 322 SW 4th Ave, Portland, OR 97204

Focus: **Office Hours**

Time: 2 – 4 PM PDT

Location: Five Oak Building, Suite 850 Abraham Room

421 SW Oak St., Portland, OR 97204

Parking Option: 322 SW 4th Ave, Portland, OR 97204

March 29, 2019

Data Science, Biomedical Informatics, and the OHSU Department of Medical Informatics & Clinical Epidemiology

Data Science is a broad field that intersects many other fields within and outside of biomedicine and health, including biomedical informatics. Data science is certainly an important component of research and educational programs in the OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE).

What exactly is data science? There are many methods, but one consensus is, "the multi-disciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from data in various forms, both structured and unstructured" [1].

The definition of data science is somewhat different from the definition of biomedical informatics, which is "the interdisciplinary field that studies and pursues the effective uses of biomedical data, information, and knowledge for scientific inquiry, problem solving and decision making, motivated by efforts to improve human health" [2].

Clearly there is overlap as well as complementarity. As noted by Payne et al., biomedical informatics deals with a broader spectrum of data and information tasks, focused not only on what is learned from data but also how that is applied in a broader sociotechnical context [2].

Many DMICE research programs focus on aspects of Data Science:

- Re-use of data from EHR (William Hersh, Aaron Cohen, Steven Bedrick) – leveraging data in EHR to identify patients as candidates for research studies and signals for rare diseases (porphyria) [3]
- Documenting genomic variation in leukemia (Shannon McWeeney) – allowing for repurposing of drugs [4]
- Quality of data for clinical care and research (Nicole Weiskopf) – methods for insuring completeness and comprehensiveness of data for use in research, quality measurement, and other tasks [5]
- Urinary microbiome in health and disease (Lisa Karstens) – identifying role of microbiome and how its genetics can be leveraged for diagnosis and treatment [6]
- Use of ambient data to detect and manage clinician strain – Dana Womack, Paul Gorman [7]

DMICE educational programs include Data Science in many of their courses. Our Bioinformatics & Computational Biomedicine (BCB) major includes:

- Data Harmonization and Standards for Translational Research – BMI 533/633 (Instructors: Melissa Haendel, Ph.D., Ted Laderas, Ph.D., Christina Zheng, Ph.D.)
- Management and Processing of Large Scale Data –BMI 535/635 (Instructors: Michael Mooney, Ph.D., Christina Zheng, Ph.D.)
- Computational Genetics -BMI 559/659 (Instructor: Shannon McWeeney, Ph.D.)
- Bioinformatics Programming and Scripting – BMI 565/656 (Instructor: Michael Mooney, Ph.D.)
- Network Science and Biology- BMI 567/667 (Instructor: Guanming Wu, Ph.D.)
- Data Analytics –BMI 569/669 (Instructors: Brian Sikora, Delilah Moore, Ted Laderas, Ph.D.)

Our Health & Clinical Informatics (HCIN) major includes:

- Introduction to Biomedical and Health Informatics – BMI 510/610 (Instructor: William Hersh, M.D.)
- Analytics for Healthcare – BMI 524/624 (Instructors: Abhijit Pandit, M.B.A., Tracy Edinger, N.D.)
- Clinical Research Informatics- BMI 523/623 (Instructor: Nicole Weiskopf, Ph.D., Robert Schuff)

We also have developed ample instructional materials in Data Science for other learners:

- R Bootcamp (Instructors: Ted Laderas, Ph.D. and Jessica Minnier, Ph.D.)
- Clinical Data Wrangling Workshop (Instructor: Ted Laderas, Ph.D.)
- OHSU Big Data to Knowledge (BD2K) Open Educational Resources (OERs)

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2. Payne, PRO, Bernstam, EV, et al. (2018). Biomedical informatics meets data science: current state and future directions for interaction. *JAMIA Open*. 1: 136-141. https://academic.oup.com/jamiaopen/article/1/2/136/5068667.
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7. Womack, D. (2018). *Subtle cues: Qualitative elicitation of signs of strain in the hospital workplace*. PhD Dissertation, Oregon Health & Science University.

March 18, 2019

DMICE Faculty, Staff and Fellows Participate in AMIA Informatics Summit, March 25-29

The Department of Medical Informatics and Clinical Epidemiology (DMICE) will be well represented at the AMIA 2019 Informatics Summit, to be held March 25-29 at the Park 55 Hotel in San Francisco, California.

Kate Fultz Hollis, M.S., M.B.I. '17, DMICE research associate, will be leading a workshop on innovative tools for research reproducibility and data sharing on March 25th. The workshop will help participants understand challenges and define clinical and pre-clinical reproducibility as it related to clinical research informatics; identify places in research workflow to incorporate reproducible practices, programs, and software; and create a workflow that enables reproducibility practices and sharing data.

Kate developed a second workshop for AMIA Summit on research data governance: a tutorial introduction, and one of the instructors is alumnus **Nelson Sanchez-Pinto, M.D, M.B.I. '15**, assistant professor of pediatrics and preventive medicine, Northwestern University School of Medicine. This workshop will include a presentation of background knowledge of principles of research data governance as well as an opportunity to role-play various data governance-related positions in an organization.

On March 26th, **David Dorr, M.D., M.S.,** professor and vice chair, will present on assessing the benefits and challenges of Clinical Quality Language (CQL) – a HL7 specification for representing logic criteria for clinical quality measures. Historically, electronic clinical quality measures (eCQMs) have had logic encoded in the Quality Data Model (QDM). This project assessed interpretability of human-readable CQL-representations of eCQMs compared to QDM-representations. The researchers found that individuals may have differing preferences for models of logic-expression that delineate eCQM criteria.

Matthew Brush, Ph.D., former postdoctoral fellow and currently research assistant professor in the OHSU Library, will participate in a panel on open, expert-curated, harmonized, and standardized precision oncology knowledge, ontologies and APIs on March 27th. The panel will illustrate how the data represented in knowledge bases drives the

modeling work in translational research networks, which in turn informs the development of pre-clinical standards for genomic data and knowledge, which ultimately informs the development of standards for clinical systems for use at point of care.

Clinical Informatics Fellow **Brian Tran, M.D.,** will present on burnout and electronic health record use among academic primary care physicians with varied clinical workloads on March 28th.

Professor and chair **William R. Hersh, M.D.,** will lead an in-person session of the OHSU 10×10 ("ten by ten") course on March 27th. This continuing education course, offered online in partnership with AMIA, is an introduction to biomedical and health informatics. Since the inception of the course in 2005, over 2500 people have completed it.

March 10, 2019

DMICE Welcomes Newest Faculty Member

DMICE is pleased to welcome the newest member of our faculty, Dana Womack, PhD. Dr. Womack completed her PhD in our biomedical informatics program last June and has been awarded a K12 career development award for her project, *Echoes of Workplace Overload and Wellbeing*. The new grant will advance Dr. Womack's work in the detection of clinician overload in hospitals using multi-source data integration and analysis.

OHSU is one of 11 sites funded for the K12 program by the Agency for Healthcare Research & Quality (AHRQ) to provide career development awards to new researchers focused on developing the learning health system. The NW Center of Excellence & K12 in Patient Centered Learning Health Systems Science will be directed by grant PIs Jeanne-Marie Guise, MD, MPH of OHSU and Lucy Savitz, PhD, MBA of Kaiser Center for Health Research.

Dr. Womack will be an assistant professor in the both the Department of Medical Informatics & Clinical Epidemiology (DMICE), School of Medicine and in the School of Nursing. She will also have an appointment in the Quality, Research & Magnet Department of OHSU Healthcare/Nursing Administration. Her initial work focus will be to build on the foundation

established in her dissertation, which was entitled, *Recognition of Hospital Work System Strain Through Knowledge Elicitation, Multi-Source Data Integration and Analysis*.

Last spring, Dr. Womack received one of two best paper awards at the annual meeting of biomedical informatics trainees funded by the T15 training grant program of the National Library of Medicine (NLM).

The Career Development Award of Dr. Womack brings the total of such awards in DMICE to four:

- Michelle Hribar, PhD – Modeling and Optimization of Clinical Processes Using EHR Data (R00LM012238)
- Nicole Weiskopf, PhD – Measuring and Improving Data Quality For Clinical Quality Measure Reliability (K01LM012738)
- Lisa Karstens, PhD – Functional Considerations of the Urinary Microbiome in Overactive Bladder (K01DK116706)
- Dana Womack, PhD – Echoes of Workplace Overload and Wellbeing (K12HS022981)

"I am thrilled that Dr. Womack is the newest member of our faculty, and also that she will be jointly appointed in the School of Nursing as well as OHSU Hospital. The work of her new K12 grant using ambient data sources to detect clinical strain is highly innovative, which will lead to ways to improve clinical outcomes and reduce burnout," said William Hersh, MD, professor and chair of DMICE.

March 5, 2019

DMICE Faculty and Staff Co-author Evidence-based Guidelines for Severe Traumatic Brain Injury in Children

Traumatic brain injury (TBI) is a leading cause of death and disability in children and adolescents. In March 2019, the third edition of the Brain Trauma Foundation Guidelines for the Management of Pediatric Brain Injury was released, updating the 2012 edition. But people may not realize that the Pacific Northwest Evidence-based Practice Center (EPC), based in the Department of Medical Informatics and Clinical Epidemiology (DMICE), has played a major role in all three editions of the guideline.

Four authors of the newly released guidelines, published in a supplement to the March 2019 issue of *Pediatric Critical Care Medicine*, are investigators or staff in the Pacific Northwest EPC: professor Nancy Carney, Ph.D., associate professor Annette Totten, Ph.D., research associate Cindy Davis-O'Reilly, and senior research assistant Erica Hart.

But the story begins 19 years ago, a few years after the EPC, then known as the Oregon EPC, was founded in 1997. In 2000, Dr. Carney, who, under the direction of now professor Mark Helfand M.D., M.P.H., M.S., had worked on our EPC's first evidence report related to rehabilitation for TBI, assembled a team from OHSU – including Ms. Davis-O'Reilly and former faculty Drs. Hugo du Coudray and Randall Chesnut – to take on the task of producing evidence-based guidelines for brain trauma in children. Dr. Carney contacted clinicians who had participated in previous unsuccessful attempts at writing pediatric guidelines and convinced them to work with the EPC at OHSU.

Dr. Carney, armed with a comprehensive literature search produced by the EPC, assembled the group of neurosurgeons and critical care physicians at a National Brain Injury Association meeting in Chicago to initiate the project. Nathan Selden, M.D., Ph.D., now Campagna professor and chair of neurological surgery at OHSU, was a member of this first guidelines group. The first version of the guidelines was published simultaneously in three journals, *Critical Care Medicine, Pediatric Critical Care Medicine, and Journal of Trauma,* in special supplements in July 2003, with Drs. Carney, Selden, Chesnut, du Coudray, Brahm Goldstein, M.D., Helen Miller, M.D., and Craig Warden, M.D., M.P.H. – all from OHSU – among the authors.

"We had the expertise of the EPC as a foundation for the work, and the tremendous commitment of the pediatric clinicians on the team who were determined to produce evidence-based treatments for children," Dr. Carney reported. "These guidelines have inspired a new generation of strong research that will strengthen the evidence-base for future editions."

Dr. Carney then served as principal investigator for the Brain Trauma Foundation's multiple TBI guidelines projects from 2004 through 2012, at which time the EPC officially took over and continues to run the program, with professor Roger Chou, M.D., as principal investigator, Dr. Totten as program director, Dr. Carney on the author team, and Ms. Davis-O'Reilly and Hart as research staff. The second edition of the pediatric guidelines was published in *Pediatric Critical Care Medicine* in a supplement in January 2012. Drs. Carney, Selden, Chesnut, Goldstein, and Warden were co-authors, along with several EPC research associates. The fourth edition of the guidelines for severe TBI in adults, for which Drs. Carney and Totten and Ms. O'Reilly were first, second, and third authors, respectively, has been cited over 500 times since its publication in January 2017.

The EPC oversaw the work of the third edition of the pediatric guidelines, with funding from the Department of Defense via a subcontract from Stanford University. With the addition of 48 new studies since the second edition, the new guidelines provided a foundation for the concurrent development and publication of "Pediatric Severe Traumatic Brain Injury: 2019 Consensus and Guidelines-Based Algorithm for First and Second Tier Therapies." This treatment algorithm, based on evidence from the guidelines and extended through an expert

consensus process, provides a clinically useful protocol for management of these severely injured children.

February 28, 2019

Where Are Our Informatics Alumni Now?

Major* / Certificate/Degree	Health & Clinical Informatics**	Bioinformatics & Computational Biomedicine***	Total
Graduate Certificate	422	N/A	422
MS with Thesis****	74	21	95
MS without Thesis*****	196	17	213
PhD	18	9	27
Total	710	47	757
Number of students receiving degrees and certificates: 691			

* Formerly Track
** Includes formerly Clinical Informatics and Health Information Management Tracks
*** Includes formerly Bioinformatics & Computational Biomedicine Track
**** Includes formerly Master of Science
***** Includes formerly Master of Biomedical Informatics and Master of Medical Informatics

The OHSU Biomedical Informatics Graduate Program will be graduating its 22nd class this coming June. As of June 2018, the program had a total of 691 alumni who had received 757 degrees or certificates, as noted in the Table. (Some have received more than one.)

We recently queried our alumni list to ask where they worked and lived. The following individuals gave us permission to share their information, including Name, Job Title, Company/Institution, City, State/Country:

- Mohamed Abdelmoneam, Product Specialist, InterSystems, Sydney, Australia
- Siran Abtin, Senior Systems Analyst, OHSU, Portland, OR
- Kyle Ambert, PhD, Data Scientist, Intel, Hillsboro, OR
- Michael Ames, MBI, Director of Technology Innovation, Colorado Center for Personalized Medicine, Aurora, CO
- Sary Beidas, MBBS, MBI, Associate Program Director / IM Residency, Orange Park Medical Center, Jacksonville, FL
- Julie Belleza, Systems Analyst, Jeppesen, Denver, CO
- Lorraine Bessmer, Cybersecurity Lead, St. Luke's Health System, Boise, ID
- Madhavi Bharadwaj, Sr.Application Engineer, Kaiser Permanente, Portland, OR
- Keith Boone, MBI, Informatics Adept, Audacious Inquiry, Millville, MA
- Damian Borbolla, MD, MS, Assistant Professor, Biomedical Informatics, University of Utah, Salt Lake City, UT

- Steve Chamberlin, ND, MS, Post Doctoral Scholar, Oregon Health and Science University, Portland, OR
- Sarah Corley, MD, Chief Medical Officer, The MITRE Corporation, McLean, VA
- Bimal Desai, MD, MBI, Chief Medical Information Officer, Children's Hospital of Philadelphia, Philadelphia, PA
- Peter Embi, MD, MS, President & CEO, Regenstrief Institute, Indianapolis, IN
- David English, MD, MBI, CMIO, ALAMEDA HEALTH SYSTEM, Oakland, CA
- Laura Fochtmann, MD, MBI, Distinguished Service Professor, Stony Brook University, Stony Brook, NY
- Kate Fultz Hollis, MLS, MBI, Research Associate, OHSU, Los Angeles, CA
- Travis Gamble, PhD, Data Scientist, Peace Health, Eugene, OR
- Linda Gerace, self-employed, N/A, Republic, WA
- Timothy Gray, MS, Senior Application Analyst, OHSU, Portland, OR
- Patrick Hess, Clinical Informatics Specialist II, Kasier Permanente, Irvine, CA
- Timothy Hickman, MD, Associate Teaching Professor, UMKC School of Medicine Department of Biomedical and Health Informatics, Kansas City, MO
- Pramod Jacob, MBBS, MS, Medical Director , also Free lance Consultant, dWise Heatlhcare IT solutions, Bangalore, India
- Andrew James, MD, MBI, Neonatologist, The Hospital for Sick Children, Toronto, ON
- Jayashree Kalpathy-Cramer, PhD, MS, Associate Professor of Radiology, Harvard Medical School, Boston, MA
- Matt Kavanagh, MS, VP of Product Management, Applied Pathways, Schaumburg, IL
- Drew Kelts, MD, Cottage Hospital, Santa Barbara, CA
- Arthur Knepper, MBI, Clinic IS Analyst, University of Western States, Portland, OR
- Michael Krall, MD, MS, Retired, Retired, Portland, OR
- Nathan Lazar, PhD, Data Scientist, Recursion Pharmaceuticals, Salt Lake City, UT
- Julie Lin, Associate Professor of Medicine, University of Vermont Medical Center, Burlington, VT
- Eli Lourie, MBI, EHR Medical Director, Specialty Care, Children's Hospital of Philadelphia, Media, PA
- Jason Lyman, MD, MS, Associate Professor of Biomedical Informatics, University of Virginia, Charlottesville, VA

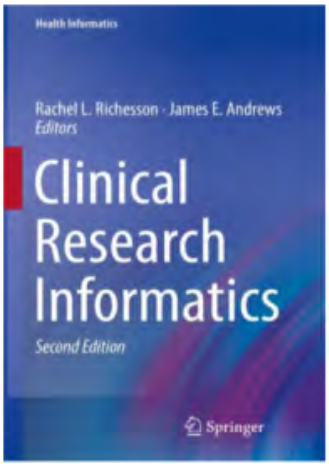
- Eisa Mahyari, PhD, Computational Biologist, Oregon Health & Science University, Portland, OR
- Mario Manese, MS, Data Scientist, Cerner, Kansas City, MO
- Mary Ellen Mattson, MBI, Senior Clinical System Analyst, Children's Minnesota, Lino Lakes, MN
- Robert Miller, MD, Vice President and Medical Director, CancerLinQ, American Society of Clinical Oncology, Alexandria, VA
- John Norris, Digital Marketing Analyst, Samaritan Health Services, Albany, OR
- Dustin Pezall, MBI, Manager of Population Health Analytics, Palmetto Health, Columbia, SC
- Tina Purnat, MS, Unit Leader, Health Informatics and Information Systems, World Health Organization, Copenhagen, Denmark
- Mohamed Ragab, Product Specialist, InterSystems, Sydney- Australia, Australia
- Max Schimpf, MBI, Information Analyst, Kaiser Permanente, Portland, OR
- Gretchen Scholl, EHR Educational Informaticist, Oregon Health & Science University, Portland, OR
- Dean Smith, MD, MBI, Sr VP/CMIO, GlobalMed, Falls Church, VA
- Elspeth Stevens, MBI, Senior Internal Auditor, St. Charles Health System, Bend, OR
- Binitha Surendran, MBI, Senior Analyst, Kaiser Permanente, Hillsboro, OR
- Anne Turner, MD, MS, Professor, Biomedical Informatics and Medical Education, University of Washington, Seattle, WA
- Ed VanBaak, MBI, Director, Clinical Informatics, Audacious Inquiry, Baltimore, MD
- Yves Vimegnon, MD, MBI, Chief Operating Officer, a-ICT Group, Portland, OR
- Corinne Visser, Co-Owner, CBD dog cookie business, Milwaukie, OR
- Keith Woeltje, MD, MBI, Chief Medical Information Officer, BJC Healthcare, St. Louis, MO
- Deborah Woodcock, MBA, Clinical Workflow Analyst, OHSU, Vancouver, WA
- Brady Wright, MD, MBI, Chief Health Informatics Officer, McGuire VA Medical Center, Richmond, VA
- Adam Wright, PhD, Associate Professor, Harvard Medical School, Boston, MA
- Thomas Yaeger, MD, Clinical Informatics Consultant, Guthrie Clinic, Athens, PA

This list does not include the more than 2500 people who have completed the AMIA-OHSU 10×10 ("ten by ten") course, whose curriculum is identical to the BMI 510 – Introduction to

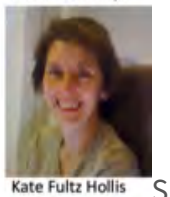
Biomedical & Health Informatics course, which serves as an introductory course in our Health & Clinical Informatics major. A couple hundred people completing the OHSU 10×10 course have gone on enroll in our graduate program, and in fact two have progressed through the entire spectrum from 10×10 to Graduate Certificate to Master's to PhD.

February 15, 2019

DMICE Faculty and Research Associate Contribute to New Edition of Clinical Research Informatics Textbook




Nicole Weiskopf


Kate Fultz Hollis

Springer has just published the second edition of the textbook, Clinical Research Informatics. Assistant Professor Nicole Weiskopf, PhD is co-author of a chapter on data quality DMICE Research Associate Kate Fultz Hollis, MBI co-authored a chapter on data governance. With senior editors Rachel Richesson, PhD (Duke University) and James Andrews, PhD (University of South Florida), Fultz Hollis also provided editing of all chapters.

The book is an overview of all topics related to clinical research informatics and updates the 2012 edition. New chapters include *Data Quality in Clinical Research* by Dr. Weiskopf and Drs. Meredith Zozus and Michael Kahn; *Data Mining and Knowledge Discovery* by Dr. Mollie Cummins; and the *Evolution of Pharmacovigilance in the Age of Digital Healthcare* by Drs. Richesson and Michael A. Ibara. The OHSU Biomedical Informatics Graduate Program has used this textbook in the course, BMI 523 – Clinical Research Informatics, since 2012, and the book has been rated very high by students. The ebook version of the new is available through the OHSU Library.

December 18, 2018

Is your health information system ailing? Clinical informaticians to the rescue

(This article is also being shared via the internal OHSU School of Medicine newsletter InsideSOM, and is written by Jennifer Smith, OHSU Senior Communications Lead.)

OHSU School of Medicine's clinical informatics fellowship leads the nation in a new field

"I code like a neurologist."

If your first idea of a pediatric neurologist does not conjure a physician who brings a coder's affection for technical solutions to clinical practice, you have not met Amelia Drace, M.D., M.S.C.I.

Dr. Drace is a first-year clinical informatics fellow at OHSU. OHSU's was among the first programs approved by the Accreditation Council for Graduate Medical Education (ACGME) for fellowship training in the clinical informatics subspecialty. Now, the three-year-old program is one of the largest of its kind in the nation.

Clinical informatics is unique in that physicians from any specialty can pursue it. "We are different from other clinical subspecialties," said Vishnu Mohan, M.D., M.B.I., F.A.C.P., F.A.M.I.A., program director. "Physicians who go through our program not only develop skills that have to do with technology and data science, but also those that relate to managing people and projects. Additionally, their informatics skills are enhanced by their established skills in patient care."

It is a relatively new field for physicians. Dr. Drace caught the bug for computer coding as an undergraduate student when a friend taught her web design. It remained a hobby throughout medical school, but she did not see the potential for clinical informatics as a specialty until well into her GME training at Washington University in St. Louis.

"In residency, I realized a lot of the clinical tools were difficult to navigate and the user experience was not strong," she said. "I saw an opportunity to leverage my interest in coding by taking a design approach to information technology tools in health care."

She is finding an outlet for her diverse interests in the OHSU program. “It’s great to meet people like me, and be in an environment with physicians that think the way you do and get bothered by the same things you do,” said Dr. Drace.

History of a new subspecialty

The American Board of Medical Specialties first approved clinical informatics as a subspecialty of all physician specialties in 2011. In 2013, the American Board of Preventive Medicine began offering board certification and six OHSU School of Medicine faculty members became board-certified “clinical informaticians” that year.

Now, physicians seeking this board certification must complete a 24-month ACGME-approved fellowship in clinical informatics. The Department of Medical Informatics and Clinical Epidemiology administers the clinical informatics program. Known for excellence in all things informatics, the department has been a leader in distance learning for biomedical informatics. In fact, six of the country’s 35 programs send their fellows to take the online courses offered by OHSU.

“DMICE offers a broad spectrum of online courses for our graduate certificate, masters and PhD informatics programs, and we leveraged our expertise and the breadth of our extensive course catalog when we designed didactics for clinical informatics fellows. Other programs soon saw the advantages of outsourcing their didactic learning to OSHU. The experience of learning together has been great for all fellows who participate in our courses, because it allows them to progress as a virtual cohort,” said Dr. Mohan, who is also associate professor of medical informatics and clinical epidemiology, OHSU School of Medicine, and chair of the American Medical Informatics Association program directors community.

When the American Medical Informatics Association set out to create competencies for this new fellowship, OHSU stepped up to the challenge. William Hersh, M.D., F.A.C.M.I., F.A.M.I.A., F.A.C.P., professor and chair of medical informatics and clinical epidemiology, was essential to this effort.

Although the clinical informatics subspecialty is relatively new, OHSU has offered a graduate program, funded in part by an NIH training grant, in biomedical informatics for over two decades. It has also pioneered online learning in the informatics field since 1999. The program has nearly 700 alumni, many of whom work for health systems, industry, and academic medical centers.

Clinical informatics is part of the medical education continuum. Thanks in large part to Dr. Hersh and colleagues, medical informatics is a thread in the *YOUR M.D.* competency-based curriculum. House officers in other specialties do informatics projects and collaborate with the clinical informatics fellows. And, the OHSU clinical informatics program was one of the first in the country to issue Maintenance of Certification (MOC-II) credits for continuing medical education.

Part technical expert, part clinician

Dr. Mohan explained that the field of informatics explores how data flow, but also how clinicians and patients use them. “As an internist I am acutely aware of the clinician-patient interaction, and how clinicians interact with each other and with patients’ families. But as an informatician, I see the entire interconnected web of technology and people and the intricate network of information that flows all around us,” he said.

Logically, the electronic health record is a common focus for informatics experts. They have a unique perspective on how to improve care delivery with technology, while also humanizing what is a commonly cited source of stress for clinicians. For example, Jeff Gold, M.D., professor of medicine, and medical informatics and clinical epidemiology, OHSU School of Medicine, conducts research through simulation on how clinicians use Epic in order to improve their experience, as well as improve EHR training and software. He has collaborated with Dr. Mohan in this area. Learn more in this 2018 Professionalism Week presentation.

One of the executive positions clinical informaticians strive for is that of chief health information officer. At OHSU, Cort Garrison, M.D., M.B.A., fills the leadership role. He is also associate director of the clinical informatics fellowship program. Dr. Garrison is helping implement “sprints” throughout clinics in the OHSU Practice Plan. His systems approach to a clinic workflow allows him to see solutions to the everyday stressors experienced by a busy physician, medical assistant or practice manager. Ultimately, sprints aim to increase clinician engagement and well-being.

Alumni of the clinical informatics fellowship are putting their skills to work for the growing OHSU health system. Ani Chintalapani, M.D. F ’18, is now a clinical informaticist at Tuality Healthcare and a member of the Tuality Division of Hospital Medicine. He was integral to the Epic go-live at Tuality, providing “elbow support” to physicians getting to know the EHR and being a liaison between clinicians and the information technology group.

Dr. Chintalapani said learning the importance of systematic and evidence-based approaches to solutions during his OHSU clinical informatics training prepared him well for his current role. “IT in health care is still very much a human endeavor,” he said. “Your ability to succeed in this field depends on how well you can connect with people and navigate an organizational landscape.”

The go-live means the OHSU and Tuality EHR will ultimately integrate seamlessly, making for better patient care and an enhanced clinician experience – something any clinical informatician is happy to see.

By-the-numbers

More about the OHSU clinical informatics fellowship program

- Launched in 2015
- Celebrated its first graduates in June 2017
- Six fellows at any given time (a two-year program)
- Open to physicians in any board-certified specialty
- Program fellows maintain up to 20 percent FTE in their primary clinical specialty.

November 20, 2018

Incoming Student Caroline King Teams Up in Presentation on Gender Violence in Medical Training

Incoming Ph.D. student Caroline King, M.P.H., who is in her second year of the OHSU M.D./Ph.D. program, and her classmate Kelsey Priest, M.P.H., in her fifth year of the M.D./Ph.D. program, gave grand rounds (video available) for the Department of Medicine at OHSU last month. Ms. King will begin her Ph.D. studies in the department's Biomedical Informatics Graduate Program next year.

The presentation of Ms. King and Ms. Priest was titled, *Understanding and Addressing Gender Violence in Medical Training*. Their presentation provided an overview of the current challenges nationally in medical training related to gender-based harassment and violence and offered solutions for medical institutions to continue to improve. They also highlighted the recent work OHSU has done to address gender-based harassment and violence, including the creation of an institution-wide Confidential Advocate Program and support for DMICE

professor Karen Eden, Ph.D. to create a phone-based app to improve reporting services across campus.

More information about their talk is available on the OHSU O2 intranet (password required). The visibility Ms. King and Ms. Priest was on this issue was raised by a piece they published in the online magazine STAT, calling for the National Institutes of Health to follow the lead of the National Science Foundation in stopping gender violence in science.

If you or someone you know needs help addressing gender-based harassment or violence, this flowchart lists for options to report or speak with confidential resources at OHSU.

November 9, 2018

DMICE Faculty, Staff, and Students Present and Lead at AMIA Annual Informatics Symposium

Clinical informatics, bioinformatics, and clinical epidemiology were all represented as faculty, staff, and students from the Department of Medical Informatics and Clinical Epidemiology (DMICE) participated in the AMIA 2018 Annual Symposium, held in San Francisco, Calif. November 3-7. The yearly meeting is sponsored by the American Medical Informatics Association and is the premier academic conference for the field of biomedical informatics.

On Saturday, November 3rd, as part of the 9th Annual Workshop on Visual Analytics in Healthcare (VAHC), master's student and DMICE research associate **Connor Smith**, research associate **Rebecca Jungbauer, Dr.P.H.,** and associate professor **Annette Totten, Ph.D.,** were runners-up in the first VAHC design challenge, which included projects on visualizations created for patients, clinicians, and researchers, and was judged by a panel of informatics and data visualization experts. The OHSU entry was entitled **"Visual Evidence: Increasing Usability of Systematic Reviews in Health Systems Guidelines Development."** The team developed a dynamic, Tableau-based visualization of data from a recent systematic review on noninvasive, nonpharmacological

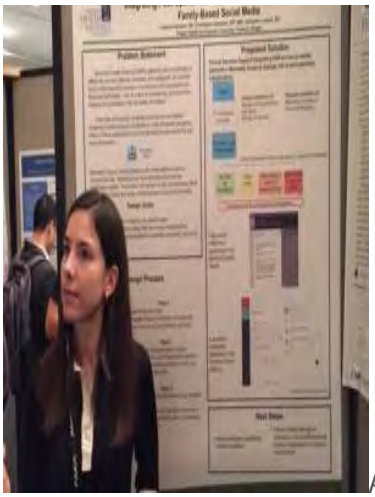
treatment for chronic pain. The purpose of the visualization was to demonstrate improved usability and interpretability of data from systematic reviews for use by clinical guidelines development committees, as part of a project funded by AHRQ and conducted by the Pacific Northwest Evidence-based Practice Center, housed in DMICE. As one of the winners, the team will be invited to submit for publication in *Applied Clinical Informatics (ACI)* as part of a Special Topic in Visual Analytics. In addition, a full report from their Agency for Healthcare Research and Quality (AHRQ) project will be published on AHRQ's Effective Health Care Program website in the near future.

Professor **Shannon McWeeney, Ph.D.,** participated in a five-person panel on Monday, November 5th, entitled "**Data Science in Biomedical Informatics Education: Critical Problems and Innovative Solutions."**

Professor and chair **William Hersh, M.D.,** was a member of a panel on **"Collaborative Science Within Academic Medical Centers: Opportunities and Challenges for Informatics"** on Tuesday, November 6th, and also presented at the AMIA Learning Showcase, **"The Full Spectrum: Biomedical and Health Informatics Education at Oregon Health & Science University"** on Monday, November 5th.

Professor **David Dorr, M.D., M.S.**, recent master's graduate **Raja Cholan,** and project manager **Bhavaya Sachdeva** were among the authors of **"Health Information Technology Needs of Community Health Center Care Teams: Complex Patients and Social Determinants of Health Information,"** presented by professor **Deborah Cohen, Ph.D.**, of OHSU Family Medicine and DMICE. The presentation was on Monday, November 5th.

Also on Monday, professor **Joan Ash, Ph.D.,** presented **"A Sociotechnical Multiple Perspectives Approach to the Use of Medical Scribes: A Qualitative Study."** Associate professor **Vishnu Mohan, M.D., M.B.I,** and professor **Jeffrey Gold, M.D.,** were co-authors.



At the Monday poster session, master's student **Carolina Heimann** presented a poster for the student design challenge, co-authored by Ph.D. student **Christopher Hoekstra** and master's student **Samantha Lawson**, entitled **"Integrating Post-Operative Complication Risk Assessment into Family-Based Social Media."**

Two Ph.D. students gave oral presentations related to the use of informatics in ophthalmology. On Tuesday, November 6th, **Wei-Chin Lin** presented **"Secondary Use of Electronic Health Record Data for Prediction of Outpatient Visit Length in Ophthalmology Clinics,"** on which assistant professor **Michelle Hribar, Ph.D.,** and professor **Michael Chiang, M.D., M.S.,** were co-authors. Ph.D. student **Aaron Coyner** gave a presentation on **"Deep Learning for Image Quality Assessment of Fundus Images in Retinopathy of Prematurity"** on Wednesday, November 7th. Ph.D. student **Ryan Swan** and **Dr. Chiang** were among the co-authors.

Also on Wednesday, **Dr. Hribar** presented **"Clinical Documentation in Electronic Health Record Systems: Analysis of Patient Record Review During Outpatient Ophthalmology Visits,"** with Dr. Chiang as a co-author. In a related talk, former clinical informatics fellow **Abigail Huang, M.D.** presented **"Clinical Documentation in Electronic Health Record Systems: Analysis of Similarity in Progress Notes from Consecutive Outpatient**

Ophthalmology Encounters," with **Drs. Chiang and Hribar** and **Mr. Lin** as co-authors. Research Associate **Isaac Goldstein**, a former DMICE summer intern, presented a paper co-authored with **Drs. Chiang and Hribar** entitled **"Total Time Requirements of Electronic Health Record Use by Ophthalmologists using Secondary EHR Data."**

Dr. Hersh was also elected as Chair of the Biomedical and Health Informatics Academic Leaders Community of the AMIA Academic Forum. He also led the in-person session of his 10×10 ("ten by ten") course as well as welcomed about 45 students, alumni, faculty, and others at the annual **OHSU Dessert Reception** on Monday evening.

November 1, 2018

DMICE Alumni Comprise Over 11% of Newly Recognized Fellows of AMIA

This year, the American Medical Informatics Association (AMIA), the professional association for the field of biomedical and health informatics, started a new Fellowship designation for members "who apply informatics skills and knowledge within their professional setting, who have demonstrated professional achievement and leadership, and who have a sustained commitment to the betterment of AMIA."

Fellows of AMIA (FAMIA) become eligible for fellowship through either formal certification (such as via having an advanced healthcare or doctoral degree) or having long-term experience in the field. Fellows must have sustained commitment to the field as well as AMIA.

At Oregon Health & Science University (OHSU), we are pleased to announce that two faculty in the Department of Medical Informatics & Clinical Epidemiology (DMICE) and 15 alumni of

our Biomedical Informatics Graduate Program are among the 130 members of the inaugural class of Fellows.

According to DIMICE Chair and new AMIA Fellow William Hersh, MD, FACP, FACMI, FAMIA, "Over 11% of the inaugural class of AMIA Fellows are alumni of our informatics educational program. This demonstrates the impact that OHSU has had on the informatics field."

The other DMICE faculty to become a Fellow of AMIA is Vishnu Mohan, MD, MBI, FACP, FAMIA, who also serves as Director of the OHSU Clinical Informatics Physician Subspecialty Fellowship.

The 15 program alumni who are in the inaugural class of Fellows include:

- Mark Baker, Pali Momi Medical Center/Hawaii Pacific Health
- Bimal Desai, Children's Hospital of Philadelphia
- Peter Embi, Regenstrief Institute
- Laura Fochtmann, Stonybrook University, School of Medicine
- Charles Hu, Legacy Health
- Ron Jimenez, Palo Alto Medical Foundation
- Jodi Kodish-Wachs, Cerner
- Eli Lourie, Children's Hospital of Philadelphia
- Vishnu Mohan, Oregon Health & Science University
- Carolyn Petersen, Mayo Clinic
- Lazaro Nelson Sanchez-Pinto, Northwestern University
- Eric Shelov, Children's Hospital of Philadelphia
- Amy Wang, University of Alabama at Birmingham
- Keith Woeltje, BJC HealthCare
- Adam Wright, Brigham and Women's Hospital

The inaugural class of Fellows will be inducted into FAMIA at the AMIA 2019 Clinical Informatics Conference, in Atlanta, April 30 – May 2, 2019.

October 25, 2018

PhD student Joshua Burkhart co-authors two journal articles

 DMICE Biomedical Informatics PhD student Joshua Burkhart recently co-authored two journal articles.

The first was an article in *Science Advances* describing evidence of a novel mechanism for metastasis whereby tumor-infiltrating macrophages fuse with cancer cells to yield binucleated hybrid cells capable of both avoiding immune detection within the vasculature and seeding metastatic sites. The paper was published with members of Dr. Melissa Wong's lab and other collaborators.

As a participant of the Sage Bionetworks Respiratory Viral DREAM Challenge, Joshua also worked with DMICE faculty Dr. Shannon McWeeney to develop TSAR, a machine learning strategy to predict human viral response using gene expression data. Following the challenge phase, he participated in working groups to analyze and interpret results along with other challenge participants. Preliminary findings were presented at RECOMB/ISCB Conference on Regulatory & Systems Genomics in November 2017 and the final report was published in *Nature Communications*.

Joshua noted, "Jeff Bezos gave an interview to Forbes in which he described a situation where he was congratulated for Amazon's having a profitable quarter and responded by saying 'Thank you, but that quarter was baked three years ago. I'm working on a quarter that'll happen in 2021 right now.' The story brought about a sense of symmetry for me as I've recently finished two of my research projects but am already deeply involved in projects that won't be made public for months or years."

October 18, 2018

Three DMICE Alums Co-Author New AMIA Code of Professional and Ethical Conduct

Three alumni of the OHSU Biomedical Informatics Graduate Program were among the co-authors of the new American Medical Informatics Association (AMIA) Code of Professional and Ethical Conduct. The code was published in the Journal of American Medical Informatics

Association (JAMIA) on October 17, 2018. The lead author was Carolyn Petersen, MS, MBI, and the other two co-authors were Peter Embi, MD, MS, and Kate Fultz Hollis, MS, MBI.

The original code was published in 2007, and a subsequent code appeared in 2013, but the changes with how we approach data now ethically requires frequent updates to the field's professional code. Ms. Petersen remarked that, "the third edition of the AMIA Code of Ethics addresses the emerging challenges facing informaticians as new technologies and a greater focus on patient-centered care and research become the norm. As with previous versions, the experience of informaticians working in a broad range of disciplines has brought a balanced, real world-based perspective to the Code."

In reference to the "living" character of the code, co-author and informatics ethics expert Ken Goodman, PhD, said, "The new Code brings us into the second decade of AMIA leadership in articulating such standards for a still-rapidly growing field. Moreover, it also demonstrates how such documents can remain vibrant – most of the rest of my electrons are turning pale and yellow. The Code is *alive*!"

October 11, 2018

DMICE Faculty Heidi Nelson Inducted as Fellow of the Royal College of Physicians

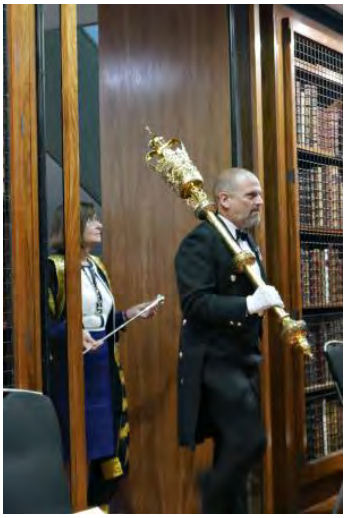
Heidi D. Nelson, M.D., M.P.H., M.A.C.P., F.R.C.P., professor of medical informatics and clinical epidemiology and medicine, was inducted as a Fellow of the Royal College of Physicians (RCP) in London on September 26, 2018. Dr. Nelson was one of 25 Masters of the American College of Physicians (M.A.C.P.) elected to fellowship to mark the 500th Anniversary of the RCP. The American College of Physicians is the largest medical specialty organization and the second-largest physician group in the United States that includes 148,000 internal medicine physicians (internists), related subspecialists, and medical students.

The RCP was established by King Henry VIII in 1518 as a professional organization for physicians. Its core mission is to drive improvements in health and healthcare through advocacy, education, and research.

Fellowship in the RCP is a prestigious honor held by some of the most innovative and exceptional physicians in the world. Election to fellowship is a mark of achievement and skill as a physician, and recognizes ongoing contributions to the profession. Fellows support and contribute to the RCP's efforts to champion the values of the medical profession, promote and improve patient-centered care, influence the health care agenda, and improve standards in clinical practice.

Following are photos from the event. Dr. Nelson in the medicinal gardens at the Royal College of Physicians in London.

Fellowship processional with president professor Dame Jane Dacre, September 26, 2018.



Portrait of King Henry VIII.

Charter of incorporation for the College by King Henry VIII under the Great Seal, 1518.

September 5, 2018

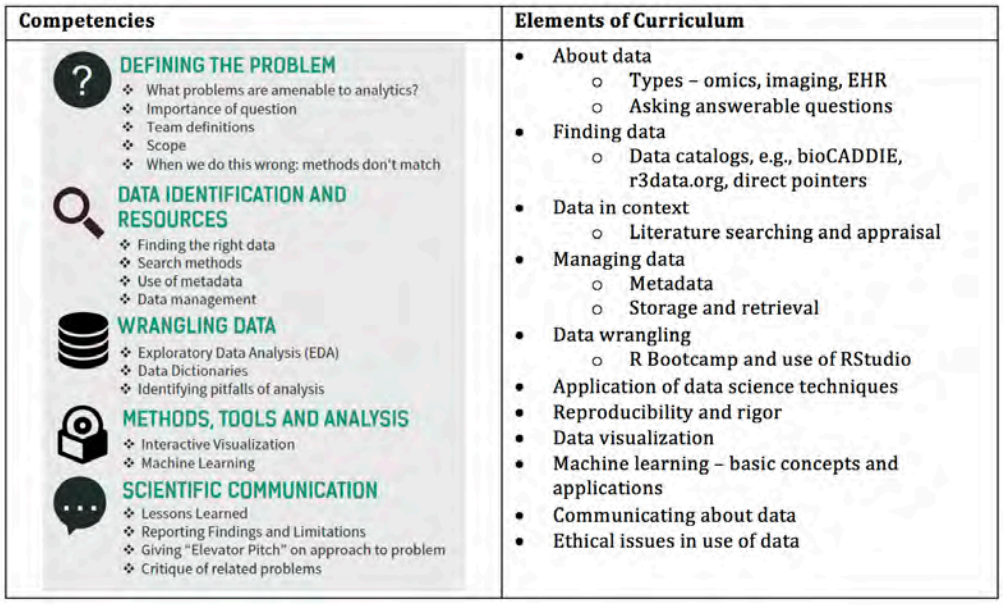
Department Awarded NLM Funding for Data Science Education

The Department of Medical Informatics & Clinical Epidemiology (DMICE) has been awarded two $100,000 administrative supplements to its National Library of Medicine (NLM) T15 training grant to develop educational offerings in biomedical informatics and data science (BIDS). The first award will assure BIDS proficiency in the training of those pursuing biomedical research careers, with an emphasis on predoctoral students and postdocs who are funded by T32 and other training grants from various institutes and centers of the National Institutes of Health (NIH). The second award will provide paid short-term (10 hours per week for 10 weeks) and full summer internship (40 hours per week for 12 weeks) opportunities for college undergraduates and high school students to increase their skills in data literacy and stewardship by working intensively with faculty on active research projects.

Both awards were funded by the NLM to address goals in its recently released Strategic Plan 2017–2027, which aims to develop a platform for Biomedical Discovery and Data-Powered Health. One of the three goals of the strategic plan is to “build a workforce for data-driven research and health.”

The overall goal of the first award is to work with all of the PhD and postdoctoral programs in the School of Medicine (SOM) of Oregon Health & Science University (OHSU) to assure proficiency of all PhD students and postdocs in BIDS. Activities will build upon the wealth of educational content and delivery developed by DMICE. The development of this content has come from a variety of funding sources, including the NLM, the NIH (mainly through the Big

Data to Knowledge [BD2K] program), and the Office of the National Coordinator for Health IT. The BD2K efforts included the development of 22 open educational resource (OER) modules in a variety of data science topics as well as skills courses based on a variety of datasets. The department has a wealth of experience in delivering this educational content to a wide variety of audiences through a variety of online and in-person means. The figure below displays the competencies developed in the OHSU BD2K work and the potential curricular elements to be offered to the various educational programs.



Competencies	Elements of Curriculum

DEFINING THE PROBLEM
❖ What problems are amenable to analytics?
❖ Importance of question
❖ Team definitions
❖ Scope
❖ When we do this wrong: methods don't match
DATA IDENTIFICATION AND RESOURCES
❖ Finding the right data
❖ Search methods
❖ Use of metadata
❖ Data management
WRANGLING DATA
❖ Exploratory Data Analysis (EDA)
❖ Data Dictionaries
❖ Identifying pitfalls of analysis
METHODS, TOOLS AND ANALYSIS
❖ Interactive Visualization
❖ Machine Learning
SCIENTIFIC COMMUNICATION
❖ Lessons Learned
❖ Reporting Findings and Limitations
❖ Giving "Elevator Pitch" on approach to problem
❖ Critique of related problems
	• About data
	  ○ Types – omics, imaging, EHR
	  ○ Asking answerable questions
	• Finding data
	  ○ Data catalogs, e.g., bioCADDIE, r3data.org, direct pointers
	• Data in context
	  ○ Literature searching and appraisal
	• Managing data
	  ○ Metadata
	  ○ Storage and retrieval
	• Data wrangling
	  ○ R Bootcamp and use of RStudio
	• Application of data science techniques
	• Reproducibility and rigor
	• Data visualization
	• Machine learning – basic concepts and applications
	• Communicating about data
	• Ethical issues in use of data

Some other recent innovations in the OHSU SOM make this project opportune. The SOM is implementing a new innovative PhD program in Biomedical Science that aims for a more flexible and efficient curriculum reflecting changes in science (e.g., open science, team science, etc.) as well as the careers of scientists. The SOM is also undertaking a specific goal to increase the number of physician-scientists on its faculty. This effort includes a revamping of OHSU's MD/PhD program (in which biomedical informatics PhD students participate through our T15 training grant). Indirectly related to this proposal but also of note are analogous efforts to infuse BIDS curricula in the SOM's MD educational program, insuring that 21st century physicians have the skills to practice medicine in our evolving technology- and data-rich environment.

The second award will establish a Data Science Collaboratory Research Experience Program for undergraduates and high school students. The program will provide paid short-term (10 hours per week for 10 weeks) and full summer internship (40 hours per week for 12 weeks) opportunities to work intensively with faculty on current research projects. The main goal of this program has been to increase data literacy and stewardship skills while introducing students to careers and possible pursuit of graduate study in data science and biomedical informatics.

August 2, 2018

Big Changes, Little Changes: OHSU Biomedical Informatics Graduate Program Undergoes Renaming and Other Changes

A couple years ago, the Oregon Health & Science University (OHSU) Biomedical Informatics Graduate Program undertook what seemed like a simple process of renaming the two tracks in the program. The university decided, however, that the two tracks of our program had grown sufficiently different that they actually warranted being separated into two programs. As such, the whole process took much longer than we anticipated. But all of the approvals and accreditations are now complete, and we can report on the changes.

Although the changes to the program and degree names are big, the underlying curriculum and courses are mostly unchanged, still reflecting the current (and ever-evolving) state of our dynamic field. In a nutshell, the "tracks" are now called "majors," and their names are somewhat changed. In addition, we are renaming the two master's degrees, with the former Master of Science (MS) degree now being called MS Thesis and the former Master of Biomedical Informatics (MBI) now called MS Non-Thesis. All master's students will be able to call their degree MS for short.

A little history may be in order. Since 2006, the program has had two tracks, which have been called Clinical Informatics (CI) and Bioinformatics & Computational Biology (BCB). These two pathways through the program have been called tracks because they represent, in our view, two different foci within the larger field of biomedical informatics, which is the discipline that acquires, organizes, and uses data, information, and knowledge to advance health-related sciences. Historically, the differences between the tracks represented their informatics focus, in particular people, populations, and healthcare (clinical informatics) vs. cellular and molecular biology, genomics, and imaging (bioinformatics).

In recent years, however, these distinctions have blurred as "omics" science has worked its way into clinical medicine and public health. At the same time, health, healthcare, and public health have become much more data-driven, due in no small part to the large-scale adoption of electronic health records. Reflecting these changes, we decided to rename the tracks to Health & Clinical Informatics (HCIN, adding the health aspects) and Bioinformatics & Computational Biomedicine (still BCB, but with the latter word changed to biomedicine, reflecting the broader focus of bioinformatics and data science being applied in medicine).

Another wrinkle in the name-changing process was that the OHSU administration requested that we drop the "tracks" monikers and instead separate the program into two different "majors." This was requested because the two tracks have very few overlapping courses.

The two majors still represent related aspects of the field, mostly in their depth of quantitative methods (deep in BCB vs. more applied in HCIN) but also in coverage of other topics (e.g., more attention to system implementation in complex healthcare environments and clinical data quality and standards in HCIN). Likewise, our National Library of Medicine (NLM) training grant will be available to students in both majors.

The program believes that both majors possess a set of common competencies at a high level that reflect the essential knowledge and skills of individuals who work in biomedical informatics. The curriculum organizes these competencies into *domains*, which are groups of required and elective courses that comprise the core curriculum of each major. To reflect the evolution of the program, the program has renamed the BCB track to Bioinformatics and Computational Biomedicine (still abbreviated BCB) and the CI track to Health and Clinical Informatics (now to be abbreviated HCIN). Each of the domains contains required courses, *individual competency* courses (where students are required to select a certain number of courses from a larger list, which used to be called *k of n* courses), and elective courses.

The program will continue the overall structure of the curriculum with the *knowledge base* that represents the core curriculum of the MS degrees and the base curriculum for advanced study in the PhD program. A thesis or capstone is added to the knowledge base to qualify for the MS Thesis or MS Non-Thesis respectively. The MS Non-Thesis capstone can also consist of an internship. Additional courses are required for the PhD, ultimately culminating in a dissertation.

The materials and Web site for the program will be updated to reflect the new names. The program will also be evolving course content as well as introducing new courses to reflect the foci of the new tracks. The program still fundamentally aims to train future researchers and leaders in the field of biomedical informatics.

Below is a copy of a letter sent to all current students reflecting the change:

Dear Biomedical Informatics Faculty and Students,

We are sending this email to announce several changes in the biomedical informatics degrees taking effect during the 2018-2019 academic year. Upon review of the former tracks in the program, the Provost's office determined that these tracks differed to such an extent that they needed to be reclassified as two discrete programs. We have assigned slightly different names to the new programs as well. The changes will affect students admitted Summer 2018 and following terms. *They do not affect students admitted any time prior to Summer 2018.* More details about these changes will be posted to the department blog (https://blogs.ohsu.edu/health-data/) and to the department website in the next few weeks.

The changes are as follows:

New degree

A new degree has been added–the Master of Science (MS) Non-Thesis (49 credits). The MS Non-Thesis replaces the Master of Biomedical Informatics (MBI) for incoming students as of Summer 2018. The Master of Science (MS) Thesis and the PhD remain unchanged. Anyone who graduates with either master's degree may put the letters "MS" after their name.

Name changes

The "Clinical Informatics (CI) Track" has been renamed and reclassified as the "Health and Clinical Informatics (HCIN) Program." (The "HCI" abbreviation was in use by another department, hence "HCIN.") This change will be in effect for the graduate certificate, MS Thesis, MS Non-Thesis and PhD.

The "Bioinformatics and Computational Biology (BCB) Track" has been renamed and reclassified as the "Bioinformatics and Computational Biomedicine (BCB) Program." This change will be in effect for the MS Thesis, MS Non-Thesis and PhD.

These are now discrete programs and are no longer two tracks of the former "Biomedical Informatics" program. Both programs will continue to be administered by the Department of Medical Informatics & Clinical Epidemiology. All courses will continue to use the BMI prefix, and students in one program will be able to take required or elective courses in the other program. Both of the new programs will be offered to PhD and postdoctoral students under our National Library of Medicine Training Grant.

Application changes

The MS Non-Thesis will appear on the application as an option in both programs beginning with the Winter 2019 term.

- Students admitted to the *MBI CI* Summer 2018 or Fall 2018 will be transitioned to the *MS Non-Thesis HCIN*. The coursework is identical and the final deliverables remain the same, i.e., either the BMI 581 Capstone or the BMI 590 Capstone:Internship.
- Students admitted to the *MS Thesis BCB* Summer 2018 or Fall 2018 will have the option to switch to the new, 49-credit, *MS Non-Thesis BCB*. The coursework is nearly identical and the final deliverable will be a BMI 590 Capstone:Internship (practical work experience) rather than a thesis. I will contact those students directly to discuss this option.

New Postdocs

Incoming postdocs in both programs will automatically be admitted to the new *MS Non-Thesis*. The coursework is essentially the same as that of the MS Thesis. The two primary difference is that the MS Non-Thesis requires a total of 49 credits, rather than the 55 credits in

the MS Thesis. The final deliverable for all postdocs will be a publishable manuscript. The manuscript should be packaged following the instructions on the DMICE website before submission to the library.

The program and name changes for new students matriculating in the 2018-2019 academic year will be scribed in SIS and in Degree Audit in the next few weeks.

July 30, 2018

New Analysis of Healthcare Information Technology Workforce Shows Continued Growth and Opportunity

A new study from the OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE) finds that as hospitals and health systems continue to adopt electronic health records (EHRs) and other forms of information technology (IT), as many as 19,852 to 153,114 more full-time equivalent (FTE) personnel may be required. The new analysis is published by DMICE chair William Hersh, M.D.; Master's graduate Keith Boone, M.B.I.; and DMICE associate professor Annette Totten, Ph.D. in the new journal, *JAMIA Open*.

The study provides an update of a 2008 paper using an industry resource, the HIMSS Analytics Database, which mostly focuses on the IT systems that hospitals and health systems implement, but also contains data on IT staffing FTE. The original paper garnered a great detail of attention when it was published in 2008, including an invitation to present the results in Washington, DC to the Capitol Hill Steering Committee on Telehealth and Healthcare Informatics and influenced the workforce funding that was part of the Health Information Technology for Economic and Clinical Health (HITECH) Act. It informed the $118 million investment in workforce development that was part of the HITECH Act.

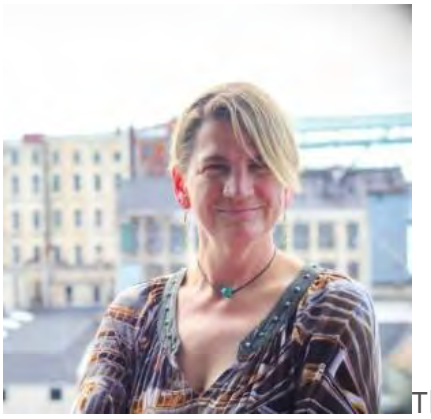
More details on the story behind the paper are in a posting to Dr. Hersh's Informatics Professor blog. The paper is published as open-access and is freely available

at https://doi.org/10.1093/jamiaopen/ooy029. The data used in the study is also available for access at https://doi.org/10.5061/dryad.mv00464.

As the need for data and information to improve operations and innovations in health-related industries grows, a large and well-trained workforce will continue to be critical, and many career opportunities will continue to be available to those who want to join the informatics workforce. Also of note, the data used in this analysis focus only on hospitals and health systems, so informatics/IT workforce growth will likely occur in other health and biomedical-related areas. The results remind us that there remain and will likely be growing opportunities for those who train and work in biomedical and health informatics.

July 24, 2018

Dr. Shannon McWeeney Awarded Medical Research Foundation Mentor Award for 2018



The Medical Research Foundation (MRF) is presenting its Mentor Award for 2018 to Shannon K. McWeeney, Ph.D., professor of biostatistics and bioinformatics, head of the Division of Bioinformatics and Computational Biology, and vice chair in the Department of Medical Informatics and Clinical Epidemiology. The Mentor Award is presented to an Oregonian who has provided outstanding leadership and support of health research, education, or the advancement of health care.

Dr. McWeeney also serves as the director of translational bioinformatics for the Oregon Clinical and Translational Research Institute (OCTRI), which is OHSU's Clinical and Translational Science Award (CTSA) program. OHSU was among the first 12 CTSA centers funded in 2006 and has been funded continuously since then. The Translational Bioinformatics program is focused on development and application of statistical and computational methodologies to solve research "bottlenecks," as well as regional and inter-CTSA program development and training. In 2009, Dr. McWeeney was recognized by OHSU as a recipient of the Chair's Award for Research. Nationally, in 2010, she was selected as a Kavli

Frontiers Fellow by the U.S. National Academy of Sciences and in 2016, she served on the Enhanced Data Sharing working group for the NCI Blue Ribbon Program for the White House Moonshot Initiative.

This award honors Dr. McWeeney's long-time, ongoing commitment to mentoring and career development. She serves as the associate director for computational biomedicine for the DMICE National Library of Medicine-sponsored T15 pre-doctoral and postdoctoral training grant. In addition, she has mentored master's, Ph.D., and M.D./Ph.D. students; postdoctoral fellows, junior clinical scientists; and assistant and associate professors during her time at OHSU. She has been continually recognized by OHSU for her contributions to education, teaching and mentoring (Faculty Excellence in Education award in 2010; Teaching Excellence in Graduate Education awards in 2012 and 2017). With respect to training faculty, staff and students in analytics, data science and data stewardship, she served as principal investigator (in a multiple PI mechanism) on two National Institutes of Health-sponsored Big Data to Knowledge (BD2K) grants focused on developing and disseminating both open educational analytics and data science resources, as well as an OHSU Informatics Analytics BD2K Skill Course to enable researchers and students to gain crucial analytics and data skills and competencies as part of the Big Data to Knowledge initiative. She also served on the EDC Oceans of Data Big Data Skills Profiling panel, a national panel with representatives from Microsoft, Google, and the Jet Propulsion Laboratory, among others, to develop an educational profile for big data-enabled workforce training. She is currently the education lead for the new National Center for Advancing Translational Sciences-funded National Center for Data to Health (CD2H).

Dr. McWeeney is the second DMICE faculty member to win the MRF Mentor Award since selections began in 1986. Cynthia D. Morris, Ph.D., M.P.H., professor, was the first in 2004. The ceremony will be held later this fall.

June 13, 2018

Department Co-Sponsors Successful Cascadia-R Conference

The second Cascadia-R Conference took place in Portland, OR on June 2, 2018. The conference was co-organized by Ted Laderas, Ph.D., Assistant Professor, Department of Medical Informatics & Clinical Epidemiology (DMICE). It brought together 224 participants interested in applications of the R language. DMICE was one of the sponsors of the conference.

The conference featured keynote presentations, hands-on workshops, and lightning talks. It was made more accessible by offering child care as well as diversity scholarships. The conference Web site features an agenda page with links to bios, slides, and other materials.

This was second offering of the conference, coming on the heels of last year's successful conference.

June 10, 2018

Two OHSU Informatics Ph.D. Students Receive Awards at National Meeting

Two OHSU biomedical informatics graduate students received awards at the annual meeting of informatics trainees sponsored by the National Library of Medicine (NLM) of the National Institutes of Health (NIH). This meeting is held annually to bring together the 300 Ph.D. and postdoctoral students who are funded by training grants from the NLM that are awarded to 16 universities, including OHSU.

The two-day meeting, hosted this year by Vanderbilt University, featured paper, poster, and "open mic" presentations from about 100 of the trainees representing the 16 universities as well as those receiving informatics training at the NLM and at Veteran's Administration sites. Four awards were given to the best paper for each day as well as the best poster and open mic presentation. OHSU students received two of the four awards.

Dana Womack, R.N., M.S., Ph.D. candidate, received one of the two best paper awards. Her presentation, *Secondary Use of Ambient Data to Enable Automated Workplace Insight*, reported on her Ph.D. dissertation that she had successfully defended the prior week.

Benjamin Cordier, Ph.D. student, received the award for the best open mic presentation for his presentation, *Quantum Algorithms for Bioinformatics and Clinical Informatics*.

Other OHSU students presenting at the conference included:

- Steve Chamberlin, N.D. – *Natural Product Target Network to Expand Treatment Options in Cancer* (paper presentation)
- Joshua Burkhart, Ph.D. student – *Pancancer Reactome Functional Interaction and Reaction Network Analyses Reveal Patterns Associated with TCGA Patient Survival* (poster)
- Ilya Ivlev, M.D., Ph.D., – *Breast Cancer Screening Patient Decision Aids: Potential Effect and Implementation* (poster)

"I have attended this meeting almost every year dating back to when I was an NLM trainee in the late 1980s," said William Hersh, M.D., principal investigator of OHSU's NLM training grant. "It is always great to see the enthusiasm and new ideas that come from the future leaders of our field. Whether applying informatics to genomes, patients, or populations, they will advance the use of information to improve health and healthcare." Dr. Hersh also serves as director of OHSU's Biomedical Informatics Graduate Program and as professor and chair of the OHSU School of Medicine's Department of Medical Informatics & Clinical Epidemiology (DMICE).

The DMICE NLM informatics training grant is the largest and the second-longest standing at OHSU.

June 7, 2018

DMICE Chair Co-Editor of New Edition of Health Informatics Textbook

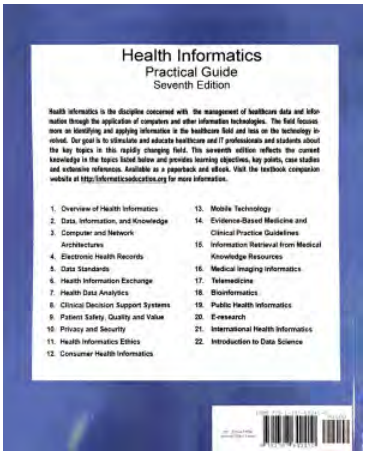
William Hersh, MD, professor and chair, Department of Medical Informatics & Clinical Epidemiology, is Co-Editor of the newly published textbook, *Health Informatics: Practical*

Guide, Seventh Edition. The other Co-Editor of the book is Robert Hoyt, MD of the University of West Florida. Dr. Hersh is also among the one or more authors of eight chapters in the book.

"I am honored to join Dr. Hoyt in co-editing this important general textbook of health informatics," said Dr. Hersh, pictured with the book to the right. Another picture below shows the back cover that lists the table of contents of the book.

The book is available for purchase on the LuLu.com Web site in both print and eBook PDF formats. The book will also be made available from the more "traditional" online booksellers, such as Amazon.com. Dr. Hoyt also maintains a Web site for the book that includes a special area for those who use the book as instructors (and can request an evaluation copy).

The content of the new book is well-aligned with the well-known introductory course that Dr. Hersh teaches, which is variably called 10×10 ("ten by ten," the standalone version in partnership with the American Medical Informatics Association) and BMI 510 (one of the initial courses in the OHSU Biomedical Informatics Graduate Program).


Health Informatics
Practical Guide
Seventh Edition

1. Overview of Health Informatics
2. Data, Information, and Knowledge
3. Computer and Network Architectures
4. Electronic Health Records
5. Data Standards
6. Health Information Exchange
7. Health Data Analytics
8. Clinical Decision Support Systems
9. Patient Safety, Quality and Value
10. Privacy and Security
11. Health Informatics Ethics
12. Consumer Health Informatics
13. Mobile Technology
14. Evidence-Based Medicine and Clinical Practice Guidelines
15. Information Retrieval from Medical Knowledge Resources
16. Medical Imaging Informatics
17. Telemedicine
18. Bioinformatics
19. Public Health Informatics
20. E-research
21. International Health Informatics
22. Introduction to Data Science

June 5, 2018

Congratulations to DMICE Graduates of 2018!

As Oregon Health & Science University celebrated commencement on Sunday, June 3, 2018, at the Oregon Convention Center, the Department of Medical Informatics and Clinical Epidemiology (DMICE) had 41 students who had completed or were set to complete their degrees this academic year, between fall term of 2017 and summer term of 2018.

OHSU held a convocation for graduates of all its schools, followed by hooding ceremonies for the individual schools. At the School of Medicine hooding and completion ceremony, Karen Eden, Ph.D., professor, announced the graduates for the biomedical informatics program. Ph.D. students Aurora Blucher and Dana Womack were hooded by their advisers, Shannon McWeeney, Ph.D., professor and vice chair, and Michelle Hribar, Ph.D., assistant professor, respectively. Those who attended are shown below.

Convocation attendees, left to right: Shannon McWeeney, Lisa Karstens, Michelle Hribar, Derrick Hee, Ben Lawrence, Gretchen Scholl, Mark Klick, Yuanye Christie Lu, Vincent Caruso, Lindsey Watson, Aurora Blucher, Dana Womack, Karen Eden.

“It is exciting to see the new graduates finishing their studies and going off to do great things in informatics,” said William Hersh, MD, DMICE professor and chair. “We now have 692 alumni of the program who have received 757 degrees and certificates dating back to the start of our program in 1996.”

Graduates of the biomedical informatics program this academic year include:

Doctor of Philosophy in Biomedical Informatics

Aurora Skye Blucher

Dissertation: *The Cancer Targetome and its Application to a Pathway Perspective on Targeted Therapy Response in Acute Myeloid Leukemia*

Nathan H. Lazar

Dissertation: *A Bayesian Tensor Factorization Algorithm to Predict Drug Response in Cancer Cell Lines*

Dana Marie Womack

Dissertation: *Recognition of Hospital Work System Strain through Knowledge Elicitation, Multi-source Data Integration and Analysis*

Master of Science in Biomedical Informatics

Vincent Matthew Caruso

Steven R. Chamberlin

Erin Nicole Hickman

Mark T. Klick

Jason Jensen Li

Adam Therneau

Andrew Wen

Master of Biomedical Informatics

Mitzi Lynn Boardman

David Yale Gelman

Derrick Bowen Hee

Lawrence Hsu

Ilya Ivlev

Banjamin Lee Lawrence

Yuanye Lu

Raghavendra Mishra

Srinivas Reddy Mummadi

Maximilian Nobunori Schimpf

Jonathan Michael Tan

Amy Yunhsin Wang

Lindsey Kiley Watson

Theodore Brady Wright

Graduate Certificate in Biomedical Informatics

David Boston

Yee T. Chang

Maya Lynn Dewan

Daria Ferro

Noah Finkel

Laura L. Hickerson

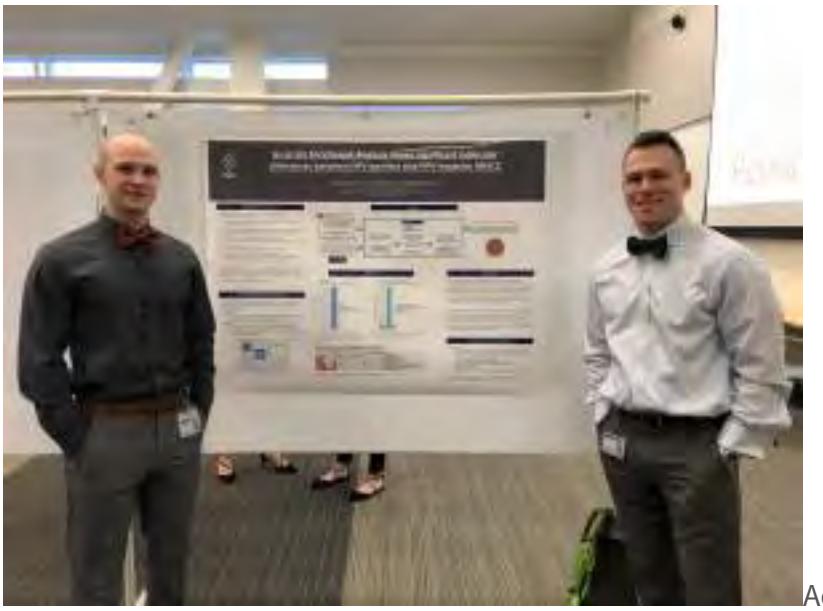
Evan William Orenstein

Allison Lynn Owen
Sang Su Pak
Gretchen Roxanne Scholl
Daniel Nathan Seitz
Antenor P. Vilceus
Elizabeth S. Zentzis

May 30, 2018

Post-Doc Fellow and Dentist Mentors OHSU Dental Students to Award in Research Project

Post-doctoral fellow Mitzi Boardman, DDS, MS, who is both a student in the Bioinformatics and Computational Biology (BCB) educational program as well as a trained dentist, recently had the opportunity to mentor dental students in the OHSU School of Dentistry. As her research involves using computational methods to better understand the molecular mechanisms of head and neck cancer, she hoped to give dental students the opportunity to experience an area of research that they would not otherwise encounter in their training. She felt that the topic of head and neck cancer was highly relevant for them as they are on the front lines of early diagnosis for this prevalent cancer.

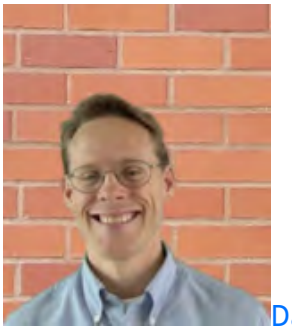
 According to Dr. Boardman, “I reached out and was welcomed to present my project to the student research group at the dental school to try to engage interested students. Two brilliant, enthusiastic, and committed second year dental students stepped up, and we worked together for several months. We met once each week for 1-2 hours. We processed our data and ran analyses during our meetings, and they did their reading and writing and thinking in between. In addition to their having a well-rounded research project and poster to present at research day, we had a lot of fun working together and they told me that it was a great growth experience for them.”

 The students, Nicolas Maxim and James Bonar, presented their work at the dental school’s research day and were selected to present at the Oregon Dental Association Conference, where they took part in the student research competition. They won first place and a $1000 scholarship sponsored by the Oregon Dental Association. Dr. Boardman felt that the opportunity to work directly with the students

and being a part of their success and growth as professionals was highly rewarding. She added, “I highly recommend seeking out mentorship opportunities as they are a vehicle for connecting our work with outside departments as well as building relationships that can be uplifting and empowering for the mentor as well as the mentee.

May 15, 2018

DMICE Professor and Vice Chair Appointed as OHSU Chief Research Information Officer

 David A. Dorr, M.D., M.S., professor and vice chair, Department of Medical Informatics & Clinical Epidemiology (DMICE), has been appointed OHSU’s chief research information officer (CRIO). Dr. Dorr’s major activities in this role will be to facilitate technology and software systems to support the innovation of OHSU researchers, with a focus on clinical and translational informatics, computational techniques, implementation science and clinical research.

“This is exciting not only for David, who will be able to advance his informatics leadership role,” said DMICE chair William Hersh, M.D., “but also for the university, which needs coordinated informatics leadership across all missions, including research, clinical care, and education. I also hope there will be synergy with the academic activities of our department, leading to more advances in the use of informatics to improve health, healthcare, and research.”

More information is available in a posting on the OHSU Research Blog.

May 7, 2018

OHSU Informatics Faculty and Former Postdoc Develop Machine Learning System That

Outperforms Experts at Diagnosing Childhood Eye Disease

An OHSU biomedical informatics faculty and a former postdoctoral fellow of the program are among a group of researchers who have developed a deep convolutional neural network system that outperformed clinical experts in the diagnosis of Retinopathy of Prematurity (ROP), a disease that causes blindness in premature infants. The results of their work have been published in the journal, JAMA Ophthalmology.

The system was tested against eight ROP experts, performing better than six of them and comparable to the other two.

The OHSU faculty and senior author of the study was Michael Chiang, MD, professor of ophthalmology and of medical informatics and clinical epidemiology at OHSU. Also an author was Jayashree Kalpathy-Cramer, PhD, associate professor of radiology at Harvard Medical School. Dr. Kalpathy-Cramer was a postdoctoral fellow in biomedical informatics at OHSU from 2006-2009.

The study was also reported on by Oregon Public Broadcasting.

April 30, 2018

DMICE at OHSU Research Week

This is OHSU Research Week, and faculty and students from the Department of Medical Informatics & Clinical Epidemiology are making many presentations. Below is a list.

Monday, April 30th

Podium Presentations

6. Etiology vs Location: Is HPV-positive head and neck squamous cell carcinoma (HNSCC) more similar to HPV+ cervical SCC than it is to HPV-negative HNSCC?

10:00 AM – 11:30 AM, Old Library Auditorium

Mitzi Boardman, NLM Postdoctoral Fellow

Poster Session

52. A comprehensive review of Prostate Specific Antigen (PSA)-based prostate cancer screening recommendations in the developed nations

4:00 PM – 5:00 PM, BICC

Lily Cook, NLM Predoctoral Fellow

29. A mixed methods analysis of hospitalist pages

4:00 PM – 5:00 PM, BICC

Ani Chintalapani, Clinical Informatics Fellow

30. Provider Perspectives on Dashboards at OHSU

4:00 PM – 5:00 PM, BICC

Brady Wright, Clinical Informatics Fellow

28. Demographics and Reflections of Medical Students with Experience as Scribes: A Survey

4:00 PM – 5:00 PM, BICC

Thomas Frohwein, Clinical Informatics Fellow

7. Secondary Use of Electronic Health Record Data for Prediction of Outpatient Visit Length in Ophthalmology Clinics

4:00 PM – 5:00 PM, BICC

Wei-Chin Lin, PhD student

158. Pancancer Reactome Functional Interaction and Reaction Network Analyses Reveal Patterns Associated with TCGA Patient Survival

5:00 PM – 6:00 PM, BICC

Joshua Burkhart, NLM Predoctoral Fellow

Tuesday, May 1st

Podium Presentations

3.The R – Transfer Learning Framework (RTL) for Reproducible, Robust, and Generalizable Classification of Rare Cellular Subsets (RCS) in Single – Cell Transcriptomics.

10:00 AM – 11:45 AM, Old Library room 217

Eisa Mahyari, NLM Predoctoral Fellow

4. Natural Product Target Network to Expand Treat Options in Cancer

10:00 AM – 11:45 AM, Old Library room 211

Steve Chamberlin, NLM Predoctoral Fellow

6. Clinician overload: Can data science help?

12:00 PM – 1:45 PM, Old Library room 211

Dana Womack, NLM Predoctoral Fellow

1. Clinical Documentation in Electronic Health Record Systems: Analysis of Similarity in Progress Notes from Consecutive Outpatient Ophthalmology Encounters

12:00 PM – 1:45 PM, Old Library room 211

Abigail Huang, Clinical Informatics Fellow

Wednesday, May 2nd

Podium Presentations

5. Crowdsourced Detection of Paraphasic Speech Errors: A Pilot Study

2:00 PM – 3:30 PM, Old Library room 221

Steven Bedrick, Faculty

Joshua Burkhart selected for 2018 Young Investigators Award Recipients for Sage Assembly hosted by Sage Bionetworks

Joshua Burkhart, Biomedical Informatics PhD student and National Library of Medicine Predoctoral Trainee, has been selected as one of the 2018 Young Investigators Award Recipients for Sage Assembly hosted by Sage Bionetworks. Joshua is mentored by Guanming Wu, PhD. His project, entitled, *Pancancer Reactome Functional Interaction and Reaction Network Analyses Reveal Patterns Associated with TCGA Patient Survival*, was co-authored with Francesco Raimondi, Robert B. Russell, and Guanming Wu.

March 31, 2018

DMICE Alumna Appointed Co-Chair of Federal Health IT Advisory Committee

We are pleased to share that one of our alumni, Carolyn Petersen, MBI, has been appointed as Co-Chair the Health Information Technology Advisory Committee (HITAC) of the Office of the National Coordinator for Health IT (ONC). The HITAC is the federal government's key advisory committee that recommends policies, standards, implementation specifications, and certification criteria relating to health IT infrastructure,

nationally and locally, that advances the electronic access, exchange, and use of health information.

Ms. Petersen has served as a patient stakeholder reviewer for the Patient-Centered Outcomes Research Institute, a patient advocate for the National Cancer Institute, and a consumer representative for an advisory panel at the Food and Drug Administration. In addition to holding a Master of Biomedical Informatics from our program, she has a Master of Science in Exercise and Movement Science from the University of Oregon.

March 19, 2018

Awarding of Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Scholarship for Biomedical Informatics

We are pleased to announce the awarding of the Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Scholarship for Biomedical Informatics to Mr. Raja Cholan. Mr. Cholan is a student in the Master of Science in Biomedical Informatics Program at Oregon Health & Science University (OHSU).

The $25,000 scholarship will allow Mr. Cholan to complete his graduate studies and undertake a project using the Intelligent Medical Objects (IMO) clinical terminology appliance. Mr. Cholan's project will use IMO's clinical quality measures (CQM) dashboard to identify codes from CQM value sets that are not covered in CQMs at OHSU in order to better understand the usage of these codes and to assess the impact of these missing codes on CQM performance.

Dr. Naeymi-Rad is the founder of IMO and an expert in the application of standards-based terminology solutions to problems in healthcare. Dr. Kepic is an Obstetrics & Gynecology physician who practices in North Chicago, IL.

February 22, 2018

DMICE Faculty to Offer Health Informatics Course to College Undergraduates

DMICE faculty William Hersh, M.D., professor and chair, and Ted Laderas, Ph.D., assistant professor, will be launching a new course in the OHSU-PSU School of Public Health in the Spring 2018 academic quarter entitled, Introduction to Health Informatics. The course will introduce the field. Students will learn the application of informatics skills and knowledge to health-related problems. Application activities will include simple data analysis and visualization of clinical data, answering clinical questions using information retrieval methods, and doing simple association analysis of gene variants and disease.

As noted in the course syllabus, the learning objectives for the course include:

- Introduce students to problems and challenges that health informatics addresses
- Introduce students to the research and practice of health informatics
- Provide all students with basic skills and knowledge in health informatics to apply in their future health-related careers
- Lead students in discussion around ethical and diversity issues in health informatics
- Provide additional direction to those interested in further (i.e., graduate) study in the field

The course will cover the following topics:

1. Overview of Field and Problems That Motivate It
2. Health Data, Information, and Knowledge

3. Electronic Health Records
4. Personal Health Records and Decision Aids
5. Information Retrieval (Search)
6. Bioinformatics
7. Informatics Applications in Public Health
8. Data Science, Analytics, and Visualization
9. Ethical Issues in Health Informatics
10. Careers in Health Informatics

Readers of this blog will likely hear more about this course soon.

February 19, 2018

DMICE Faculty Thomas Yackel, MD Heading to Virginia Commonwealth University School of Medicine

Long-time DMICE faculty and Oregon Health & Science University (OHSU) leader Thomas Yackel, M.D., M.P.H., M.S., professor and chief clinical integration officer, will be leaving OHSU to assume the roles of President of MCV Physicians, the faculty practice plan of Virginia Commonwealth University (VCU) Health, and senior associate dean for clinical affairs in the VCU School of Medicine.

Dr. Yackel came to OHSU in 2000 as a postdoctoral fellow in biomedical informatics. He stayed on to assume a faculty role and eventually became OHSU's first associate chief medical information officer. His title later shifted to chief health information officer and he most recently has served as chief population health and value based care officer. He also served as one of the inaugural associate program directors of OHSU's ACGME-accredited clinical informatics fellowship.

"Tom has been an exemplary faculty member and contributor to all the missions of informatics at OHSU," according to DMICE Chair Dr. William Hersh. "We will miss him but are certain he will provide great leadership at VCU."

February 5, 2018

Health Affairs Paper Describes Three Innovations in Health Care Delivery to Improve the Value of Health Care

This posting was authored by David A. Dorr, M.D., M.S., vice chair and professor of medical informatics and clinical epidemiology and professor of medicine.

Recently, there was a patient on my primary care schedule in his early 50s with schizophrenia, a history of substance use, severe diabetes, and chronic hepatitis C infection. He had recently resurfaced in the clinic after requesting refills of his medications for some time without an in-person visit, and came because he was only told to. He was reported as disheveled yet cogent, knowing all his medications, but didn't have a stable place to live or the ability to afford his medications. At my visit, he didn't come and hasn't responded to calls. People like him, with high needs across the behavioral, social, and physical domains, represent a fundamental challenge for our systems – his likelihood to have many hospitalizations and poor health outcomes is high while the quality of care we are able to give him in standard, visit-based care is low. In some way, he represents a driver for us to try to change our fundamental models of care – by knowing who he is and other people like him, by acting proactively to find what will work for him, and to help him reduce his risks. To do so requires significant amounts of data, information, and knowledge.

Our paper in the February 2018 issue of *Health Affairs* describes three innovations in health care delivery intended to improve the value of health care – its benefit over its cost, especially for those most at risk, like my patient. These innovations vary substantially – from the banding together of large groups in Accountable Care Organizations (ACOs) to primary care transformation in small and rural clinics – but share some similar challenges. These challenges to the diffusion of innovations may be linked to an inability to use and apply data, information, and knowledge to change perceptions of current practice and motivate change.

Three authors – myself (David A. Dorr, M.D., M.S.), Deborah J. Cohen, Ph.D., and Julia Adler-Milstein, Ph.D. – gathered data about three different innovation models to understand the similarities and differences in the use of data and in health information technology (HIT) systems to drive these innovations in response to a *Health Affairs* special issue on Diffusion of Innovation.

 Dr. Adler-Milstein is an associate professor of medicine and director of the Clinical Informatics and Improvement Research Center, School of Medicine, University of California, San Francisco. She reported results of a national survey funded by the Commonwealth Fund that assessed ACOs adoption and intensified use of health IT and performance reporting functions, finding significant adoption of several types of HIT, including Electronic Health Records (EHRs), registries about patients with certain diseases, health information exchange, and the use of performance measurement at the physician level and for higher level dashboards. Over half of respondents reported health information exchange and enhancing EHRs for population management as very challenging.

 I serve as vice chair and professor in medical informatics and clinical epidemiology at Oregon Health & Science University (OHSU), and reported on practices engaged in Advanced Primary Care programs, focusing on the nearly 500 primary care practices and over 2,800 practices engaged in the Comprehensive Primary Care (CPC) and subsequent CPC+ program. Through funding from the Commonwealth Fund, we surveyed and interviewed practices; they reported significant investments in the use of HIT as they engaged in these programs. One primary example is the use of HIT to manage a process called risk stratification, where the entire group of patients seen within the practice were assigned a risk score for future adverse outcomes such as hospitalizations or ED visits. These risk scores could be assigned by clinical intuition, through an HIT algorithm, or both, and nearly all practices reported challenges in using HIT to create, adapt, update, and display these risk scores. The challenges in these efforts led to distrust and frustration with scores, and HIT changes were some of the top reported challenges in adopting the innovations proposed by the models. However, technology also provided a number of answers, including bringing diverse groups with similar problems together through on-line tools, enabling peer problem-solving.

 Dr. Cohen, a professor in family medicine with a joint appointment in medical informatics and clinical epidemiology at OHSU, focused on EvidenceNOW, an effort where seven cooperatives across the country, funded by the Agency for Healthcare Research and Quality, helped 1,493 small-medium size primary care practices focus on improved quality of care for heart health in their patients. Cooperatives helped practices extract data, use quality improvement techniques to increase adherence to the guidelines, and monitor the changes over time. Practices and the cooperatives reported significant barriers, including the variety of locations for data storage, lack of access to the data, and inconsistent implementation of measures across practices.

Overall, significant changes to HIT were made to adopt the innovations yet were felt to be insufficient. Across all the efforts, engaged participants reported significant fatigue at the challenges related to HIT and the number of expected changes. This work was done in the setting of extensive policy changes to encourage the use of HIT, especially EHRs, and participants reported the number of requirements unrelated to their specific goals felt burdensome. Policy changes to tie the HIT adoption and support to drive the programs more carefully may improve response and success in using data to drive diffusions of innovations.

Funding for the research reported here comes from the Commonwealth Fund (Adler-Milstein, Dorr) and the Agency for Healthcare Research & Quality (Cohen).

January 26, 2018

DMICE Helps OHSU Enter National Discussion on Sexual Harassment

DMICE postdoctoral fellow, Mitzi Boardman, D.D.S., M.S. and Karen Eden, Ph.D., professor of medical informatics and clinical epidemiology, have been participating in planning with School of Medicine Dean Sharon Anderson, M.D. for a much needed workshop on sexual harassment awareness for students and fellows at OHSU. “In the moment when it’s happening you kind of go gray—is this right? Is this wrong? Did I do something to give the impression that this is okay?” said Dr. Boardman. “It’s much easier to not tell someone. It’s important to know what the resources are and what to do.” The word spread quickly and

OHSU senior leadership immediately supported the effort and expanded the plans to be campus-wide for everyone. A series of campus dialogues was born.

The OHSU Sexual Harassment Awareness Dialogues are:

- Wednesday, Jan. 31, Richard Jones Hall 4340, noon to 1 p.m., listening session with senior leadership
- Tuesday, Feb. 27, Mackenzie Hall 1115, noon to 1 p.m., open lunch conversation
- Tuesday, March 13, Doernbecher Vey Auditorium, noon to 2 p.m., workshops

More information on the campuswide discussion can be found at: http://www.ohsu.edu/xd/education/schools/school-of-medicine/news-and-events/sexual-harassment-awareness.cfm

January 24, 2018

Python Bootcamp For Neuroscientists a Successful Collaboration Between DMICE and Neuroscience Graduate Program Faculty and Students

Spurred on by student interest, DMICE faculty Ted Laderas, PhD, assistant professor, Lisa Karstens, PhD, assistant professor, and Michael Mooney, PhD, assistant professor, all collaborated with Neuroscience Graduate Program (NGP) faculty, instructors and students on an introductory Python bootcamp focused on neuroscience students earlier this month. The bootcamp had the overall goal of introducing 21 Neuroscience Graduate Program students at OHSU to the basics of programming in Python using data that the students were interested in: behavioral data, electrophysiology data, and confocal microscopy data. The course was designed to be a 1 credit course to encourage students to persist and finish it. Everyone managed to complete the course and the students are planning follow up sessions in learning more Python using the 6 months of DataCamp in the Classroom.

"I had the pleasure of working with a great group of students, professors and instructors in developing the material, and had a great time teaching complete beginners to programming and Python," said Dr. Laderas. "Given the positive feedback from the students, we plan on giving this course next year, enabling students to start learning the benefits of programming as a skill." Course materials are available freely at https://github.com/dasaderi/python_neurobootcamp and the faculty welcome any suggestions or potential collaborators.

For more information about the NGP Python Bootcamp, visit http://laderast.github.io/2018/01/17/what-we-learned-teaching-python-to-neuroscience-students/.

January 22, 2018

Update of Site, What is Biomedical & Health Informatics?

The Chair of our Department of Medical Informatics & Clinical Epidemiology, Dr. William Hersh, recently updated a Web site he maintains, What is Biomedical & Health Informatics? The site aims to answer this question as well as demonstrate the technologies used in our distance learning program at Oregon Health & Science University (OHSU) and the 10×10 ("ten by ten") course that Dr. Hersh teaches in partnership with the American Medical Informatics Association (AMIA).

The site features voice-over-Powerpoint lectures that use Articulate Presenter, which provides the slides and sound in Flash and HTML5 format and also allows easy navigation among the slides. Also provided are PDF files of the slides as well as another PDF that has references to all of the papers, reports, books, and other citations in the lecture. The site also contains a list of key textbooks as well as links to some papers and to important organizations and other sites for the field.

November 3, 2017

Why Pursue a Career in Biomedical and Health Informatics?

(This entry is re-posted from the Informatics Professor Blog of our department chair, William Hersh, MD.)

There are an ever-growing number of career opportunities for those who enjoy working with data, information, and knowledge to improve the health of individuals and the population in the field of biomedical and health informatics. This field develops solutions to improve the health of individuals, the delivery of healthcare, and advancing of research in health-related areas. Jobs in informatics are highly diverse, running the spectrum of the highly technical to those that are very interpersonal. All are driven, however, by the goal of using data, information, and knowledge to improve all aspects of human health [1, 2].

Within biomedical and health informatics are a myriad of sub-disciplines, all of which apply the same fundamental science and methods, but are focused on particular (and increasingly overlapping) subject domains. Informatics can be viewed as proceeding along a continuum from the cellular level (*bioinformatics*) to the person (*medical* or *clinical informatics*) to the population (*public health informatics*). Within clinical informatics may be a focus on specific healthcare disciplines, such as nursing (*nursing informatics*), pharmacy (*pharmacy informatics*), and radiology (*radiology informatics*) as well as on consumers and patients (*consumer health informatics*). There are also disciplines in informatics that apply across the cell-person-population spectrum:

- *Imaging informatics* – informatics with a focus on the storage, retrieval, and processing of images
- *Research informatics* – the use of informatics to facilitate biomedical and health research, including a focus on clinical and translational research that aims to accelerate research findings into healthcare practice

Another emerging new discipline that has substantial overlap with informatics is *data science* (or *data analytics* in its more applied form). The growth in use of electronic health records, gene sequencing, and new modalities of imaging, combined with advances in machine learning, natural language understanding, and other areas of artificial intelligence provide a wealth of data and tools for use to improve health. But informatics is not just about processing the data; the range of activity includes insuring the usability of systems for entering and working with high-quality data to applying the results of data analysis to improve the health of individuals and the population as well as the safety and quality of healthcare delivery.

The variety of jobs in biomedical and health informatics means that there is a diversity in the education of those holding the jobs. Informatics has a body of knowledge and a way of thinking that advance the field. It is also an interdisciplinary field, existing at the interface of a number of other disciplines. For this reason, education has historically been at the graduate level, where individuals combine their initial education in one of the core disciplines (e.g., health or life sciences, computing or information sciences, etc.) with others as well as the core of informatics. An example of such a program is ours at Oregon Health & Science University (OHSU).

A variety of data show that professionals from this discipline are in high demand. Job sites such as Monster.com show a wide variety of well-paying jobs. A previous analysis of online job postings found 226,356 positions advertised [3]. More recently, a survey of healthcare IT leaders shows continued demand for professionals in this area [4]. For physicians working in the field, there is now a new medical subspecialty [5]. The nursing profession has had a specialization in nursing informatics for over a decade, and we are likely to see more certifications, for example the American Medical Informatics Association (AMIA) developing an Advanced Health Informatics Certification that will apply to all informatics professionals, not just those who are physicians and nurses.

Does one need to be a clinician to be trained and effective in a job in clinical informatics? Must one know computer programming to work in any area of informatics? The answers are no and no. Informatics is a very heterogeneous field, and there are opportunities for individuals from all types of backgrounds. One thing that is clear, however, is that the type of informatics job you assume will be somewhat dependent on your background. Those with healthcare backgrounds, particularly medicine or nursing, are likely to draw on that expertise for their informatics work in roles such as a Chief Medical or Nursing Informatics Officer. Those with other backgrounds still have plenty of opportunities in the field, with a wide variety of jobs and careers that are available.

Informatics is a career for the 21st century. There are a wide variety of jobs for people with diverse backgrounds, interests, and talents, all of whom can serve the health of society through effective use of information and associated technologies.

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3. Schwartz, A, Magoulas, R, et al. (2013). Tracking labor demand with online job postings: the case of health IT workers and the HITECH Act. *Industrial Relations: A Journal of Economy and Society*. 52: 941–968.

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5. Detmer, DE and Shortliffe, EH (2014). Clinical informatics: prospects for a new medical subspecialty. *Journal of the American Medical Association*. 311: 2067-2068.

November 1, 2017

Consider Giving a Gift to the OHSU Biomedical Informatics Education Program

A message from William Hersh, MD:

A new academic year is upon us, and I am writing this letter to provide alumni and friends of the OHSU Biomedical Informatics Education Program an update on new developments in our department. **I am also inviting your participation in a new fund-raising effort for the program to which I have made the first gift.** First, let me share a sampling of exciting news with you all:

- This past June, we celebrated our 20th cohort of graduates. A total of 48 students participated in convocation ceremonies, including three PhD students, six MS students, 20 MBI students, and 19 graduate certificate students. This brings our total number of alumni to 666, with 738 degrees and certificates awarded!
- In 2016, for the third year in a row, an OHSU biomedical informatics student team won the American Medical Informatics Association (AMIA) Student Design Challenge. The winning team created an application that provides clinicians with an at-a-glance awareness of their patients' social determinants of health issues.
- We continue to achieve success in receiving research grants that push the boundaries of informatics science. In September, the department received notices of funding for ten grants, ranging from two career development awards for young faculty to a large multi-institution award aiming to transform the data and information products of scientific research in a more open and collaborative manner. Additionally, the National Library of Medicine renewed our Biomedical Informatics Training Grant for a sixth five-year cycle.
- The demand for our educational programs transcends national boundaries. We are developing educational programs in India, Thailand, and the United Arab Emirates, among other places. While most of the teaching is provided online, our faculty are visiting these locations and others to disseminate our expertise.
- We are pleased to announce our first philanthropy-funded scholarship, the Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Scholarship for Biomedical Informatics. Dr. Naeymi-Rad is the founder of Intelligent Medical Objects (IMO), Inc. and Dr. Kepic is an

obstetrics and gynecology physician. This $25,000 scholarship will be awarded to an MS student in the winter quarter, following a competitive review process.

Despite all of our success, the majority of the funding described above is restricted. Federal grants, for example, do not allow investment in new faculty, students, or research explorations. As we face an increasingly competitive environment in the informatics field, **it is critical that we have unrestricted support to pursue new research opportunities and compete for the best and brightest students.**

I am so excited by this new funding drive that **I have been its first contributor, making a $10,000 gift of my own to launch the effort.** I invite you to join me with a gift of your own.

Sincerely,

William Hersh, M.D.
Professor and Chair, Department of Medical Informatics and Clinical Epidemiology

October 30, 2017

Come Hear @OHSUInformatics Presenters at #AMIA2017

A number of faculty, students, and others from the Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE) will be presenting their work at the AMIA 2017 Annual Symposium. Below is a list of presentations with titles, presenters, co-authors, times, and locations at the Washington, DC Hilton.

2:21 PM–2:39 PM Nov 6, 2017

Oral Presentations

Predictors of OpenNotes use among Veterans receiving Mental Health Care

Speaker
Steven Dobscha M.D., Director, VA Health Services Research and Development Center of Innovation
Co-Authors
Lauren Denneson, VA Center to Improve Veteran Involvement in Care
Maura Pisciotta, VA Center to Improve Veteran Involvement in Care
Donald Bourne, Oregon Health and Science University
David Phillips-Moses, VA Center to Improve Veteran Involvement in Care
Susan Woods, Maine Medical Center

LOCATION

Gunston

4:30 PM–4:50 PM Nov 6, 2017

Learning Showcase

The Full Spectrum Biomedical and Health Informatics Education at Oregon Health & Science University

Speaker
William Hersh, Professor and Chair, Department of Medical Informatics & Clinical Epidemiology, Oregon Health & Science University
LOCATION

Columbia Hall

5:00 PM–6:30 PM Nov 6, 2017

Posters

Medication Errors Generated When Using Computerized Provider Order Entry Systems in Pediatrics: A Systematic Review

Speaker
Pieter Cornu, Clinical decision support coordinator, UZ Brussel
Co-Authors
Katherine Coffey, The University of Durham
Dean Sittig, The University of Texas Health Science Center at Houston
Joan Ash, Oregon Health & Science University
Andrew Husband, The University of Durham
David Bates, The Center for Patient Safety Research and Practice, Division of General Internal Medicine, Brigham and Women's Hospital
Sarah Slight, The University of Durham
LOCATION

Columbia Hall

5:00 PM–6:30 PM Nov 6, 2017

Posters

Sepsis Risk Stratification among the CMS Oncology Care Payment Model Population

Speakers
David Dorr, Professor and Vice Chair, Oregon Health & Science University

Co-Authors
Benjamin Orwoll, Oregon Health & Science University
Konrad Dobbertin, Oregon Health & Science University
Michael Savin, Oregon Health & Science University
LOCATION

Columbia Hall

5:00 PM–6:30 PM Nov 6, 2017

Posters

The Pulse: An Interactive Web-based Application for Tracking Clinical Quality Measure Performance

Speakers
David Dorr, Professor and Vice Chair, Oregon Health & Science University
LOCATION

Columbia Hall

9:06 AM–9:24 AM Nov 7, 2017

Oral Presentations

Implementation of a Medication Reconciliation Assistive Technology: A Qualitative Analysis

Speaker
Theodore Wright, Clinical Informatics Fellow at OHSU and VAPORHCS
Co-Authors
Kathleen Adams, Veterans Affairs Portland Healthcare System
Victoria Church, Veterans Affairs Portland Healthcare System
Mimi Ferraro, Veterans Affairs Portland Healthcare System
Scott Ragland, Veterans Affairs Portland Healthcare System
Anthony Sayers, Veterans Affairs Portland Healthcare System
Stephanie Tallett, Veterans Affairs Portland Healthcare System
Travis Lovejoy, Veterans Affairs Portland Healthcare System
Joan Ash, Oregon Health and Sciences University
Patricia Holahan, Stevens Institute of Technology
Blake Lesselroth, Veterans Affairs Portland Healthcare System
LOCATION

Jefferson West

10:30 AM–10:48 AM Nov 7, 2017

Oral Presentations

Information Retrieval for Biomedical Datasets: The 2016 bioCADDIE Challenge

Speaker
Kirk Roberts, Assistant Professor, University of Texas Health Science Center at Houston
Co-Authors
Anupama Gururaj, University of Texas Health Science Center at Houston
Xiaoling Chen, University of Texas Health Science Center at Houston
Saeid Pournejati, University of Texas Health Science Center at Houston
Trevor Cohen, University of Texas Health Science Center at Houston
William Hersh, Oregon Health & Science University
Dina Demner-Fushman, U.S. National Library of Medicine
Lucila Ohno-Machado, University of California, San Diego
Hua Xu, University of Texas Health Science Center at Houston
LOCATION

Jefferson West

10:48 AM–11:06 AM Nov 7, 2017

Oral Presentations

Quantifying the Impact of Trainee Providers on Outpatient Clinic Workflow using Secondary EHR Data

Speakers
Isaac Goldstein, Research Assistant, Oregon Health & Science University
Co-Authors
Michelle Hribar, Oregon Health & Science University
Sarah Read-Brown, Oregon Health & Science University
Michael Chiang, Oregon Health & Science University
LOCATION

Gunston

2:03 PM–2:21 PM Nov 7, 2017

Oral Presentations

A Framework for Data Quality Assessment in Clinical Research Datasets

Speakers
Kathleen LeeHealth Informatics Analyst, Weill Cornell Medicine
Co-Authors

Nicole Weiskopf, Oregon Health & Science University
Jyotishman Pathak, Weill Cornell Medicine
LOCATION

Fairchild

4:24 PM–4:42 PM Nov 7, 2017

Oral Presentations

Using Social Networking Analysis to Understand the Importance of Patients and Caregivers in Online Teams of Care

Speakers
Allison Kurahashi, Research Coordinator, Temmy Latner Centre for Palliative Care, Sinai Health System
Co-Authors
Trevor Jamieson, University of Toronto
Michael Chiang, Oregon Health Science University
Teja Voruganti, University of Toronto
LOCATION

Lincoln West

5:00 PM–6:30 PM Nov 7, 2017

Posters

Automated Image Quality Assessment for Fundus Images in Retinopathy of Prematurity

Speakers
Aaron Coyner, Bioinformatics and Computational Biology PhD Student, Oregon Health & Science University
Co-Authors
Ryan Swan, Oregon Health & Science University
Jayashree Kalpathy-Cramer, MGH/Harvard Medical School
Sang Jin Kim, Oregon Health & Science University
John Campbell, Oregon Health & Science University
Karyn Jonas, University of Illinois at Chicago
Susan Ostmo, Oregon Health & Science University
R.V. Chan, Illinois Eye and Ear Infirmary
Michael Chiang, Oregon Health & Science University
LOCATION

Columbia Hall

8:30 AM–10:00 AM Nov 8, 2017

Panel – Didactic

Clinical Informatics in Medical Education: Innovations from the AMA Accelerating Change in Medical Education Initiative

Panelists
Paul Gorman, Professor, Oregon Health Sciences University
William Hersh, Professor and Chair, Department of Medical Informatics & Clinical Epidemiology, Oregon Health & Science University
Susan Skochelak, Vice President, Medical Education, American Medical Association
Anderson Spickard, Associate Professor, Vanderbilt
Dr. Blaine Takesue, Assistant Professor, Regenstrief Institute
LOCATION

Georgetown

9:24 AM–9:42 AM Nov 8, 2017

Oral Presentations

Specifications of Clinical Quality Measures and Value Set Vocabularies Shift Over Time: A Study of Change through Implementation Differences

Speaker
Raja Cholan, Student, Oregon Health & Science University
(**NOTE**: This paper is a among a group designated as "Best of Student Papers in Knowledge Discovery and Data Mining" by the AMIA Knowledge Discovery and Data Mining (KDDM) Working Group.)
Co-Authors
Nicole Weiskopf, Oregon Health & Science University
Doug Rhoton, Oregon Health & Science University
Nicholas Colin, Oregon Health & Science University
Rachel Ross, Oregon Health & Science University
Melanie Marzullo, Oregon Health & Science University
Bhavaya Sachdeva, Oregon Health & Science University
David Dorr, Oregon Health & Science University
LOCATION

Fairchild

October 19, 2017

Announcing New Dr. Frank Naeymi-Rad and Dr. Theresa Kepic Scholarship for Biomedical Informatics

The Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE) is pleased to announce the **Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic Scholarship for Biomedical Informatics**. Dr. Naeymi-Rad is the founder of Intelligent Medical Objects (IMO), Inc. and an expert in the application of standards-based terminology solutions to problems in healthcare. Dr. Kepic is an Obstetrics & Gynecology physician who practices in North Chicago, IL.

The $25,000 scholarship will provide funding for tuition and fees for a student in the OHSU Biomedical Informatics Graduate Program to obtain his or her degree while gaining practical experience in applying standards-based terminology using IMO tools to solve health-related problems.

The student must currently be enrolled full-time in the OHSU Master of Science (MS) program. He or she must be a student in good standing in the program and be an on-campus student. The scholarship must be used for the student's tuition and fees. The scholarship will be awarded to support the student starting in the winter quarter of the 2017-2018 academic year.

A competitive selection process is being launched to select a student who is committed to the area of biomedical informatics focused on the application terminology standards. The student will also serve as a resource for the terminology appliance server that is being provided for academic use to the OHSU Department of Medical Informatics & Clinical Epidemiology.

Interested students are required to complete an application indicating their interest in standards-based terminology for solving problems in healthcare. The scholarship recipient will be selected by a committee of OHSU and IMO personnel and designated as the Dr. Frank Naeymi-Rad and Dr. Theresa A. Kepic OHSU Biomedical Informatics Scholar.

The timeline for the awarding of the scholarship will follow the announcing of the program, solicitation of applications, and awarding through a competitive review process.

To maintain the Scholar Status, the student will submit a quarterly report following the IMO report format and make a formal presentation either in person or via teleconference to IMO and OHSU on their work. The student will need maintain a GPA of 3.0 and otherwise good standing in the OHSU program.

For further information about the scholarship, interested students should email Andrea Ilg.

Applications must include the following information (1 to 2 pages) emailed to Ms. Ilg by December 1, 2017:

1. Name
2. Program enrollment (degree, track)
3. Matriculation and planned graduation dates
4. Describe your vision for applying standards-based terminology using IMO tools to solve health-related problems
5. Please provide a description of a proposed project using standards-based terminology, with 1-3 sentences for each of the following sections:

- Background
- Purpose
- Methods
- Evaluation
- Goals

Program faculty will work with the funded student to fully elaborate the goals, methods, and outcomes for the project.

October 12, 2017

DMICE Faculty to Play Major Role in New OHSU-Led National Center for Data to Health

Oregon Health & Science University (OHSU) is the lead institution in a new award from the National Center for Advancing Translational Sciences (NCATS) to establish a National Center for Data to Health (CD2H). The center emanates from the National Institutes of Health (NIH) Clinical and Translational Science Award (CTSA) Program and its major goal is to support the use of health data, algorithms and information systems to bridge basic science and clinical research.

The contact PI of the project is Melissa Haendel, PhD, associate professor in the Department of Medical Informatics & Clinical Epidemiology (DMICE). Dr. Haendel co-director of the NCATS-funded Biomedical Data Translator, the Monarch Initiative, and the OHSU Library.

The newly awarded grant provides $25 million over five years to establish the new center, which aims to foster collaboration across more than 50 premier medical research institutions within the CTSA network. According to Dr. Haendel, “The goal is to unlock and coordinate the unique wealth of technologies and innovation that each participating institution brings. Team science, data sharing, use of informatics to integrate and analyze data and collaboration will ultimately improve the care of patients.”

The specific aims of the center are to (1) harmonize the data ecosystem, (2) realize a software tool ecosystem, (3) synthesize a people ecosystem, and (4) catalyze technical and cultural evolution. The center’s “Idea to Implementation (I2I)” pipeline will leverage the above aims, develop community, and demonstrate translational impact in diverse domains, such as Rare Disease and Lifespan and aging.

Partners in the project include Northwestern University, University of Washington, Johns Hopkins University School of Medicine, Sage Bionetworks, Scripps Research Institute, Washington University, the University of Iowa, and the Jackson Laboratory. The governance structure of the project is shown in the figure from the grant proposal.

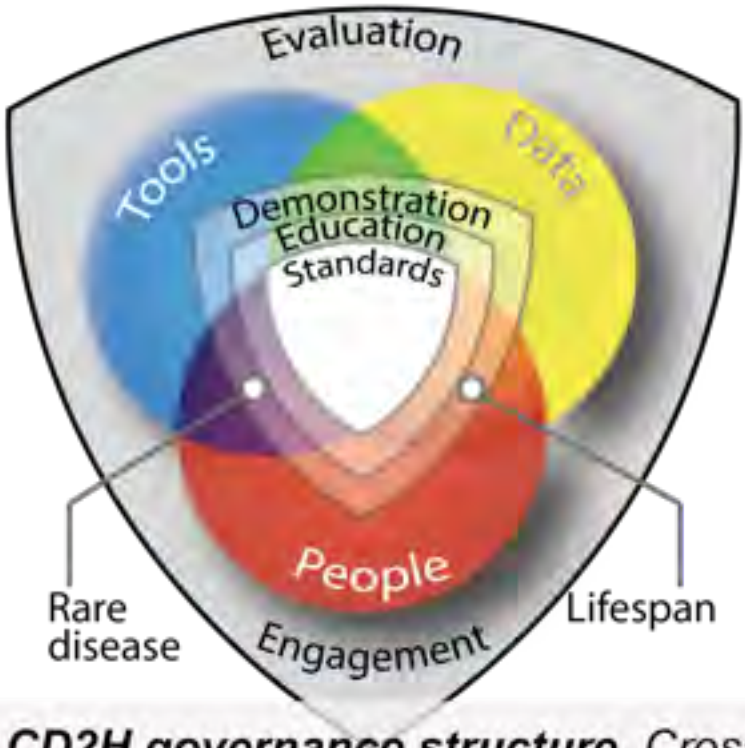


Fig. 4: CD2H governance structure. *Cross-site teams: Tools, Data, People, Evaluation, Engagement, Standards, Education, and thematic teams for rare disease & Lifespan.*

A number of DMICE faculty will play major roles in the project as follows.

In addition to serving as an overall project leader, Dr. Haendel will lead Policy for Ontologies/Standards, Operations for Rare disease, Operations for People & Attribution, and will participate in Data and Engagement teams.

Rob Schuff, MS, instructor, will also instantiate the use case elements more directly related to standardization of common clinical data elements against research data warehouses and provide guidance to others working to improve their data and software interfaces and standardization. He will be pivotal in assisting with the technical requirements, development, implementation in Software, clinical data systems expertise in Data and domain application expertise for Rare Disease and Lifespan.

Ted Laderas, PhD, assistant professor, will assist with the development and assessment of materials in Education, as well as participate in Data, Software and Lifespan

David Dorr, MD, MS, will serve as the Coordination Lead for Lifespan and participate in Data, Evaluation and Education.

Shannon McWeeney, PhD, professor and vice chair, will serve as the Policy lead for Education as well as participate in Evaluation, Engagement, Software and Lifespan.

Nicole Weiskopf, PhD, assistant professor, will participate in Data, Engagement, and Lifespan.

Beth Wilmot, PhD, assistant professor, will participate in Data, Software, Lifespan and Rare Disease, providing her domain expertise as well as her experience in diverse methodologies for analysis of complex traits and management, integration and visualization of large, multi-omic, multi-site data sets.

William Hersh, MD, professor and chair, will serve as the Operations Lead in Education and participate in Engagement and People, Expertise and Attribution.

October 10, 2017

Michael Chiang, MD Elected to American College of Medical Informatics

DMICE Professor Michael Chiang, MD has been elected to the American College of Medical Informatics (ACMI). He will be inducted into the College on November 5 during the 2017 American Medical Informatics Association (AMIA) Annual Symposium. ACMI is an honorary College of elected fellows from the United States and abroad selected for significant and sustained contributions to the field. Dr. Chiang joins four other DMICE faculty who are fellows of ACMI: Joan Ash, PhD, professor and vice chair; David Dorr, MD, MS, professor and vice chair; Paul Gorman, MD, professor; and William Hersh, MD, professor and chair.

Dr. Chiang is Knowles Professor of Ophthalmology and Medical Informatics and Clinical Epidemiology at OHSU and is vice chair in the Department of Ophthalmology. He also leads the Oregon State Elks Center for Ophthalmic Informatics. As a clinician-scientist, he conducts research in the application of biomedical informatics to clinical ophthalmology. Dr. Chiang's clinical practice focuses on pediatric ophthalmology and adult strabismus. His research examines telemedicine for diagnosis of retinopathy of prematurity and other ophthalmic diseases, implementation and evaluation of electronic health record systems, modeling of clinical workflow and computer-based image analysis for clinical diagnosis.

Dr. Chiang directs a National Institutes of Health (NIH)-funded T32 training program in translational visual science for graduate students and postdoctoral fellows, teaches in both the ophthalmology and biomedical informatics departments, and has directly mentored over 40 graduate students, medical students, and postdoctoral fellows. His research has been continuously funded by the NIH since 2003 and his group has published over 100 peer-reviewed journal papers.

(Adapted from OHSU Research News.)

September 26, 2017

September Brings 10 New Grants and Contracts for DMICE

The month of September was highly productive for the Department of Medical Informatics and Clinical Epidemiology (DMICE), with 7 new grants funded within the department and 3 more larger OHSU grants funded that include DMICE collaborators.

Two faculty received career development grants from the National Library of Medicine (NLM), the institute within the National Institutes of Health (NIH) that funds research and training in biomedical informatics.

Michelle Hribar, Ph.D., assistant professor, was awarded an R00 grant, *Modeling and Optimization of Clinical Processes Using EHR Data*. This research grant provides 3 years of funding with total costs of $672,297.

Nicole Weiskopf, Ph.D., assistant professor, has been awarded a K01 grant, *Measuring and Improving Data Quality for Clinical Quality Measure Reliability*. The career development grant provides 3 years of funding with total costs of $462,128.

Another grant was awarded by the Agency for Healthcare Research and Quality (AHRQ) to DMICE faculty Jeff Gold, M.D., professor; Vishnu Mohan, M.D., M.B.I., associate professor; and Joan Ash, Ph.D,. professor and vice chair. Entitled, *Creation and Validation of a Training Toolkit to Ensure Safe and Proficient Use of EHR by Medical Scribes*, the grant is for 5 years with total costs of $2 million.

In addition, Annette Totten, Ph.D., assistant professor, and Eilis Boudreau, M.D., Ph.D., associate professor, have been awarded a contract from the Department of Veterans Affairs on sleep study data analytics. Their project will evaluate the Office of Rural Health Pathway to Partnership Sleep-Telemedicine Project to determine whether e-consultation, telehealth, and virtual care models result in equivalent care outcomes when compared to traditional face-to-face care. They will also look at Veterans' satisfaction with care and cost-effectiveness. The

amount of funding for the base year of the contract is $156,210. The VA can choose to exercise two option periods, which would bring the total amount of funding to $424,120.

The Pacific Northwest Evidence-based Practice Center (PNWEPC) within DMICE also received new funding. Roger Chou, M.D., professor and EPC director, will be on a grant from the National Center for Complementary & Integrative Health, *Clinical Coordinating Center for Spinal Manipulation and Patient Self-Management for Preventing Acute to Chronic Back Pain*. The grant is based at the University of Minnesota, with Dr. Gert Bronfort as principal investigator, and Dr. Chou a co-investigator at OHSU. In addition, the PNWEPC will be providing guideline support development to the American Urological Association on the topic of recurrent urinary tract infections, with Dr. Chou as the principal investigator.

The department was also awarded an administrative supplement for its NLM biomedical informatics and data science training grant, now in its 26th year. A total of $100,000 has been provided for one year to advance faculty and curriculum development in data science. This adds to the five-year, $4.4 million award that was funded earlier this summer to fund predoctoral and postdoctoral positions from the NLM and the National Institute for Environmental and Health Sciences (NIEHS). The latter positions will facilitate collaboration between the department and the new OHSU-PSU School of Public Health.

A number of DMICE faculty are also part of 3 larger grants awarded to OHSU.

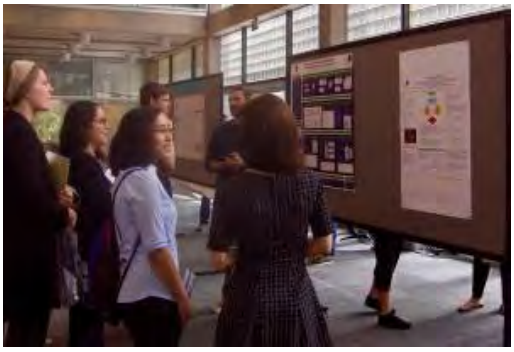
Melissa Haendel, Ph.D,. associate professor, has been awarded a large, multi-institution grant under the CTSA Data to Health (CD2H) initiative of the National Center for Advancing Translational Science (NCATS). Entitled, *A National Center for Digital Health Informatics Innovation*, the grant involves 9 institutions and includes 5 other DMICE faculty: Shannon McWeeney, Ph.D., professor and Vice Chair; Ted Laderas, Ph.D,, assistant professor; David Dorr, M.D., M.S., professor; Nicole Weiskopf, Ph.D., assistant professor; Robert Schuff, M.S., instructor; and William Hersh, M.D., professor and chair.

Annette Totten, Ph.D., assistant professor, is principal investigator of a contract awarded to the Oregon Rural Practice-based Research Network (ORPRN) by the Patient-Centered Outcomes Research Institute (PCORI). Entitled *A Cluster-Randomized Trial Comparing Team-Based versus Primary Care Clinician-Focused Advance Care Planning in Practice-Based Research Networks*, the award will provide 4 years of funding with total costs of $8 million. This award has been approved pending completion of a business and programmatic review by PCORI staff and issuance of a formal award contract.

Cynthia Morris, Ph.D., M.P.H., professor and vice chair, is Senior Associate Director, Education & Career Development; Shannon McWeeney, Ph.D., professor and vice chair, is Associate Director, Translational Bioinformatics; and Rob Schuff, M.S., instructor, is Associate Director, Clinical Research Informatics for OHSU's Oregon Clinical & Translational Research Institute (OCTRI), which had its 5-year, $37 million grant renewed as part of the NIH Clinical and Translational Science Award (CTSA) program.

September 19, 2017

Learn About Career and Educational Opportunities in Biomedical Informatics at Prospective Student Open House Saturday October 14, 2017



Discover One of the Leading Programs in Biomedical Informatics!

Please join us to learn more about careers and educational opportunities in biomedical informatics – the field at the intersection of health, biomedicine, computer science, and data science – at the annual Open House of the OHSU Biomedical Informatics Graduate Program. The Open House will take place this year on Saturday, October 14th from 11:30 am to 2:30 pm. Participants can register and look at the schedule here: DMICE Open House.

The Open House is a great opportunity to learn about our programs and be part of discussions with DMICE Chair William Hersh, Vice Chair Shannon McWeeney, and current students and faculty in the program.

October 29, 2017

DMICE Bringing Informatics Education to India

 The Oregon Health & Science University (OHSU) Department of Medical Informatics & Clinical Epidemiology (DMICE), in collaboration with Krishmatics, will be delivering a new online course, Health Informatics and Analytics, to an audience in India. The course will be led by DMICE Chair and well-known informatics educator, Dr. William Hersh. At the end of the online portion of the course, Dr. Hersh will conduct an in-person session in India.

The course adapts and combines components of OHSU's well-known curricula in both health informatics and data analytics. The overall goal of the course is to provide a deep introduction to the application of information technology and data analytics in healthcare. Students will learn about clinical data, electronic health records, data standards and interoperability, clinical decision support, quality measurement, and information retrieval, and how they are employed in healthcare data analytics.

The course is offered in two parts:

- An 8-unit Web-based component provided through on-line lectures, readings, interactive discussion, and self-assessment tests accessed via OHSU's Sakai Learning Management System
- An intensive one-day in-person session bringing participants together to integrate the material, allow presentation of course projects, and meet the instructor as well as other students in person

The course uses the following teaching modalities:

- Voice-over-PowerPoint lectures – The key material is delivered using Flash, HTML 5, or a special iPad player. As such, the content is easily accessed by any type of connection to the Internet.
- Interactive threaded discussion – Students engage in discussion on important issues using the on-line threaded discussion forums. An on-line faculty moderator helps keep the discussion on track.
- Reading assignments – The course uses a variety of readings made available to students.
- Homework/quizzes – Each of the units is accompanied by a 10-question multiple-choice self-assessment that aims to have the student apply the knowledge from the unit.

The topics of the course include:

1. Overview of Field and Problems Motivating It
1.1 What is Biomedical and Health Informatics?
1.2 A Discipline Whose Time has Come
1.3 Problems in Healthcare Motivating Biomedical and Health Informatics
1.4 Who Does Biomedical and Health Informatics?
1.5 Seminal Documents and Reports

2. Electronic and Personal Health Records (EHR, PHR)
2.1 Clinical Data
2.2 History and Perspective of the Health (Medical) Record
2.3 Definitions and Key Attributes of the EHR
2.4 Benefits and Challenges of the EHR
2.5 EHR Examples
2.6 Personal Health Records

3. Health Care Data Analytics
3.1 General Health Care Data Analytics
3.2 Extracting and Working with Data
3.3 Population Health and the Application of Health IT
3.4 Applying Health IT to Improve Population Health at the Community Level
3.5 Identifying Risk and Segmenting Populations: Predictive Analytics for Population Health
3.6 Big Data, Interoperability, and Analytics for Population Health
3.7 Data Analytics in Clinical Settings
3.8 Risk Adjustment and Predictive Modeling

4. Standards and Interoperability
4.1 Standards and Interoperability: Basic Concepts
4.2 Identifier and Transaction Standards
4.3 Message Exchange Standards
4.4 Terminology Standards
4.5 Natural Language Processing of Clinical Text

5. Advancing Care With the EHR
5.1 Healthcare Quality
5.2 Clinical Decision Support (CDS)
5.3 Computerized Provider Order Entry (CPOE)
5.4 Clinical Workflow Analysis and Redesign
5.5 System Selection and Implementation
5.6 Evaluation of Usage, Outcomes and Cost
5.7 Public Health Informatics

6. Protection and Analytical Use of Data
6.1 Privacy, Confidentiality, and Security
6.2 HIPAA Privacy and Security Regulations
6.3 Evidence-based Medicine
6.4 Clinical Practice Guidelines
6.5 Digital Imaging
6.6 Telemedicine: Definitions, Uses, and Barriers

7. Research Informatics
7.1 Clinical Research Informatics
7.2 Bioinformatics – The Big Picture
7.3 Overview of Basic Molecular Biology
7.4 From Clinical Genetics and Genomics to Precision Medicine
7.5 Genomics Data in the EHR and Other Information Systems

8. Information Retrieval (Search)
8.1 Information Retrieval
8.2 Knowledge-based Information
8.3 Content
8.4 Indexing
8.5 Retrieval
8.6 Research: Evaluation and Future Directions

9. Informatics and Analytics in the Indian context (in person)
9.1 Age of digitization in India
9.2 Health Informatics and Analytics in India
9.3 Employment and entrepreneurship opportunities
9.4 Global opportunities
9.5 Course content and expectations
9.6 Technical help

July 3, 2017

DMICE NLM Biomedical Informatics & Data Science Training Grant Renewed for Five Years

The Department of Medical Informatics & Clinical Epidemiology has been awarded $3.8 million for five years from the NIH National Library of Medicine (NLM) to renew its Training Grant in Biomedical Informatics & Data Science.

The grant will provide annual funding for seven PhD students, four postdoctoral fellows, and four short-term training positions for diversity students.

This award is a competitive renewal of this training grant that has been held by OHSU since 1992, making it one of the longest and most established programs in the field. Many alumni of the program have gone on to successful careers in academia and industry. Current trainees in the program recently attended the annual meeting for NLM trainees held this year at the University of California San Diego on June 5-6. The picture below shows trainees and faculty who attended the event, some of whom presented papers and posters (see legend below).

Front: Mitzi Boardman, Bill Hersh, Aurora Blucher*, Eric Feczko, Kristen Stevens
Middle: Julian Egger, Steve Chamberlin+, Aaron Coyner, Josh Burkhart, Eric Leung*
Back: Dana Womack+, James Jacobs*, Geoff Schau
(Not pictured: Shannon McWeeney, Erin Hickman*)
(*gave oral presentation, +gave poster presentation)

July 13,2017

DMICE Hosts Inaugural Cascadia-R Conference

The inaugural Cascadia-R Conference was held June 3, 2017 in the OHSU Collaborative Life Sciences Building (CLSB) on the South Waterfront. The morning featured two workshops. The first was a beginner/intermediate workshop introducing data wrangling and visualization using tidyverse, by Chester Ismay and Department of Medical Informatics & Clinical Epidemiology (DMICE) faculty Ted Laderas, PhD (see photo). The second was a more advanced programming workshop about the functional programming package purr by Charlotte Wickham. There was such great feedback and enthusiasm for the workshops that the organizers are considering having a whole day just dedicated to workshops for future conferences.

In attendance were 190 R users and programmers from all parts of the west coast: Oregon, Washington, California and British Columbia (see photo). There were several stimulating speakers, including a keynote from OHSU Medical Oncology Professor Vinay Prasad, MD about big data and medical reversal. Gabriela de Quieroz, of R Ladies Global, gave a keynote to encourage women R users to start their own chapter of R-Ladies. OHSU was well represented, including DMICE faculty Lisa Karstens, PhD and alumnus Mark Danes giving talks. The day ended with short-form lightning talks that covered authoring manuscripts in R, automated User Interface Testing, and mentoring new R-users.

The entire program can be seen at http://cascadiarconf.com, with workshop material, talks, and other information. The organizers were thrilled to help connect data science enthusiasts, R users, and programmers and look forward to hosting future Cascadia-R conferences at OHSU. More insights into conference organization can be found on Dr. Laderas' blog.

June 11, 2017

DMICE Chair Elected to International Informatics Academy

 DMICE Chair William Hersh, MD, FACMI, FACP has been elected to the inaugural group of 121 international leaders in biomedical informatics. Dr. Hersh was elected to the International Academy of Health Sciences Informatics (IAHSI). He will be inducted into the group with his colleagues at the MEDINFO 2017 meeting in August in Hangzhou, China. Dr. Hersh has won numerous other awards in the informatics field. At the national level, he received the 2015 HIMSS Physician IT Leadership Award and the 2007 AMIA Donald AB Lindberg Innovation in Informatics Award. Locally, he received the OHSU Faculty Senate Award for Teaching in 2008. Dr. Hersh is also a Fellow of both the American College of Medicine Informatics and the American College of Physicians.

June 2, 2017

Celebrating Twenty Years of Graduates of the OHSU Biomedical Informatics Graduate Program

Each June, we are pleased to announce students who take part in OHSU Commencement as graduates of the degree and certificate programs of the Biomedical Informatics Graduate Program. This weekend's OHSU Convocation marks the 20th year of graduates from the program, and there are 48 graduates, distributed among our four graduate programs:

- PhD – 3
- Master of Science – 6
- Master of Biomedical Informatics – 20
- Graduate Certificate – 19

This group brings the total number of alumni of our program to around 700, dating back to the first graduates in 1998.

(NOTE: The individuals listed below are in the graduation program but this does not indicate they will be receiving their diplomas, as some are still completing graduation requirements and will receive their diplomas soon. Also, pictures from the department banquet and convocation will appear in separate postings in this blog soon.)

Graduates by degree/certificate and track

PhD – Clinical Informatics Track

- Olubumi Akiwumi
- Nathan Bahr
- Bryan Gamble

Master of Science – Bioinformatics and Computational Biology Track

- Benjamin Cordier
- Jeffrey Hunter
- Brandon Keibler
- Raviteja Madhira
- Nasim Sanati

Master of Science – Clinical Informatics Track

- Erin Hickman

Master of Biomedical Informatics – Bioinformatics and Computational Biology Track

- Ashley Choi
- Prerna Das
- Annika Eriksson
- Thomas Meyer
- Melissa Yan

Master of Biomedical Informatics – Clinical Informatics Track

- Benjamin Barsotti
- Keith Boone
- Cinthia Feldman
- Kate Fultz-Hollis

- Kenneth Gridley
- Christopher Hoekstra
- Ilya Ivlev
- Arthur Knepper
- James Morrison
- Dustin Pezall
- Eric Shelov
- Amy Wang

Master of Biomedical Informatics – Health Information Management Track

- Ashley Armijo
- Leslie DeYoung
- Hanna Nelson

Graduate Certificate – Clinical Informatics Track

- Dale Cox
- Sarah Gebauer
- Nathan Gerstmann
- Carrie Grinstead
- Umar Iqbal
- Inho Kim
- Michael Kopinsky
- J Edward Maddela
- Naveen Muthu
- Lucas Newman
- Jennifer Pacheco
- Ellen Provost
- Gene Ren
- Sarah Schultz

Graduate Certificate – Health Information Management Track

- Sang Pak

- Erleen Palmer
- Skyler Sommers
- Crystal Vargas
- Laura Zukowski

May 31, 2017

DMICE Professor Karen Eden Receives 2017 School of Medicine Service Award

Congratulations to Karen Eden, Ph.D., professor of medical informatics and clinical epidemiology, who received the 2017 Service Award for the OHSU School of Medicine, as part of the Distinguished Faculty Awards sponsored by the OHSU Faculty Senate. The award was announced on May 25, 2017.

Dr. Eden was one of four nominees for outstanding service within the school. According to the nomination, “Dr. Karen Eden volunteers for service on committees not with the aim of fulfilling her obligations as a faculty member, or for personal accolades, but to truly improve our environment.”

Upon receiving the award, Dr. Eden said, “It was a great honor to be selected to receive the School of Medicine Service Award. I want to recognize the incredible DMICE educational staff, graduate students and my colleagues who made this possible.”

Dr. Eden currently serves on the Faculty Senate, Diversity Advisory Council, OHSU Graduate Council, and Graduate Program Steering Committee. She also continues to serve as ex-Officio on the Women in Academic Medicine committee as a past co-chair.. She is also the associate

director of the Patient Centered-Outcomes Research K12 career development program. Within DMICE, Dr. Eden is associate director of the pre- and post-doctoral programs and directs the health and clinical informatics track of the biomedical informatics graduate program.

Last year, Dr. Eden was honored to be selected by DMICE graduates to serve as an usher at graduation. This graduation she will assist with the hooding of DMICE graduates.

“We are thrilled for Dr. Eden,” said DMICE Chair William Hersh, M.D. “Karen’s service at the departmental, school, university, and national levels is unparalleled. That she is able to provide this while maintaining a busy portfolio of research and activities is all the more impressive.”

The Distinguished Faculty Awards program was established by the Faculty Senate to recognize outstanding performance by members of the faculty. There are six categories that rotate among the schools on an annual basis: teaching, leadership, excellence, services, research, and collaboration.

May 23, 2017

DMICE Postdoctral Fellow, Ilya Ivlev, MD, PhD Publishes Systematic Review

Postdoctoral Fellow, Ilya Ivlev, MD, PhD, has published a study in *Journal of General Internal Medicine*, Use of Patient Decision Aids Increased Younger Women’s Reluctance to Begin Screening Mammography: A Systematic Review and Meta-Analysis, that is also featured in the journal’s Capsule Commentary section as well as on the OHSU News site. The systematic review reports that evidence-based breast cancer screening decision aids reduces by 77 percent the number of women who plan to undergo screening mammography. It is one of the first to examine the effects of these aids on women’s intentions to be screened.

May 9, 2017

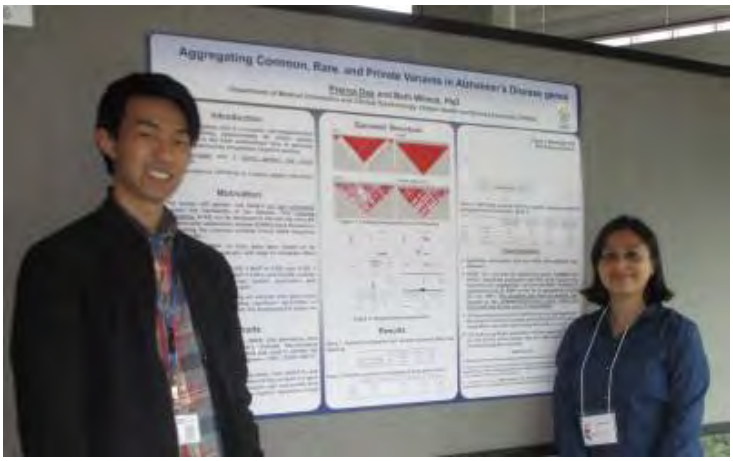
DMICE Student Wins Second Place in Research Week Three-Minute Thesis Competition

Prerna Das, a student in the OHSU Master of Science in Biomedical Informatics program, won second place in the OHSU Research Week Three-Minute Thesis (3MT) competition, held May 3, 2017. Das presented her thesis topic, *In Pursuit of Genetic Risk Factors for Alzheimer's*. She also presented a poster on this topic at the May 1 poster session. The three winners of the 3MT will represent OHSU at the statewide competition at the University of Oregon on May 12th.

Overall at Research Week, there were five oral presentations from Department of Medical Informatics & Clinical Epidemiology (DMICE) faculty, staff, fellows and/or students as authors, while 15 posters at the Monday evening poster session featured DMICE-affiliated authors.

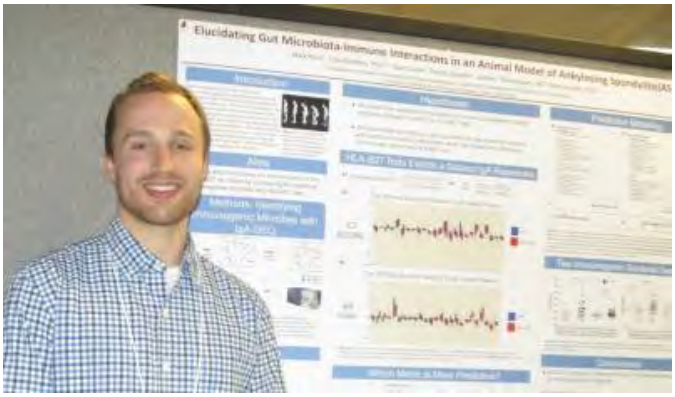
Below are some pictures from the event:

Eric Leung, pre-doctoral fellow, viewed MBI student Prerna Das's poster, *Aggregating Common, Rare, and Private Variants in Alzheimer's Disease Genes*.

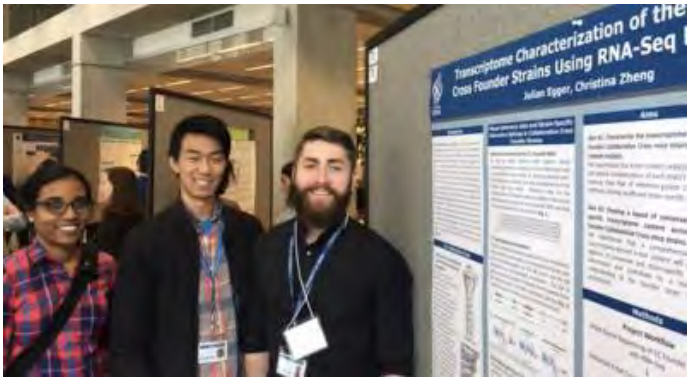


Pre-doctoral fellow Dana Womack, M.S., discussed her poster, *Exploration of Operational Data Streams as a Source of Actionable Insight*, with Research Week judge Virginia Tilden, PhD., R.N., F.A.A.N., professor and senior associate dean for research affairs in the School of Nursing.

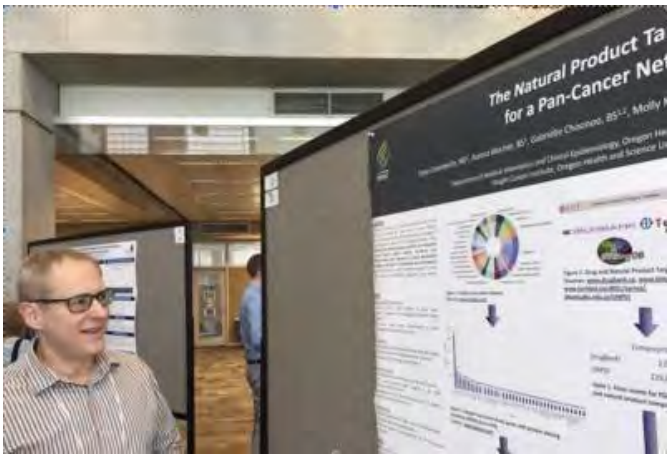
Mark Klick, master of science student, presented a poster on *Elucidating Gut Microbiota-Immune Interactions in an Animal Model of Ankylosing Spondylitis*.



Erin Hickman, M.D., post-doctoral fellow, and Eric Leung, pre-doctoral fellow, reviewed Julian Egger's poster on *Transcriptome Characterization of the Collaborative Cross Founder Strains Using RNA-Seq K-mer Content*. Julian is a pre-doctoral fellow.

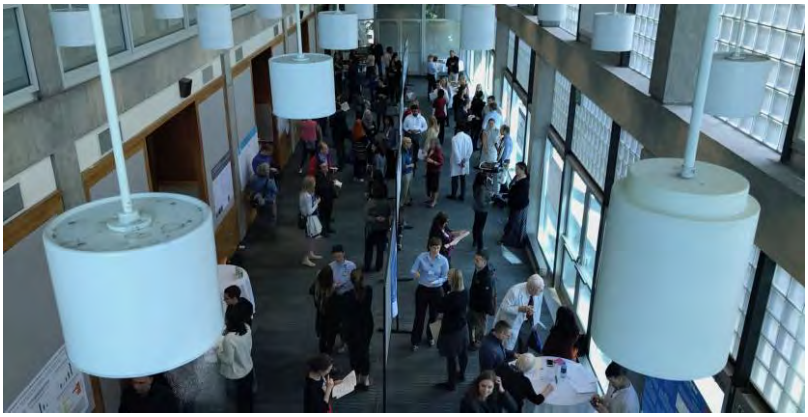


Steve Chamberlin, N.D., post-doctoral fellow, created a poster on *Natural Product Targetome in Cancer: Definition and Application*.



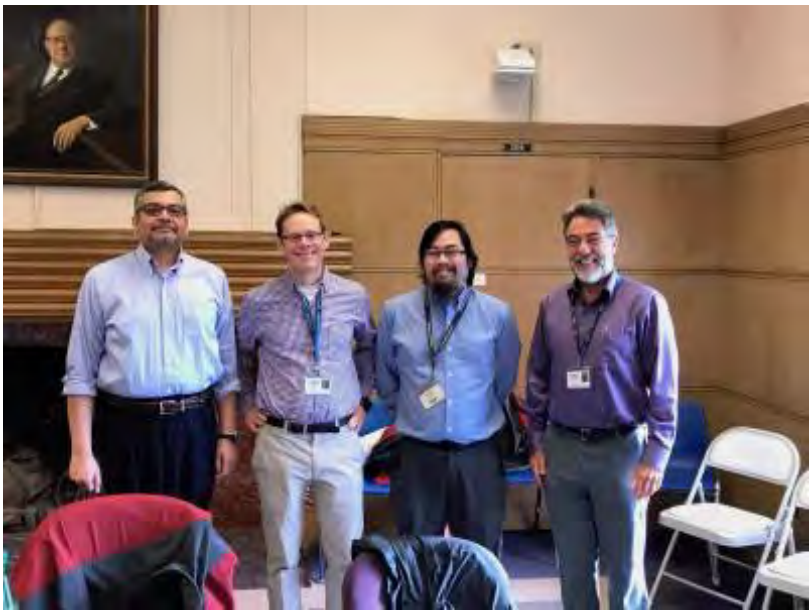
May 5, 2017

DMICE Faculty and Fellows Present at Inaugural OHSU Symposium on Educational Excellence



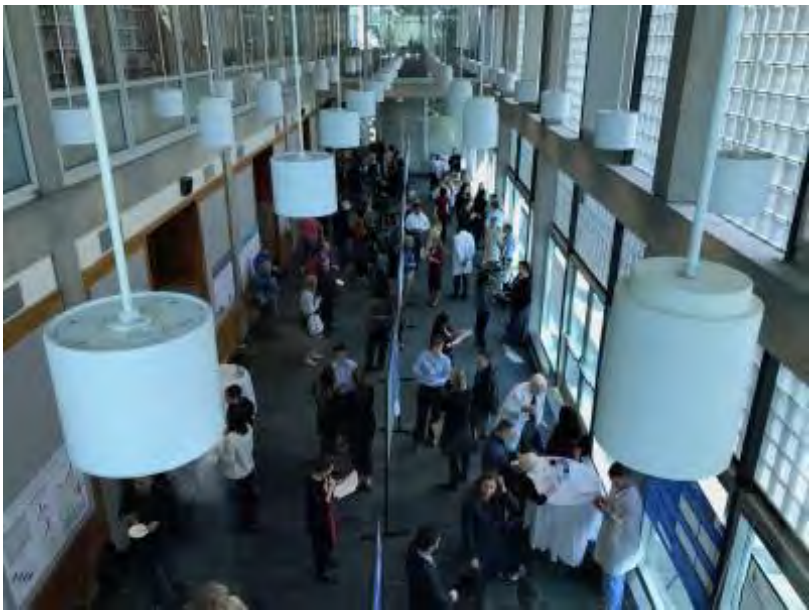
Several faculty and trainees from the Department of Medical Informatics & Clinical Epidemiology (DMICE) presented panels and posters at the inaugural OHSU Symposium on Educational Excellence on Friday, April 14, 2017.

A panel, *Innovation in Teaching Cross-Cutting Disciplines: Case Study of Biomedical Informatics & Data Science*, was presented by William Hersh, MD; David Dorr, MD, MS; Ted Laderas, PhD; and Vishnu Mohan, MD, MBI.

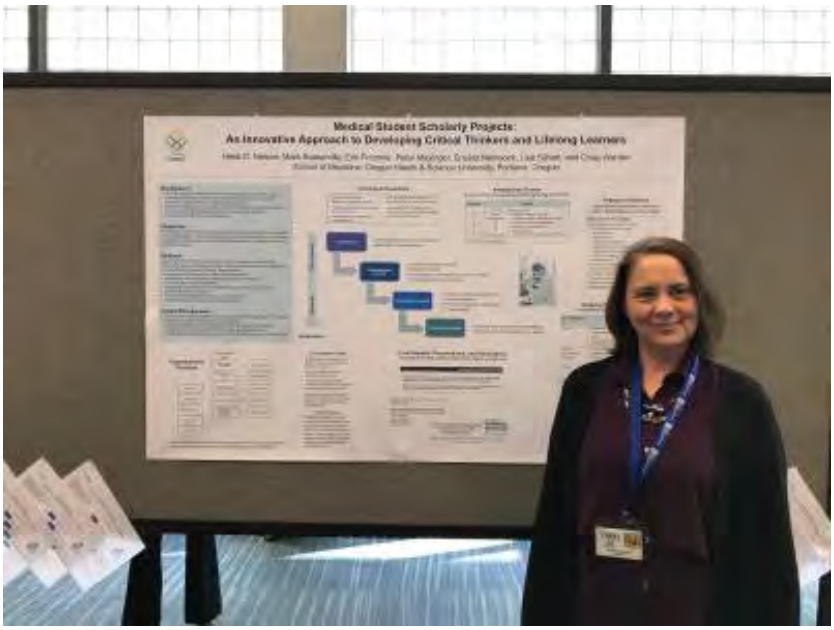


Heidi D. Nelson, MD, MPH was part of a panel, *Developing Effective Faculty Mentors for Student Scholarly Projects in the New MD Curriculum*.

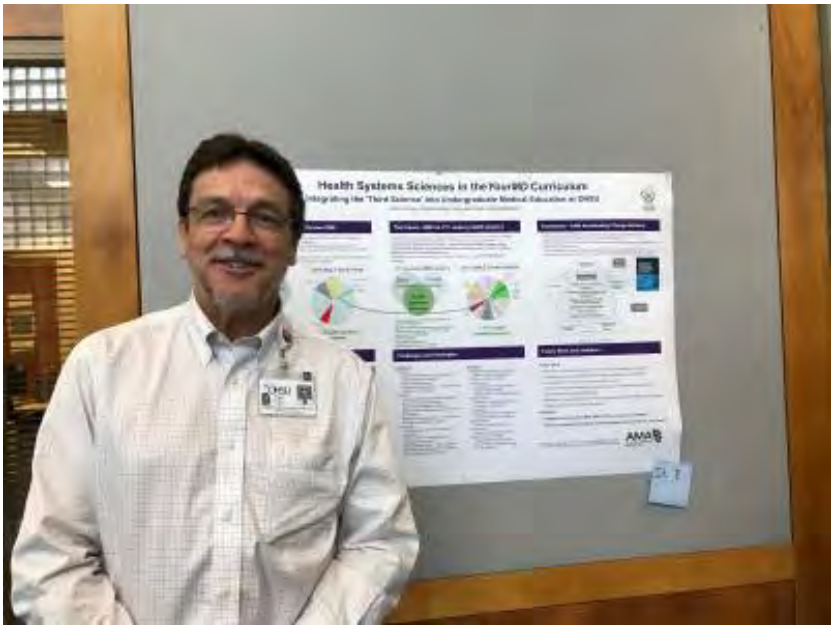
Several DMICE faculty took part in the poster session in the BICC Gallery.



Heidi D. Nelson, MD, MPH was also among authors of a poster, *Preparedness of Pre-Clinical Medical Students to Plan and Conduct a Scholarly Project*.



Paul Gorman, MD was among authors of a poster, *Health Systems Science: Integrating the 'Third Science' into the Undergraduate Medical Curriculum*.



Gretchen Scholl and Anirudh Chintalapani, MD presented a poster, co-authored by Vishnu Mohan, MD, MBI and Jeffrey Gold, MD, *Creating and deploying online CME activities featuring the safe, efficient and effective use of the electronic health record*.

William Hersh, MD was among authors of a poster, *creativeIDEAS: A Vision for Training the Next Generation of PhD scientists in the School of Medicine*.

April 18, 2017

OHSU News Hub Features Blog Posting from DMICE Chair on March for Science

 DMICE Chair William Hersh, MD wrote a posting to his Informatics Professor blog that has been featured on the OHSU News Hub. In the posting, Dr. Hersh described his rationale for participating in the March for Science Portland.

April 16, 2017

School of Medicine Selects Journal Article from Evidence-based Practice Center as Paper of the Month

One of the systematic reviews from the Pacific Northwest Evidence-based Practice Center, previously highlighted in Health Data, Information and Action, was selected as the OHSU School of Medicine Paper of the Month for March 2017. The journal article on low back pain was published in the February 14, 2017 issue of Annals of Internal Medicine. Congratulations, Dr. Roger Chou and team!

February 27, 2017

Informatics Fellows Win Award from Society for Imaging Informatics in Medicine (SIIM) for FHIR-Based Application

DMICE Clinical Informatics Fellow James Morrison, M.D., received a $10,000 prize in the first Innovation Challenge of the Society for Imaging Informatics in Medicine. Dr. Morrison, an interventional radiologist, and his team from OHSU presented their project, Voice Enabling the Imaging Enterprise, a voice interface going directly into the electronic health record (EHR) that allows quick, seamless data access through voice commands.

In addition to Dr. Morrison, the winning team included Steven Kassakian, M.D., former National Library of Medicine (NLM) post-doctoral fellow and now medical director of Clinical Informatics and assistant professor, DMICE; Eric Leung, Ph.D. student and NLM pre-doctoral fellow; and Jonathan Steinberger, M.D., assistant professor of interventional radiology.

The project uses Amazon Echo voice-activated hardware and connects with the EHR via the HL7 Fast Health Interoperability resources (FHIR) standard. The OHSU team envisions this technology as an optimal solution for getting information out of the EHR and other resources while allowing users to maintain focus on the task at hand, whether that is reading imaging studies in radiology, operating in the OR, or talking to a patient in clinic.

“The inaugural SIIM Innovation Challenge was an ideal venue to get feedback and exposure for our idea of bringing a more robust voice-activated interface in to the radiology reading room and outpatient clinic.,” said Dr. Morrison.

“Winning the Grand Prize and People’s Choice Award was validation of the underlying concept, and the $10,000 gave my co-founders and me the capital we needed to take our prototype to the next level. It’s fair to say that without SIIM’s support our idea may never have made it out of the dreamer phase.”

Dr. Morrison plans to use the funds to obtain additional hardware for development and testing.

The SIIM meeting was held in July 2016 in Portland, Ore., and the OHSU team will report on their progress at the 2017 meeting in June in Pittsburgh, Pa.

A video about the project can be viewed at https://youtu.be/W0pbgQ1k1vQ. Photo above provided by Society for Imaging Informatics in Medicine (SIIM).

February 19, 2017

Biomedical Informatics Graduate Program Renames Tracks, Reflecting Evolution of Field

The OHSU Biomedical Informatics Graduate Program has received university approval to rename the two tracks of its program to reflect changes in the field and evolving content in the curriculum.

Since 2006, the program has had two "tracks," which we have called *Clinical Informatics* (CI) and *Bioinformatics & Computational Biology* (BCB). We have chosen to call these two pathways through our programs "tracks" because they represent two different foci within the larger field of biomedical informatics, which is the discipline that acquires, organizes, and uses data, information, and knowledge to advance health-related sciences. Historically, the differences between the tracks represented their informatics focus, in particular people, populations, and healthcare (clinical informatics) vs. cellular and molecular biology, genomics, and imaging (bioinformatics).

In recent years, however, these distinctions have blurred as "omics" science has worked its way into clinical medicine. At the same time, health, healthcare, and public health have become much more data-driven, due in no small part to the large-scale adoption of electronic health records. As such, the two tracks have begun to represent different but still distinct foci, mostly in their depth of quantitative methods (deep vs. applied) but also in coverage of other topics (e.g., system implementation, especially in complex health environments; usability; and clinical data quality and standards).

We believe that both tracks possess a set of common competencies at a high level that reflect the essential knowledge and skills of individuals who work in biomedical informatics. Our curriculum organizes these competencies into "domains," which are groups of required and elective courses that comprise the core curriculum of each track. To reflect the evolution of the program, we have renamed the BCB track to *Bioinformatics and Computational Biomedicine* (still abbreviated BCB) and the CI track to *Health and Clinical Informatics* (now to be abbreviated HCI). The table lists below lists the common competencies and the names of the domains for each track. Each of the domains contains required courses, individual competency courses (where students are required to select a certain number of courses from a larger list, which we used to call "k of n" courses), and elective courses.

High-Level Competency	Domain Names for Health & Clinical Informatics (HCI) Track	Domain Names for Bioinformatics & Computational Biomedicine (BCB) Track
Apply core concepts of using data, information, and knowledge to advance health and biomedicine	Health and Clinical Informatics	Bioinformatics & Computational Biomedicine
Apply knowledge of appropriate area(s) of health and biomedicine to informatics practice and research	Health Care	Biomedical Science
Apply computing skills to biomedical informatics	Computer Science	Computer Science
Apply quantitative methods to biomedical informatics	Evaluative Sciences	Machine Learning, Analytics, and Biostatistics
Apply people and organizational knowledge to clinical informatics	Organizational Behavior and Project Management	N/A
Apply advanced scholarship to biomedical and health informatics	Thesis/Capstone/Dissertation Requirements	Thesis/Capstone/Dissertation Requirements

The program will continue the overall structure of the curriculum with the “knowledge base” that represents the core curriculum of the master’s degree and the base curriculum for advanced study in the PhD program. A thesis or capstone is added to the knowledge base to qualify for the MS or MBI (latter in the HCI Track only) degrees, respectively. Additional courses are required for the PhD, ultimately culminating in a dissertation.

We are in the process of updating the materials and Web site for our program to reflect the new names. We will also be evolving our course content as well as introducing new courses to reflect the foci of the new tracks. The program still fundamentally aims to train future researchers and leaders in the field of biomedical informatics.

February 16, 2017

Evidence-based Practice Center publishes two systematic reviews related to low back pain in Annals of Internal Medicine

The Pacific Northwest Evidence-based Practice Center (EPC), based in the Department of Medical Informatics and Clinical Epidemiology, had two systematic reviews related to low back pain published in the February 14, 2017 issue of *Annals of Internal Medicine.* The papers were published in conjunction with a clinical guideline on noninvasive treatments for subacute, and chronic low back pain, issued by the American College of Physicians (ACP).

Roger Chou, M.D., director of the EPC and professor of medical informatics and clinical epidemiology and medicine, was first author of the systematic review on systemic pharmacologic therapies for low pain. The review was conducted by EPC investigators and staff at OHSU along with EPC partners, the University of Washington CHASE Alliance and Spectrum Research, Inc. Among the co-authors were DMICE staff Tracy Dana, M.L.S., Jessica Griffin, M.S., and Sara Grusing, B.A.

The second systematic review focused on nonpharmacologic therapies for low back pain. Dr. Chou served as first author, with DMICE staff Ms. Tracy, Ms. Griffin and Ms. Grusing as co-authors, along with others at OHSU, the University of Washington, and Spectrum Research.

“Low back pain is a common problem and it continues to be a challenge for primary care and specialist providers,” said Dr. Chou. “The EPC evidence reviews to support the ACP guideline required a huge effort to gather and assess the abundance of evidence on nonpharmacological therapies as well as prescription and over-the-counter medications, and I’m grateful to our EPC investigators for their excellent teamwork.”

The ACP guideline on low back pain was prepared by the ACP Clinical Guidelines Committee. Linda Humphrey, M.D., M.P.H., professor of medicine and medical informatics and clinical epidemiology, and Devan Kansagara, M.D., M.C.R., associate professor of medicine and medical informatics and clinical epidemiology, served on the guidelines committee. Both physicians also work at the VA Portland Health Care System.

“The guidelines emphasize nonpharmacological treatments as first-line therapy for chronic LBP. In particular, they emphasize the limited role of opioids for LBP,” added Dr. Chou.

The EPC reviews are available from the Annals Web site:

- Systematic Pharmacologic Therapies
- Nonpharmacologic Therapies

January 30, 2017

Extension of Clinical Informatics Subspecialty Grandfathering Period Provides New Options for Physician Certification

In November, the American Board of Preventive Medicine (ABPM) announced that the “grandfathering period” for physicians to become board-certified in the new subspecialty of clinical informatics would be extended for five additional years, from 2017 to 2022 (see

also). This means that physicians can become board-certified in the subspecialty through either the practice pathway or via "non-traditional" fellowships that include both the OHSU National Library of Medicine (NLM) fellowship as well as our master's degree program, the latter of which is available online.

OHSU has developed an ACGME-accredited clinical informatics fellowship and we believe this is the gold standard for training in clinical informatics. However, we also recognize that a two-year on-site fellowship is not possible for all who desire to achieve certification in the subspecialty, especially those who are mid-career and not easily able to relocate for a full-time fellowship.

The requirements for board eligibility include board certification in a primary specialty and qualification via the practice pathway or a non-traditional fellowship. The practice pathway requires one to have "practiced" clinical informatics for 25% or more time over three of the last five years. Education time counts as half of the time of practice time, i.e., 50% or more time over three years, which is comparable to the duration of a one-and-a-half-year full-time master's degree.

All practice pathway time is additive, so a combination of practice and/or educational activities can reach the threshold. In addition, a recent master's degree from an established program (the actual list is not known but includes long-standing programs, including ours at OHSU) has been enough to achieve board eligibility. Those eligible for the exam can then apply to ABPM to take the exam, which is offered annually each October.

About 40 graduates of the OHSU Biomedical Informatics Graduate Program have achieved eligibility in the subspecialty since its inception, and we look forward to working with those physicians who aim to achieve eligibility via our online education or clinical fellowship programs.

January 12, 2017

OHSU NLM Training Grant for Biomedical Informatics Graduate Program Renewed

The OHSU Department of Medical Informatics & Clinical Epidemiology received word in December that our Biomedical Informatics Research Training Grant from the National Library of Medicine (NLM) of the National Institutes of Health (NIH) will be renewed for another five years from 2017-2022. This will enable us to provide financial support (stipends plus tuition) for doctoral (PhD) and postdoctoral trainees in our educational program for another five years.

Our program has been funded as an NLM training site continually since 1992. We are currently evaluating applicants to start in the 2017-2018 academic year. The application period for the

2017-2018 year has already closed, but it will open for the 2018-2019 academic year starting next summer.

The OHSU NLM Training Grant Program has produced a number of highly successful graduates, many of whom have gone to successful careers in academia, industry, and elsewhere. We hope to continue this success in the next five-year cycle of the training grant and beyond.

November 29, 2016

Professor Heidi Nelson Honored by American College of Physicians

Heidi D. Nelson, M.D., M.P.H., M.A.C.P., has been awarded Mastership in the American College of Physicians (ACP), the national organization of internal medicine physicians. Dr. Nelson, Research Professor and Vice Chair in the Department of Medical Informatics and Clinical Epidemiology (DMICE), also serves as Director of Scholarly Projects for the Oregon Health & Science University School of Medicine, and Medical Director of Cancer Prevention and Screening at Providence Health and Services in Portland, Oregon.

Election to Mastership recognizes outstanding and extraordinary career accomplishments. Masters must have made a notable contribution to medicine. This includes, but is not limited to teaching, outstanding work in clinical medicine (research or practice), contributions to preventive medicine, improvements in the delivery of health care, and/or contributions to the medical literature. According to ACP bylaws, Masters are elected “on account of personal character, positions of honor, contributions toward furthering the purposes of the ACP, eminence in practice or in medical research, or other attainments in science or in the art of medicine.”

Dr. Nelson’s research, teaching, and clinical activities focus on clinical epidemiology, screening and prevention, women’s health, and health care policy and delivery. Within DMICE, Dr. Nelson serves as a lead investigator in the Pacific Northwest Evidence-based Practice Center and is the collaborating principal investigator for the HRSA-sponsored Women’s Preventive Services Initiative. Dr. Nelson has conducted numerous systematic

reviews on screening and prevention topics used to inform decision making by the U.S. Preventive Services Task Force, AHRQ Effective Healthcare Program, National Institutes of Health, and multiple other partners since 1998. Her studies have been used to determine clinical practice guidelines, health policy, and formulary and coverage decisions affecting millions of Americans. She recently published a textbook on systematic review methodology (*Systematic Reviews to Answer Health Care Questions*. Wolters Kluwer: Philadelphia, 2014).

Dr. Nelson has also served as an investigator for several prominent national studies, including the Study of Osteoporotic Fractures, Breast Cancer Surveillance Consortium, Breast Pathology Study, and Melanoma Pathology Study. She has served on influential national panels including the Institute of Medicine Committee on Prevention Services for Women that determined services to be covered under the Affordable Care Act, PROSPR Scientific Consulting Committee for the National Cancer Institute, and the NIH Advisory Committee on Research on Woman's Health. In the School of Medicine, Dr. Nelson develops and directs Scholarly Projects, a required component of the new MD curriculum in which medical students create in-depth investigative projects across the course of their medical school education with the goal of creating critical thinkers and lifelong learners.

ACP will honor new Masters at Convocation during Internal Medicine Meeting 2017, ACP's annual scientific conference March 30-April 1 in San Diego.

November 29, 2016

DMICE Faculty Presentations at NIH Big Data to Knowledge (BD2K) Meeting

Several department faculty will be attending the NIH Big Data to Knowledge (BD2K) Meeting and Open Science Symposium this week in Washington, DC. The department has two grants from the BD2K program to develop open educational resources and establish data science skills courses, all of which can be accessed by the project Web site.

The faculty will present three posters at the meeting:

- Data Science Educational Resources for Anyone, Anywhere
- Getting Your Hands Dirty With Data
- Get Real: A Synthetic Dataset Illustrating Clinical and Genetic Covariates

The Open Data Science Symposium will feature a variety of sessions describing how open data and open science can transform biomedical research.

November 17, 2016

DMICE Teams Take First and Third Place at AMIA 2016 Student Design Challenge


OHSU informatics students who placed 1st and 3rd in the Student Design Challenge include (left to right) Vincent Caruso, M.S., Steven Chamberlin, N.D., Dana Womack, M.S., Ian Stavros, and Matthew Sundling, Ph.D.

A team of students in the biomedical informatics program at OHSU took first place in the Student Design Challenge at the American Medical Informatics Association Annual Symposium, marking top honors for an OHSU team three years in a row. The winners were announced November 16, 2016, at the end of the symposium, held in Chicago, Ill.

Students Dana Womack, M.S., Steven Chamberlin, N.D., and Ian Stavros received the first place award with their presentation on SocialVue: Making Social Determinants of Health Visible in the EHR.

“The AMIA student design challenge was a positive learning experience for our team,” said Ms. Womack. “We look forward to future use of our design in the medical home to support care that is tailored to patients’ social determinants of health.”

In third place was another team from OHSU. Matthew Sundling, Ph.D., Vincent Caruso, M.S., Kristen Stevens, and Geoffrey Schau, M.S., presented Chronic Disease Monitoring with PrecisionPatientLedger and RAPID3.

“It gives me great pride to see the talent and insights among the diverse students in our program to win this challenge for the third year in a row,” said DMICE professor and chair William Hersh, M.D.

This year’s Student Design Challenge theme was The Human Side of Big Data – Facilitating Human-Data Interaction. Both teams gave podium presentations as well as displayed posters on their research at the AMIA meeting.

A third DMICE team, students Raja Cholan, Jennifer Pacheco, Gene Ren, and Laura Hickerson, were finalists in the Design Challenge with their project, Personalized Heart Disease Risk

Manager: A Tool for Patients and Clinicians to Manage Cardiovascular Risk and presented a poster at the AMIA symposium.

A DMICE student team won the Design Challenge in both 2014 and 2015.

November 16, 2016

Evidence-based Practice Center Produces Systematic Review on Statins for Prevention of Cardiovascular Disease in Adults


Roger Chou M.D.

The Pacific Northwest Evidence-based Practice Center (EPC), part of the Department of Medical Informatics and Clinical Epidemiology (DMICE), has produced an evidence report and systematic review on statins for the prevention of cardiovascular disease in adults, published in *JAMA* November 13, 2016. The report was used by the US Preventive Services Task Force (USPSTF) to inform their recommendations on the topic.

A major finding of the report was that statins help prevent heart attacks and strokes in adults with cardiovascular risk factors such as high cholesterol, high blood pressure, diabetes and smoking but have not yet had a heart attack or stroke.

The Task Force is now recommending initiating use of low- to moderate-dose statins in adults aged 40 to 75 years without a history of cardiovascular disease (CVD) who have these risk factors and a calculated 10-year CVD event risk of 10% or greater.

The review was led by EPC director and professor Roger Chou, M.D., with co-authors research associate Tracy Dana, M.L.S., research associate Ian Blazina, M.P.H., former research assistant Monica Daeges, and Thomas Jeanne, M.D., formerly an OHSU preventive medicine resident and now an epidemiologist with the Multnomah County Health Department.

“Cardiovascular disease is responsible for one out of every three adult deaths in the U.S. and is often silent until a heart attack or stroke occurs – so understanding the effectiveness of statins in people without a prior heart attack or stroke is very important.” said Dr. Chou.

“The Pacific Northwest EPC was pleased to conduct the scientific review for the US Preventive Services Task Force to inform its recommendations, which have broad policy and clinical implications, and will add to the ongoing dialogue about the appropriate use of statins for prevention of a first heart attach or stroke.”

The EPC has conducted evidence reviews for the USPSTF since 1998, producing reviews on more than 50 topics in the past 18 years.

More information on the EPC paper in *JAMA* can be found at

https://www.ohsu.edu/xd/about/news_events/news/2016/11-14-Cholesterol-lowering-dru.cfm

November 10, 2016

OHSU Informatics to Have Major Presence at AMIA 2016

Department of Medical Informatics and Clinical Epidemiology (DMICE) faculty, staff and students will lead a strong presence from Oregon Health & Science University (OHSU) at the American Medical Informatics Association Annual Symposium (AMIA 2016) to be held in Chicago, Ill. November 12-16, 2016.

One highlight of the symposium is that two teams from DMICE are in the top three finalists for the fourth annual Student Design Challenge. These two teams will give podium presentations as well as display posters on their research. Student teams from 2014 and 2015 won top honors in this competition the previous two years.

Students Dana Womack, M.S. Steven Chamberlin, N.D., and Ian Stavros will present, *SocialVue: Making Social Determinants of Health Visible in the EHR*, while Matthew Sundling, Ph.D., Vincent Caruso, M.S., Kristen Stevens, and Geoffrey Schau, M.S. will present, *Chronic Disease Monitoring with PrecisionPatientLedger and RAPID3*.

A third DMICE team, students Raja Cholan, Jennifer Pacheco, Gene Ren, and Laura Hickerson, were finalists in the Student Design Challenge with their project, *Personalized Heart Disease Risk Manager: A Tool for Patients and Clinicians to Manage Cardiovascular Risk,* and will present a poster at the AMIA symposium.

Several DMICE research groups will give podium presentations at the symposium.

Professor and vice chair Joan Ash, Ph.D., will present, *Clinical Decision Support for Worker Health: A Qualitative Study of Five Primary Care Settings*, which has DMICE co-authors assistant professor Dian Chase, Ph.D., and Jane Wiesen, Ph.D.

Dr. Ash will also present, *Studying Readiness for Clinical Decision Support for Worker Health Using the Rapid Assessment Process and Mixed Methods Interviews*, also with Drs. Chase and Wiesen as co-authors as well as Elizabeth Murphy. M.D.

Assistant professor Vishnu Mohan, M.D., M.B.I., will present, *Using Simulations to Improve Electronic Health Record Use, Clinician Training and Patient Safety: Recommendations From A Consensus Conference*, with DMICE-affiliated co-authors Deborah Woodcock, M.B.A., Gretchen Scholl, Julie Doberne, M.D., Ph.D. '16, professor Jeffrey Gold, M.D., and Drs. Chase and Ash.

A Mixed Methods Task Analysis of the Implementation and Validation of EHR-Based Clinical Quality Measures will be presented by assistant professor Nicole Weiskopf, Ph.D. Her co-authors include professor Aaron Cohen, M.D., M.S., and professor and vice chair David Dorr, M.D, M.S. as well as Ms. Woodcock.

Other special presentations include a tutorial by professor Michael Chiang, M.D., *Disseminating Informatics Knowledge: Peer-review and Scholarly Publications* and a Clinical Research Informatics Working Group Pre-symposium, *The Emerging Role of the Chief Research Informatics Officer in Academic Medical Centers*, involving research associate Kate Fultz Hollis, M.S., and professor emerita Judith Logan, M.D., M.S.

Dr. Dorr, who served on the AMIA scientific program committee, is participating in a panel, *From the Trenches – Issues Facing Clinical Informatics Administrative Clinicians in the Primary Care Setting*.

In addition to the three student design challenge posters, there will be seven posters displayed by DMICE faculty and staff:

- Dr. Ash is a co-author of *A Systematic Review of The Types And Causes Of Prescribing Errors Generated From Using Computerized Provider Order Entry Systems in Primary and Secondary Care*.
- Assistant professor Stephen Wu, Ph.D., senior research assistant Tamara Timmons, M.D., and professor and chair William Hersh, M.D., are authors of *Development of Test Topics for Cohort Identification*.
- Dr. Wu also has a poster on *Restoring Line Breaks in Epic-derived Clinical Notes* with Dr. Timmons as a co-author along with assistant professor Steven Bedrick, Ph.D.
- A third poster in which Dr. Wu is an author is *A Part-Of-Speech Weighting Scheme for Clinical Information Retrieval*.

- Dr. Dorr and his research group are presenting two posters, *A Qualitative Analysis of Electronic Clinical Quality Measures Development and Data Validation*, with co-authors research assistant Nicholas Colin, former research assistant Shelby Martin, Bhavaya Sachdeva, M.P.H, and Mr. Cholan.
- Dr. Dorr's research group is also presenting, *Confidence in Methodologies to Accurately Predict Risk Stratification in Primary Care Practices*,with DMICE co-authors research assistant Jesse Wagner, M.A., former research assistant Lindsey Watson, and Ms. Sachdeva.
- Finally, a poster on *Comparison of Electronic Health Record Data Sources to a Gold Standard Patient Data Set in Correctly Identifying Chronic Conditions* is from authors Ms. Martin and Drs. Weiskopf and Dorr.

The OHSU Biomedical Informatics Program will also be an exhibitor at the AMIA Symposium. Dr. Hersh will be presenting an overview of the OHSU program in the exhibit hall on Monday afternoon.

Dr. Hersh will also be participating in a pre-symposium retreat for fellows from around the country in new ACGME-accredited clinical informatics subspecialty fellowships. All five OHSU clinical informatics will be participating as well: James Morrison, M.D., Inho Kim, M.D., Ben Orwoll, M.D., Brady Wright, M.D., and Ani Chintalapani, M.D.

November 6, 2016

DMICE is Hiring Informatics Faculty!

The Department of Medical Informatics and Clinical Epidemiology (DMICE) at Oregon Health & Science University (OHSU) is seeking to recruit a highly trained junior faculty member who can advance the translation of informatics principles and research into operations while continuing to pursue new knowledge. Areas of interest for the position are understanding of the value-based delivery system changes, population management, quality measurement and improvement, safety, clinical decision support, clinical and translational research, and/or advancing data science. Experience in data repurposing, provenance, and algorithmic approaches to understanding variation and improving research and clinical care are also helpful. Educational experience for the value of informatics and its role in facilitating change in health and health care are desired.

Position Description

The individual will have responsibilities for research, service, and teaching. He or she will be expected to foster an independent research career that provides valuable new knowledge in the pursuit of the above areas. The faculty member will also engage in operations and implementation work at OHSU to advance research and clinical practice systems. He or she

will also participate in educational offerings in biomedical informatics and data science at OHSU.

Salary

Commensurate with degree, years of experience, and rank.

Qualifications

- M.D. or Ph. D. with formal Informatics training
- Experience in research methods in informatics, especially in the above areas
- Operational informatics or dissemination and implementation experience a plus
- Clinical and translational research experience
- Teaching experience is desirable, either in informatics or clinical programs

For consideration

For formal consideration, please Apply Online, submit your curriculum vitae, a description of research plans and goals, and three letters of reference. Applicants are encouraged to learn more about our department and its faculty, research and projects.

About OHSU and DMICE

At OHSU, some of the most brilliant minds in the country collaborate to provide high-quality and innovative care, explore new research frontiers, educate tomorrow's health professionals and improve the community's health through extensive outreach. The knowledge developed at OHSU is quickly translated into new cures and new ways to prevent disease. As Portland's largest employer, with more than 15,000 employees, OHSU can offer services and community support activities not found anywhere else in the region. OHSU is a nationally prominent research university and Oregon's only public academic health center. OHSU operates dental, medical, nursing and pharmacy schools that rank high both in research funding and in meeting the university's social mission.

DMICE is one of the largest and highly respected academic informatics programs in the country. In addition to having a diverse and well-funded research portfolio, DMICE has been a pioneer in informatics education, including graduate programs, online education, a new clinical informatics subspecialty fellowship for physicians, and a partnership with the American Medical Informatics Association to develop the 10×10 ("ten by ten") course that has trained over 2000 individuals. DMICE also houses the Pacific Northwest Evidence-based Practice Center and the Informatics Discovery Lab, both of which are world-class initiatives intended to advance putting knowledge into practice. Faculty carry out research projects in areas such as healthcare data analytics, population health, ontology development, machine learning, information retrieval, and sociotechnical understanding of systems.

OHSU values a diverse and culturally competent workforce. We are proud of our commitment to being an equal opportunity, affirmative action organization that does not discriminate against applicants on the basis of any protected class status, including disability status and protected veteran status. Individuals with diverse backgrounds and those who promote diversity and a culture of inclusion are encouraged to apply. To request reasonable accommodation contact the Affirmative Action and Equal Opportunity Department at 503-494-5148 or aaeo@ohsu.edu.

November 4, 2016

DMICE and BICC Celebrate 25 Years of Accomplishment

Last week marked the celebration of 25 years of the OHSU Biomedical Information Communication Center (BICC), the building that houses our department, the OHSU Library, and a number of other units. The day started with several individuals describing their early involvement in planning and starting up the BICC, and ended with a keynote talk about the future of the National Library of Medicine by its new Director, Dr. Patricia Brennan. In between included a talk by our department chair, Dr. William Hersh, on the accomplishments of the department. He also presented a poster on the large array of collaboration we do with other departments and units at OHSU.

October 23, 2016

DMICE Collaborates with OHSU Library to Make Biomedical Big Data Science Open Educational Resources Available

For the last couple years, faculty from the our department have been collaborating with the OHSU Library to develop open educational resources (OERs) in the area of Biomedical Big Data Science. Funded by a grant from the National Institutes of Health (NIH) Big Data to Knowledge (BD2K) Program, OERs have been produced that can be downloaded, used, and repurposed for a variety of educational audiences by both learners and educators.

Development of the OERs is an ongoing process, but we have reached the point where a critical mass of the content is being made available for use and to obtain feedback. The OERs are intended to be flexible and customizable and we encourage others to use or repurpose

these materials for training, workshops and professional development or for dissemination to instructors in various fields. They can be used as “out of the box” courses for students, or as materials for educators to use in courses, training programs, and other learning activities. We ultimately aim to create 32 modules on the following topics:

1. Biomedical Big Data Science
2. Introduction to Big Data in Biology and Medicine
3. Ethical Issues in Use of Big Data
4. Clinical Standards Related to Big Data
5. Basic Research Data Standards
6. Public Health and Big Data
7. Team Science
8. Secondary Use (Reuse) of Clinical Data
9. Publication and Peer Review
10. Information Retrieval
11. Version Control and Identifiers
12. Data Annotation and Curation
13. Data Tools and Landscape
14. Ontologies 101
15. Data Metadata and Provenance
16. Semantic Data Interoperability
17. Choice of Algorithms and Algorithm Dynamics
18. Visualization and Interpretation
19. Replication, Validation and the Spectrum of Reproducibility
20. Regulatory Issues in Big Data for Genomics and Health Semantic Web Data
21. Hosting Data Dissemination and Data Stewardship Workshops
22. Guidelines for Reporting, Publications, and Data Sharing
23. Terminology of Biomedical, Clinical, and Translational Research
24. Computing Concepts for Big Data
25. Data Modeling
26. Semantic Web Data
27. Context-based Selection of Data

28. Translating the Question
29. Implications of Provenance and Pre-processing
30. Data Tells a Story
31. Statistical Significance, P-hacking and Multiple-testing
32. Displaying Confidence and Uncertainty

At the present time, 20 of the above modules are available for download and use. We are encouraging their use and seeking feedback from those who make use of them. The feedback will be used to improve the available modules and guide development of those not yet released.

We have also been developing mappings to research competencies in other areas, such as for the NIH Clinical and Translational Science Award (CTSA) consortium research competency requirements and the Medical Library Association professional competencies for health sciences librarians. To this end, we have been able to link these materials to existing efforts, and provide training opportunities for learners and educators working in these areas. We ultimately aim to complete this mapping across all of the BD2K training offerings, to align with other groups, avoid redundancy and to ensure we are meeting the needs of these various groups.

This project is actually one of several projects that have been funded by grants to develop and provide education in biomedical informatics and data science. The other projects include:

1. Update of the ONC Health IT Curriculum that includes focused training of 1000+ incumbent health IT and healthcare professionals in healthcare data analytics.
2. Development of data science skills courses funded by a second grant from the BD2K program that makes use of some of the OERs as well as other materials.

We hope that all of these materials are useful for many audiences and look forward to feedback enabling their improvement.

October 20, 2016

DMICE alumnus receives School of Medicine Alumni Association award

 The first Ph.D. graduate of the OHSU biomedical informatics program was honored by the School of Medicine Alumni Association as he received its Early Career Achievement Alumni Award at a reception in the Biomedical Information Communication Center on September 22, 2016.

Adam Wright, Ph.D. '07, is currently an associate professor of medicine at Harvard Medical School and a scientist at Brigham and Women's Hospital in Boston, Mass. His research focuses on the technical, quantitative methods needed to develop electronic health record systems and the ability to qualitatively evaluate them.

"I was deeply honored and really excited to receive the OHSU School of Medicine Early Career Achievement Award," Dr. Wright said. "My years at OHSU were really formative for me as an informatician and scientist – the methods, approaches and ways of thinking I learned from my courses and research projects at DMICE absolutely shaped my approach to research and teaching today, and I still draw on many lessons from my time there."

Dr. Wright's dissertation at OHSU was "SANDS: A service-oriented architecture for clinical decision support in a national health information network," for which he won the John A. Resko Award for Outstanding Dissertation in the School of Medicine in 2007.

Dr. Wright added, "I'm also proud to be a graduate of such an outstanding program – at Harvard and everywhere else I go, OHSU has a terrific reputation, and I often find myself collaborating with fellow DMICE graduates – it's an outstanding network and a lot of fun!"

In his current position at Harvard Medical School and Brigham and Women's Hospital, Dr. Wright leads a team of biomedical informatics researchers, physicians, and computer scientists focused on improving the way that electronic health records work. His team concentrates on clinical decision support systems and data mining of extremely large clinical datasets, with a particular interest in improving clinical problem lists, using health information technology to prevent instances of medical malpractice and patient harm and ensuring electronic health records operate safely.

In 2015, Dr. Wright was elected into the American College of Medical Informatics (ACMI) this fall. DMICE professors Joan Ash, Ph.D., and David Dorr, M.D., M.S., currently collaborate with

Dr. Wright on several of his grants from the National Institutes of Health and the Agency for Healthcare Research and Quality.

We in DMICE congratulate Dr. Wright on this outstanding achievement.

October 17, 2016

BICC 25th Anniversary Celebration Looks at Past, Present and Future of DMICE


J. Robert Beck, M.D., BICC Founding Director

A series of events on Friday, October 28, 2016 mark the 25th anniversary of the Biomedical Information Communication Center (BICC). It also reminds us of the development and growth of biomedical informatics and clinical epidemiology at OHSU for more than a quarter century.

It started in the summer of 1989, when two lone informaticians headed west from Hanover, New Hampshire along the “Oregon trail,” bound for Portland and the then-named Oregon Health Sciences University.

Their goal: J. Robert Beck, M.D., was to be the first director of the BICC, a unit that brought together the disparate departments at OHSU that offered information or communication

services. At the time, that included the Library, EdComm, the EduTech Center, photography, telecommunications, and academic computing.

As part of the BICC, Dr. Beck, along with Kent A. Spackman, M.D, Ph.D., brought a new research program to OHSU: biomedical informatics. Both pathologists, Drs. Beck and Spackman were interested in medical decision making and knowledge-based systems, respectively. A year later, William R. Hersh, M.D., now DMICE professor and chair, was the first new faculty member recruited to the informatics research program. His research focus was information retrieval.

1991 marked completion of the BICC building, and the informatics program moved into the fifth floor, where it remains today. In 1992, the National Library of Medicine funded our biomedical informatics training program. Originally for post-doctoral trainees, the program, now in its 25th year, funds 18 pre-doctoral and post-doctoral fellows annually.

By 1995, there were nine core informatics faculty. Dr. Hersh and Paul Gorman, M.D., began a series of continuing medical education courses, *Using Computer Tools to Solve Clinical Problems*.

A year later, the graduate program in biomedical informatics began, with the establishment of the M.S. program, followed by the doctoral program in 2003. DMICE also offers a graduate certificate and a master of biomedical informatics degree and provides training in two tracks: clinical informatics and bioinformatics and computational biology, the latter led by professor and vice chair, Shannon McWeeney, Ph.D.

The BICC had originally been an independent unit at OHSU, but in 1997, the informatics program became a free-standing division of the School of Medicine, Medical Informatics and Outcomes Research. That same year, the Evidence-based Practice Center, housed in DMICE, first received funding from the Agency for Healthcare Research and Quality. Six years later, we became the Department of Medical Informatics and Clinical Epidemiology.

Today 120 core faculty and staff call themselves DMICE employees, with many other faculty holding joint appointments in the department. We've received over $46.2 million in external funding in the past five years. Hundreds of people across the country and the world call themselves alumni of our educational program.

As we celebrate the 25th anniversary of the BICC, we also feel a sense of pride and accomplishment in the growth of biomedical informatics research and education at OHSU for the past quarter century.

Please join us at the BICC 25th anniversary events on October 28th for the following events:

- 9-11 am: History of the BICC Panel Presentation, including Dr. Donald Lindberg, Director Emeritus, National Library of Medicine, OHSU Auditorium

- 11am-1pm: Poster Session and Buffet Lunch, Old Library Great Hall
- 1-3 pm: Keynote Presentation by Dr. Patricia Flatley Brennan, Director, National Library of Medicine, OHSU Auditorium
- 3:30-5pm: Open House and Reception at the BICC Building

October 11, 2016

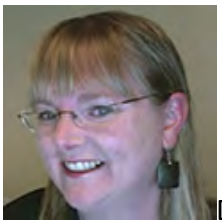
Three DMICE investigators are authors of traumatic brain injury guidelines


Dr. Nancy Carney

Three faculty and staff of the Department of Medical Informatics and Clinical Epidemiology (DMICE) were authors of the 4th Edition of the Guidelines for the Management of Severe Traumatic Brain Injury, published online in the journal *Neurosurgery.*

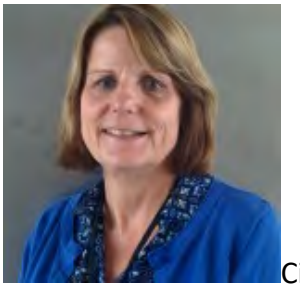
Nancy Carney, Ph.D., research associate professor, Annette M. Totten, Ph.D., assistant professor, and Cindy O'Reilly, research associate, of the Pacific Northwest Evidence-based Practice Center, were the first three authors of the guidelines, published online on September 20, 2016.

The updated guidelines provide recommendations for 18 monitoring and treatment topics for patients with severe traumatic brain injuries, or TBI, including surgical procedures, the use of monitors that measure intracranial pressure, preventing and treating brain swelling, and nutrition.


Dr. Annette Totten

National experts in neurosurgery, neuro-intensive care, and neuro-trauma, led by the Pacific Northwest Evidence-based Practice Center at OHSU and the Brain Trauma Foundation (BTF), spent six years evaluating research studies and developing evidence-based recommendations for the in-hospital management of severe TBI.

This is the first update since the third edition was published in 2007. Going forward, the guidelines will be updated as new scientific research becomes available.

 Cindy O'Reilly

"In the past, the guidelines were updated about once a decade," said lead author Dr. Carney. "From here forward, we are implementing a system which will provide updates in real time, as new information becomes available. This is an important improvement in the delivery of evidence-based information to the brain trauma community, and should result in better outcomes for patients."

Dr. Carney has worked on TBI guidelines since 2003.

For more information see the full OHSU press release at http://www.ohsu.edu/xd/about/news_events/news/2016/09-22-New-guidelines-issued-fo.cfm

September 12, 2016

Welcome to the New DMICE Blog!

 William Hersh, MD Professor and Chair DMICE Oregon Health & Science University

Welcome to Health Data, Information and Action, the new Blog of the OHSU Department of Medical Informatics & Clinical Epidemiology! We are excited to have this new venue for posting news and other announcements about our department and its research, education, and other activities. We will continue to periodically publish our print/PDF newsletter, but the primary source of news will be this blog.

Each item that is posted will have its own URL, which we will also distribute via Twitter (@OHSUInformatics) and Facebook (https://www.facebook.com/ohsu.informatics/). Some of those items will make it into the print/PDF newsletter.

Stay tuned for a stream of postings that will follow this introduction. All is going going very well for the department. The grants keep coming in, and our research attracts a great deal of attention. Our educational programs, including our National Library of Medicine and Clinical Informatics Fellowships, continue to receive national accolades.