BIOMEDICAL INFORMATICS

Faculty

Teaching and Research
• Information Retrieval (aka, Search)
  – Access to online information, from journals, Web sites, images, etc. to electronic health records (EHRs)
  – Major effort now focused on cohort discovery in EHR – opportunities for students and fellows
• Systematic reviews of informatics applications
  – Telemedicine and telehealth
  – Health information exchange
• Informatics Workforce and Education
  – How do we characterize workforce needed and its optimal education and training?
  – Metadata for educational resources
• Have led OHSU to national prominence in informatics education
  – Awards
    • Lindberg Award for Innovation in Informatics, 2008
    • Modern Healthcare Top 25 Clinical Informaticists, 2010-2012
    • HIMSS Physician IT Leadership, 2015
  – Awarded many grants over the years for training and education
    • Training: NLM, Fogarty
    • Education: ONC Health IT Curriculum, NIH Big Data to Knowledge Open Educational Resources

• Still love to teach
  – BMI 510/610
  – AMIA 10x10 ("ten by ten") program
  – BMI 536

• Elected President of International Society of Health Sciences Informatics (IAHSI) for 2020-2022
• Research
  – Clinical systems implementation
    (order entry, unintended consequences, CDS, HIT safety, and use of scribes for documentation)
  – Qualitative methods
Some people can’t hold a job, Dian can’t keep a career:

- Programmer
- Actuary
- Management consultant
- Director, Human Resources
- RN, then Family Nurse Practitioner
- NLM Fellowship/PhD in biomedical informatics at OHSU
- Currently teaching (DMICE), doing research on the EHR, and seeing patients at Old Town Clinic
Dian A. Chase: Research

- Collaboration in medicine
  - Communication
  - Collaboration across boundaries
- Using the EHR to improve clinical practice
  - Right data at the right time
  - EHR as a tool for optimization
- Other areas of interest:
  - Chronic pain and opioids
  - Reducing drug interaction alert fatigue
  - Bringing precision medicine to primary care
Aaron M. Cohen
Research Interests

• Apply biomedical text processing to enhance the capabilities of biomedical researchers, curators, annotators, and systematic reviewers:
  – Confidence based retagging of publication evidence types
  – Patient cohort identification
  – Rare disease detection

• Apply advanced analytics to improve healthcare resource management and process redesign:
  – Risk modeling using a wide selection of coded and raw data types
  – Sub-phenotype exploration and discovery

• Design and adapt new approaches to solve computational challenges in biomedical research:
  – OCTRI NLP capability evaluation to enhance research with unstructured EHR data
Aaron M. Cohen
Teaching

• Software Engineering (BMI 546, Spring Term)
• Director of the Informatics Discovery Lab (IDL), industry partnership projects
• Projects for the Research In Bioinformatics course (BMI 652)
• Mentor and advise Masters and PhD students with computational backgrounds interested in biomedical text processing and/or machine learning
• Mentor student teaching for PhD candidates
David Dorr, MD, MS

• Roles
  – Chief Research Information Officer
  – Internist
  – Professor and Vice Chair, Clinical Informatics
  – Researcher in prediction for complex illnesses
What does the CRIO do?

Engages and listens to stakeholders

Develops and articulates a shared vision for research informatics

Implements a plan for achieving the vision

Reduces barriers to collaboration, especially around data sharing, algorithm, software and tool use, and partnerships

Improves the connections of our people, data, and tool infrastructures (CD2H)

Communicates and responds
Every patient served by the OHSU community will benefit from the knowledge being discovered here.
The information used and knowledge discovered with OHSU researchers will change health and care across the globe.
Karen B. Eden, PhD
Associate Director of PhD and Postdoctoral Programs

RESEARCH INTERESTS
Evidence-based medicine
Decision-making,
Patient Decision Aids

Breast cancer risk assessment and decision aid for women
OHSU discrimination, sexual harassment and assault awareness: resource app

edenk@ohsu.edu, 4-2456
Medical Decision Making, BMI 538/638, 3 credits
Online Course, W21

Disease
- test
No test
+ test
Disease
No Disease

Eden, cont.
Chris Hoekstra, DPT, PhD – Assistant Professor

Teaching

- **BMI 517/617 – Organizational Behavior and Management in Informatics**
  - Explores the interaction of people, teams, leadership, and technology
  - Emphasizes the application of organizational behavior principles to technology implementation projects

- **BMI 561/661 – Qualitative Research Methods**
  - Explores research methods and nuances of inductive/qualitative analysis methods
  - Emphasizes approaches to rapidly understand multiple stakeholder perspectives for both evaluative and research projects
Professional Work

• I have worked as a clinician, manager, executive, and health IT consultant
• My work has focused on clinical quality and value projects with emphasis on information systems’ impact on these endeavors

Research

• My mixed-methods research focuses on organizational facilitators and barriers to the use of HIT for the management of clinical quality and value, extending current sociotechnical and technology adoption models
• I am also involved in a AHRQ-funded mixed-methods study focused on training and safety of medical scribes
Michelle R. Hribar, PhD
Research Interests

• **Secondary use of EHR data**
  – Audit log data for studying clinic workflows
  – Notes and audit log data for studying documentation
  – Ophthalmic data for clinical prediction models

• **Quality of ophthalmic digital data**
  – Ability to be reused for quality measurements, patient cohort identification, machine learning models
  – Recommendations for EHR improvements
Michelle R. Hribar, PhD

Teaching

• Computer Science & Programming for Clinical Informatics (BMI 540, Fall Term)
• Human-Computer Interaction in Biomedicine (BMI 548, Summer Term)
James Jacobs MD, MPH

• Instructor for BMI 550/650: *Bioinformatics and Computational Biology I: Algorithms*

• Instructor for BMI 551/651: *Bioinformatics and Computational Biology II: Statistical Methods in Computational Biology*

• BMI 550/650 introduces the principals of algorithm development and application to biological problems

• BMI 551/651 deals with the principals and methods of statistical learning. Emphasis is on conceptual understanding of the tools needed for applications in supervised and unsupervised learning
James Jacobs MD, MPH

My research is in the computational analysis of the interaction between the immune system and malignancy as it relates to disease development, progression and resistance to therapy.

Specifically, I study the bone tumor, osteosarcoma, in childhood and adolescences.

My work utilizes both whole genome sequencing as well as network-based methods based on gene expression data.
Lisa Karstens, PhD

• Teaching:
  – Teaches foundation programming concepts and skills in the Introduction to programming prerequisite course

• Research:
  – Developing and refining computational techniques for identifying the role the microbiome plays in human disease.
  – Focuses on how the urinary and vaginal microbiomes contribute to non-infectious bladder disorders in women.
  – Uses a multi-omic approach with high throughput methods including 16S rRNA gene sequencing and metabolomics
Ted Laderas

Research Interests

- Teaching Diverse Learners/Increasing Cross-disciplinary collaboration
  - https://laderast.github.io/burro/
  - BioData Club
- Open Science and Software Development
- Collaborative Analysis of Single Cell Flow Cytometry Data
  - flowDashboard: interactive dashboards for flow cytometry analysis
- Systems Biology and Modeling of Drug Resistance
  - Acute Myeloid Leukemia Cohort (Beat AML)
Ted Laderas
Teaching

- Course co-director, Data Analytics (BMI 569/669, summer term, co-taught with Kaiser Permanente)
- Course Director, Ready for R (Non-credit, all year)
- Co-instructor, RBootcamp (non-credit, with Jess Minnier, all year)
- Co-instructor, Management and Processing of Large Scale Data (BMI 535/635 winter term)
- Co-founder/Co-organizer, BioData Club, Cascadia-R conf, and PDX R User Group
- Mentoring master's students/mentored teaching
- Guest teacher: lots of courses!
Instructor for:

- **BMI 537: Healthcare Quality**
  - BMI 537 covers methods for measuring, managing and improving the quality of health care.
  - It includes an overview of the US health care system and beyond as well as quality challenges and issues in these systems. Students are taught the principles of quality improvement and are expected to be able to apply them in practical settings. Current national efforts in performance measures, financial incentives and quality are also covered.

- **BMI 544: Databases**
  - An introduction to databases and modern database concepts. The primary topics covered in this course include data and data organization, database principles, relational databases, database design, the SQL query language, database optimization, data warehousing, big data and NoSQL.
In addition to teaching, I practice general internal medicine and work in operational informatics.

Clinical quality measurement has been a common thread throughout my career. I have worked in this area from both the vendor and healthcare provider perspective.

I’m particularly interested in building and implementing systems that can truly improve quality without adding to the documentation burden for providers and support staff.

Through my work in quality measurement I have also developed an interest in data modelling and extraction leading to expertise in databases.
Shannon McWeeney, PhD
Professor and Division Head

- Development and application of statistical and computational methodologies to solve research bottlenecks
- Integrated approaches to facilitate identification of therapies for Precision Medicine clinical trials

mcweeney@ohsu.edu

WonderMixTape
Vishnu Mohan MD MBI FACP FAMIA

Program Director, OHSU Clinical Informatics Fellowship Program
Associate Professor, Department of Medical Informatics & Clinical Epidemiology
Oregon Health & Science University
Portland, OR, USA

mohanv@ohsu.edu
Vishnu Mohan

Introduction:

Board certified in clinical informatics (first person to be certified in the US west coast!) and internal medicine

Medical school in India → residency + practice in Pittsburgh, PA → moved to Portland, OR for the rain + the beer

DMICE alum – initially Certificate student, then signed up for the MBI

Was Associate Program Director of an internal medicine training program before joining DMICE

Now Program Director of OHSU’s clinical informatics subspecialty fellowship program (one of the first CI fellowship programs to be certified by ACGME)

Teaching:

DMICE: BMI 512 (Clinical Information Systems), BMI 513 (EHR Lab course), BMI 560 (Design and Evaluation in Informatics), BMI 519 (Business in Healthcare Informatics)

Also teach in OHSU-PSU Healthcare MBA program, clinical informatics fellows, medical residents + medical students
Areas of interest:

- How clinicians make decisions, how technology influences their decision making
- Improving patient safety
- EHR simulations
- Medical + informatics education and workforce development

Recent areas of research:

- Using high-fidelity simulation to improve EHR safety
- Developing tools and guides to improve EHR safety
- Creating and providing clinical decision support tools and services
- Defining best practices of CDS deployment and knowledge management lifecycle.
Some recently published papers you may find interesting (or not):


Our Chair Dr. Hersh often travels to far-away places and sends pictures from exotic lands…

I too would like to share a picture from my last trip to an exotic land:
hello new dmice students
Michael Mooney, PhD

- Instructor for BMI 565: *Bioinformatics Programming & Scripting*
- Co-instructor for BMI 535: *Management & Processing of Large-scale Data*

BMI 565 teaches the fundamentals of Python programming and Linux scripting, and provides hands-on experience with tools relevant for bioinformatics tasks.

BMI 535 provides an intro to data management for large-scale biomedical data. Topics covered include SQL, NoSQL, distributed file systems and parallel computing.
My research involves developing statistical and computational techniques for identifying predictive signatures of disease susceptibility and outcome.

Much of my work has focused on the discovery of polygenic effects (the combined effects of many genes) in complex diseases. And recently I have begun collaborating on epigenetic studies looking at DNA methylation patterns as biomarkers for disease.

I’m particularly interested in the application of network-based approaches and machine learning techniques to explore integrated data sets (genomic, clinical, and environmental data).
Ben Orwoll, MD, MS

- Pediatric Critical Care Physician at Doernbecher Children’s Hospital
- Physician Informaticist for Pediatric and Neonatal Intensive Care
- Instructor for BMI 516: *Health Data Standards for Interoperability*
  - BMI 516 teaches the background and rationale behind health data standardization and covers some of the major highlights in terms of today’s most frequently used standards
  - Special emphasis on the emerging FHIR standard
Ben Orwoll, MD, MS

• My research, quality improvement, and tinkering interests center around using clinical data to gain new insights and improve quality and standardization of care, especially in the inpatient pediatric population.
  – Quality improvement in care of pediatric acute lung diseases
  – (near) Real time clinical and performance data displays
  – Advancing patient/family engagement and OpenNotes
  – Fluid and electrolyte management in the ICU

• I am interested in mentoring/collaborating with students to develop innovative new clinical tools using clinical data, advanced analytics, and FHIR
BMI 570/670

Scientific Writing and Communication

This course covers

General principles of good writing
Database searching/reference software
Preparing research manuscripts
Writing journal articles and proposals
Preparing presentations and posters

Kathryn I. Pyle, AMLS, MA
Medical Informatics
and Clinical Epidemiology

Acknowledging the work of
Michael Alley
College of Engineering
Pennsylvania State University
Joanne Valerius, PhD, MPH, RHIA
Assistant Professor

- Teaches: Managing Ethics in Biomedical Informatics
  Offered Spring Term
Joanne Valerius, PhD, MPH, RHIA
Assistant Professor

- Research Interests:
  - Centers on human resource development in health care settings.
  - Focus is on a holistic approach to the workplace and how diversity impacts the workplace.
  - Practitioner perspective on the changes in HIM over the past 20 years.
  - International HIM and electronic health records
Joanne Valerius, PhD, MPH, RHIA
Assistant Professor

- Service Work/Research:
  - World Health Organization mobile app for International Classification on Functioning
  - WHO FDRG committee member
  - International Foundation ICF Charter Board Member
Nicole G. Weiskopf
weiskopf@ohsu.edu http://skynet.ohsu.edu/~weiskopf/

• EHR data quality within the context of secondary use (e.g. clinical research)
  – Data analytics combined with qualitative research and knowledge representation
  – Development and evaluation of DQ tools and metrics
  – Understanding causes and effects of poor data quality

• Validity of EHR-based research
  – Generalizability of EHR data to target populations
  – Validity of data ETL, interpretation, and analysis

• EHR-based analytics
  – Implementation and evaluation analytics approaches
  – Feedback loop between analytics and clinical practice
Guanming Wu, PhD
Associate Professor

- Focusing on pathway- and network-based systems biology approaches for analyzing, visualizing and modeling omics data for cancer and other diseases

- Biological software and database development using state-of-the-art information technologies

- Project’s web site: www.reactome.org

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