

2020

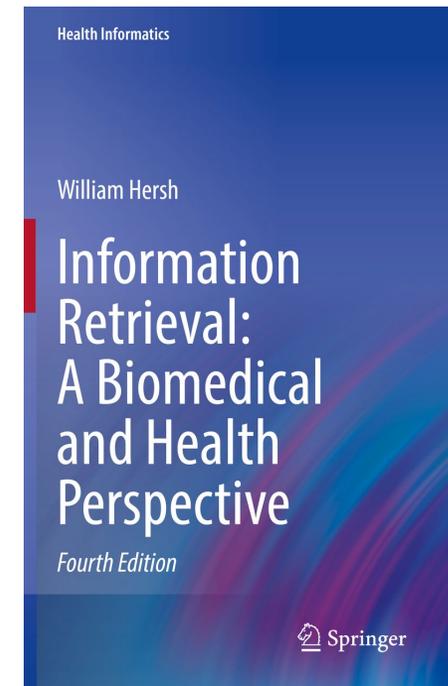
BIOMEDICAL INFORMATICS

Faculty

Teaching and Research

William Hersh, MD – 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
 - Recently published 4th edition of textbook (2020)
- 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



William Hersh, MD – Education

- 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

Joan Ash, Ph.D., M.L.S., M.B.A.

- Research
 - Clinical systems implementation (order entry, unintended consequences, CDS, HIT safety, and use of scribes for documentation)
 - Qualitative methods



Dian A. Chase, PhD, FNP, MBA

- 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



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



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,

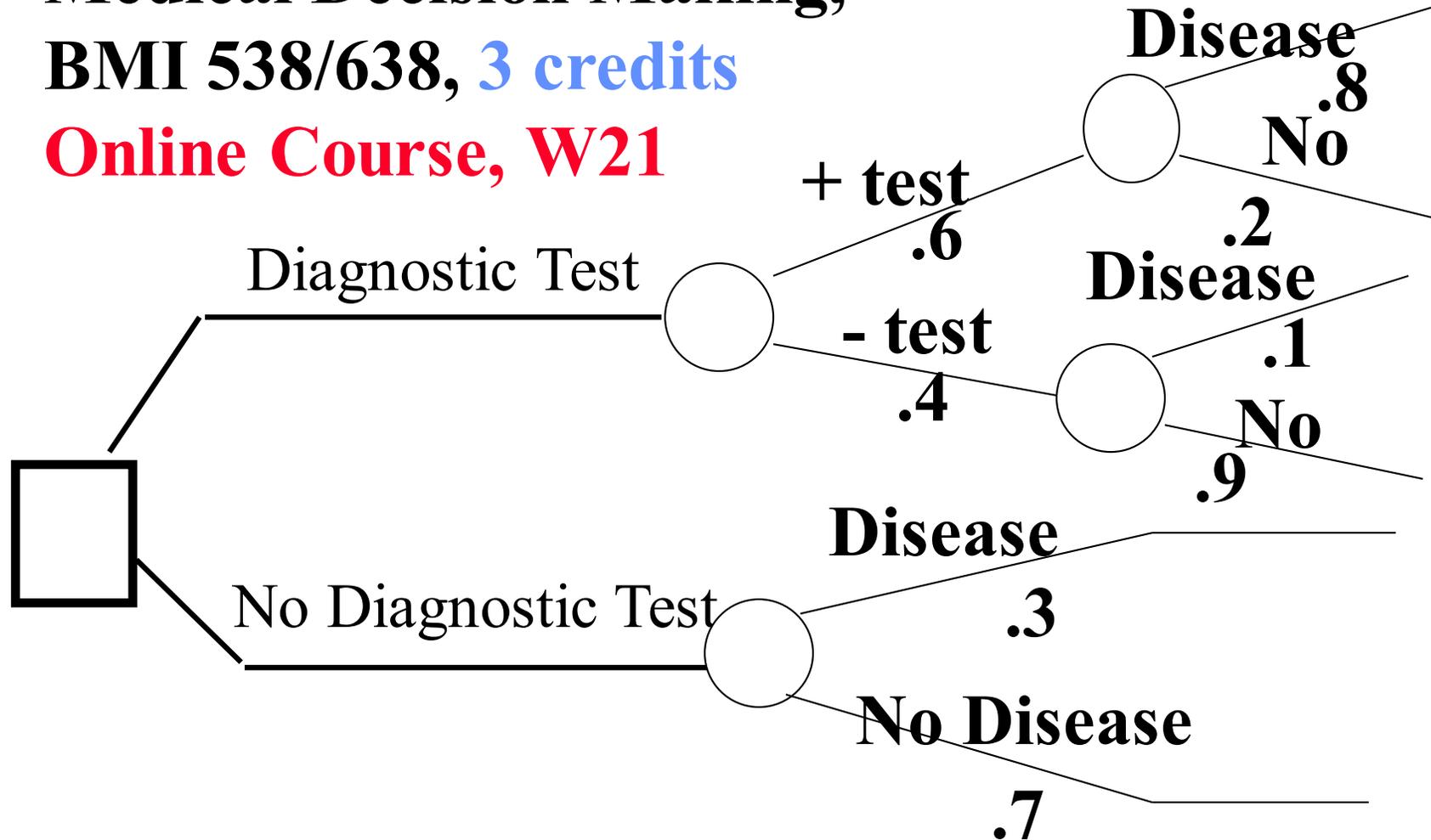
Patient Decision Aids

**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



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

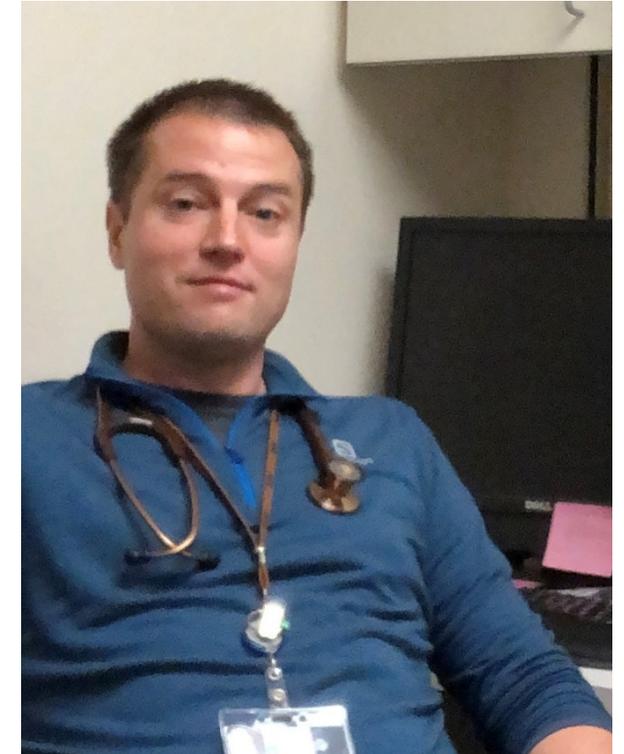
Michelle R. Hribar, PhD

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.

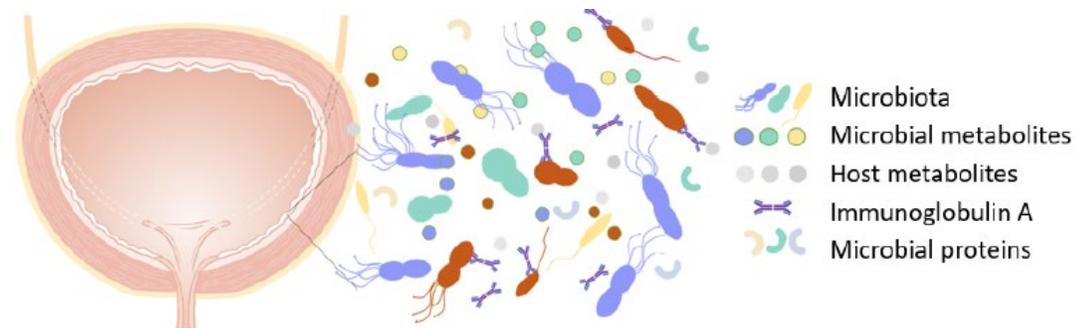
Specifically, I study the bone tumor, osteosarcoma, in childhood and adolescences.

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!

Michael Lieberman, MD, MS, FAMIA

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.



Michael Lieberman, MD, MS, FAMIA

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

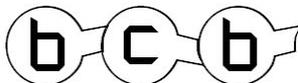
- ✓ Development and application of statistical and computational methodologies to solve research bottlenecks
- ✓ Integrated approaches to facilitate identification of therapies for Precision Medicine clinical trials



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



Vishnu Mohan

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.



Vishnu Mohan

Some recently published papers you may find interesting (or not):

Artis KA, Bordley J, **Mohan V**, Gold JA. Data Omission by Physician Trainees on ICU Rounds. Crit Care Med. 2019 Mar;47(3):403–409.

Bordley J, Sakata KK, Bierman J, McGrath K, Mulanax A, Nguyen L, **Mohan V**, Gold JA. Use of a Novel, Electronic Health Record–Centered, Interprofessional ICU Rounding Simulation to Understand Latent Safety Issues. Crit Care Med. 2018 Oct;46(10):1570–1576.

Arthurs BJ, **Mohan V**, McGrath K, Scholl G, Gold JA. Impact of Passive Laboratory Alerts on Navigating Electronic Health Records in Intensive Care Simulations. SAGE Open, vol 8, issue 2, 2018

Mohan V, Scholl G, Gold JA. Use of EHR–based simulation to diagnose aetiology of information gathering issues in struggling learners: a proof of concept study. BMJ Simul Technol Enhanc Learn. 2018 Apr;4(2):92–94. doi: 10.1136/bmjstel–2017–000217. Epub 2017 Jun 3.

Pranaat R, **Mohan V**, O'Reilly M, Hirsh M, McGrath K, Scholl G, Woodcock D, Gold JA. Use of Simulation Based on an Electronic Health Records Environment to Evaluate the Structure and Accuracy of Notes Generated by Medical Scribes: Proof–of–Concept Study. JMIR Med Inform. 2017 Sep 20;5(3):e30. doi: 10.2196/medinform.7883.

Mohan V, Scholl G, Gold JA. Use of EHR–based simulation to diagnose aetiology of information gathering issues in struggling learners: a proof of concept study. BMJ Stel, Published Online First: 03 June 2017. doi: 10.1136/bmjstel–2017–000217

Mohan V, Woodcock D, McGrath K, Scholl G, Pranaat R, Doberne JW, Chase DA, Gold JA, Ash JS. Using Simulations to Improve Electronic Health Record Use, Clinician Training and Patient Safety: Recommendations From A Consensus Conference. AMIA Annu Symp Proc. 2017 Feb 10;2016:904–913.



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:





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.



Michael Mooney, PhD

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

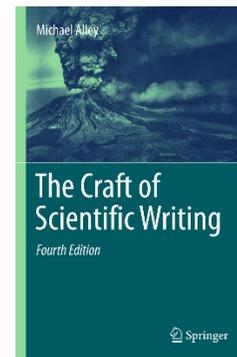
Preparing research manuscripts

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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