



Clinical & Translational Science Institute

Natural Language Processing Symposium

Wednesday December 13th, 2017

1:00-5:00 pm

Boston University School of Medicine

Instructional Building, Room L112

72 East Concord Street

Boston, MA

Sponsored by the

Wing Tat Lee Endowment

The Wing Tat Lee Endowment supports collaborations between BUSM faculty and faculty at a mainland Chinese university (with preference for Hong Kong) including training faculty from either institution by holding seminars, workshops and symposia, and carrying out research projects of common interest.

Contact: Shanshan Sheehy

617-638-5195; sh1607@bu.edu



Boston University Clinical & Translational Science Institute

Accelerating Discoveries Towards Better Health

Natural Language Processing Symposium

Wednesday December 13th, 2017
1:00-5:00 pm
Boston University School of Medicine
Instructional Building, 72 East Concord Street, Room L112

Speaker	Time	Topic
David Felson, MD, MPH	1:00-1:10	<i>Welcome</i>
Dean Karen Antman, MD	1:10-1:15	<i>Opening Remarks</i>
Peter Szolovits, PhD	1:15-2:00	<i>Keynote Speaker</i> Interpreting clinical narratives: From linguistic understanding to neural network modeling
Azer Bestavros, PhD	2:05-2:25	Overview of institute research at the nexus of data science and AI
Brian Kulis, PhD	2:25-2:40	Rich models for unsupervised learning
Katherine Liao, MD, MPH	2:40-3:00	NLP for the hard to reach places in clinical research
William G. Adams, MD	3:00-3:15	Clinical research informatics activities at the BU-CTSI
Coffee Break	3:15-3:25	<i>Networking</i>
Vasan Ramachandran, MD	3:25-3:30	<i>Speaker Introduction & Overview</i>
Kate Saenko, PhD	3:30-3:50	Machine learning for vision and language understanding
Guergana Savova, PhD	3:50-4:10	Select applications of natural language processing in biomedicine
Martha Werler, DSc	4:15-4:20	<i>Speaker Introduction & Overview</i>
Dean Sandro Galea, MD, DrPH	4:20-4:50	Using systems science to identify what matters in population health
David Felson, MD, MPH	4:50-5:00	<i>Closing Remarks</i>

This symposium is sponsored by the Wing Tat Lee Endowment that supports collaborations between BUSM faculty and faculty at a mainland Chinese university (with preference for Hong Kong) including training faculty from either institution by holding seminars, workshops and symposia, and carrying out research projects of common interest.



David Felson, MD, MPH

Boston University School of Medicine

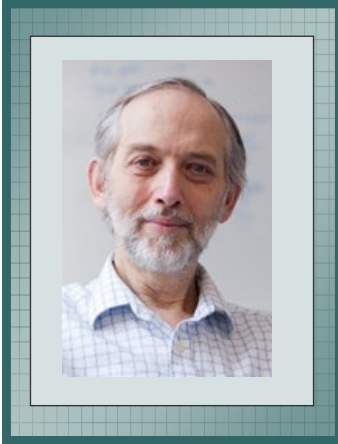
Dr. David Felson is a rheumatologist and clinical epidemiologist and chairs the Section of Clinical Epidemiology and direct the training program for the Boston University CTSI. Dr. Felson's main contributions to science are in the areas of osteoarthritis and rheumatoid arthritis outcomes. He started the Framingham Osteoarthritis Study, which was the first modern day study to characterize the prevalence of disease and was the first to obtain MRIs on a community sample. Using longitudinal data from Framingham, we were the first to show that obesity preceded knee OA and probably caused it and the first to show that weight loss could prevent disease. His recent work has been to document that structures in the joint outside of cartilage generate pain in those with disease, especially bone marrow lesions and synovitis and that these structures may be good therapeutic targets. For rheumatoid arthritis, his group pioneered the idea of a core set of outcomes and then led international efforts to standardize outcome measurement, efforts which have been successful.



Dean Karen Antman, MD

Boston University School of Medicine

Dr. Karen Antman, an internationally recognized expert on breast cancer, mesotheliomas and sarcomas, is Provost of the Medical Campus and Dean of Boston University School of Medicine since 2005. Based on her group's translational research, Dr. Antman developed now standard regimens for the treatment of sarcomas and mesotheliomas as well as regimens for breast cancer and supportive care of patients receiving chemotherapy including pharmacology, growth factors and mobilization of peripheral blood derived stem cells for blood and marrow transplant. Dr. Antman also is outspoken on public health policy issues. She has written extensively about impediments to clinical research on cancer, and she has testified before Congress on the need for federal research dollars to support cancer research. She has published reviews and editorials on medical policy and the impact of research funding and managed care on American clinical research.



Peter Szolovits, PhD

MIT

Peter Szolovits is Professor of Computer Science and Engineering and head of the Clinical Decision-Making Group within CSAIL. He is also a Professor of Health Sciences and Technology in MIT's Institute for Medical Engineering and Science and the Harvard/MIT HST program. His research centers on the application of AI methods to problems of medical decision making and design of information systems for health care institutions and patients. He has worked on problems of diagnosis, therapy planning, execution and monitoring for various medical conditions, extraction of clinical meaning from doctors' and nurses' notes, computational aspects of genetic counseling, controlled sharing of health information, and privacy and confidentiality issues in medical record systems. Dr. Szolovits' interests in AI include knowledge representation, qualitative reasoning, natural language processing and machine learning. He teaches classes in artificial intelligence, programming languages, medical computing, medical decision making, knowledge-based systems, computer systems engineering and probabilistic inference. He is a member of the National Academy of Medicine.



Azer Bestavros, PhD

Boston University

Azer Bestavros is Professor and former Chair (2000-2007) of the BU Computer Science Department. His research contributions in the broad areas of networking and distributed systems include pioneering the Web push content distribution model adopted years later by industry, seminal work on Internet traffic characterization, game-theoretic approaches to cloud resource management, and safety certification of networked systems and software. He is the Founding Director of the BU Hariri Institute for Computing, which was set up in 2010 to "create and sustain a community of scholars who believe in the transformative potential of computational perspectives in research and education." He is spearheading a number of cloud computing, big-data, and cybersecurity initiatives, most notably the Open Cloud Exchange project which aims to set up a new model for public clouds and for cloud marketplaces. He also serves as board member of the Cloud Computing Caucus, a non-profit, non-partisan coalition of industry and key government stakeholders, focused on raising



Brian Kulis, PhD

Boston University

Dr. Kulis is an Assistant Professor in the Department of Electrical and Computer Engineering and the Department of Computer Science at Boston University and a core member of the Division of Systems Engineering. Broadly speaking, he is interested in all aspects of machine learning, with an emphasis on applications to computer vision. Most of his research focuses on making it easier to analyze large-scale data. A major focus is on large-scale optimization for core problems in machine learning such as metric learning, content-based search, clustering, and online learning. He is also interested in large-scale graphical models, Bayesian inference, Bayesian non-parametrics, and deep learning.



Katherine Liao, MD, MPH

Brigham & Women's Hospital

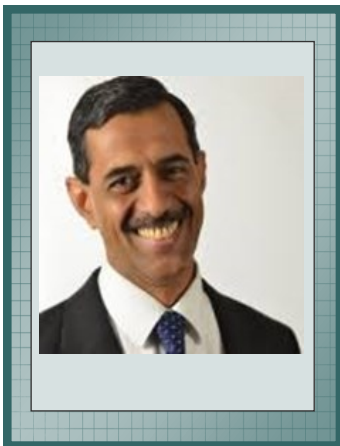
Dr. Liao is a clinical investigator and practicing rheumatologist. The mission of her lab is two-fold: 1) to study rheumatoid arthritis (RA), and the clinical and genetic factors that lead to outcomes such as cardiovascular disease and severe joint damage, and 2) to apply and develop bioinformatics methods to utilize big data for clinical and translational research studies. Dr. Liao's research focuses on applying methods such as natural language processing to electronic medical record (EMR) data to perform clinical studies in RA and other conditions. Through her work with the Informatics for Integrating Biology and the Bedside (i2b2) project, Dr. Liao led the team to develop an EMR research platform for RA studies. This platform integrated clinical and biomarker data (e.g. clinical EMR data, genetics, autoantibody data) allowing for both traditional genetic association studies as well as new approaches for data analyses such as the Phenome Wide Association Study (PheWAS). Using this platform, she collaborates closely with investigators from the fields of biostatistics and bioinformatics to apply novel methods to study focused clinical questions such as CVD in RA. Currently, she is leading a pilot project to port and further develop these methods at VA Boston Healthcare using nationwide VA data with a goal to establish an EMR research platform at the VA.



William Adams, MD

Boston University School of Medicine

Dr. Adams is an epidemiologist, medical informatician, and practicing pediatrician at Boston Medical Center (BMC). He also currently serves as Director of BU-CTSI Clinical Research Informatics for Boston University and as Director of Child Health Informatics for the Department of Pediatrics at the Boston University School of Medicine/BMC. For the past two decades, his primary research has been and continues to be focused on developing and evaluating information technology (IT)-based solutions for improving the quality of health and healthcare for children and families. His focuses include the child health EHR, patient-centered IT and clinical data warehousing for quality improvement and health disparities research. He seeks to create and evaluate integrated health information systems that are useable and effective.



Vasan Ramachandran, MD

Framingham Heart Study / BUSM

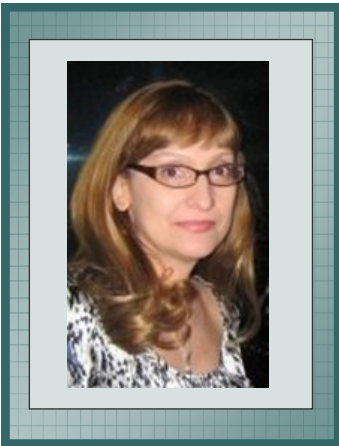
Vasan S. Ramachandran, M.D., Principal Investigator and Director of the Framingham Heart Study (FHS), and Director of the FHS fellowship program in cardiovascular epidemiology for the last 25 years. Dr. Ramachandran is a Professor of Medicine and Epidemiology at BUSM/BUSPH, and Chief, Section of Preventive Medicine and Epidemiology, Department of Medicine, BUSM. Importantly, Dr. Ramachandran's own peer-reviewed funding spans thematic areas of genetics and genomics, cardiac and vascular remodeling, novel biomarkers, systems biology including proteomics and metabolomics, and stem cell biology. He is the founding member and leader of the international EchoGen consortium, and chairs the Steering Committee of the Chronic Kidney Disease Biomarker Consortium. He is recognized internationally for translational research in cardiovascular epidemiology. He works collaboratively with the Center for Translational Epidemiology and Comparative Effectiveness Research within the Department of Medicine, BUSM, that hosts multiple epidemiological datasets, including from multiple cohort studies, national surveys (NHANES), administrative databases and electronic health records; this center will be a valuable data source for trainees.



Kate Saenko, PhD

Boston University

Dr. Saenko is an Assistant Professor of Computer Science at Boston University and Director of the Computer Vision and Learning Group. I am also a member of the IVC Research Group. Her research interests are in the broad area of artificial intelligence with a focus on adaptive machine learning, learning for vision and language understanding, and deep learning.



Guergana Savova, PhD

Harvard Medical School

Dr. Guergana Savova is Associate Professor at Harvard Medical School and Computational Health Informatics Program (CHIP; chip.org) at Boston Children's Hospital. Her research interests are in natural language processing (NLP) and information extraction especially as applied to the text generated by physicians (the clinical narrative). Dr. Savova has been creating gold standard annotated resources based on computable definitions and developing methods for computable solutions. The focus of Dr. Savova's research is higher level semantic and discourse processing of the clinical narrative which includes tasks such as named entity recognition, event recognition, relation detection and classification including co-reference and temporal relations. The methods are mostly machine learning spanning supervised, lightly supervised and completely unsupervised.



Martha Werler, DSc

Boston University School of Public Health

Dr. Werler is Professor and Chair of Epidemiology. She is a perinatal epidemiologist whose NIH- and CDC- supported research includes projects on maternal serum markers of infection and abdominal wall defects; gene-environment interactions and clubfoot; medications, folic acid intake, and inheritance in relation to spina bifida; and psycho-social and cognitive outcomes in children born with craniofacial birth defects. She has published over 175 papers and book chapters; received the National Birth Defect Prevention Network Oakley Award, the Society for Pediatric and Perinatal Epidemiologic Research Mentoring Award, and the Teratology Society Fraser Award; and served on numerous NIH advisory and review boards. Dr. Werler is Director of the BU Reproductive, Perinatal, and Pediatric Epidemiology training program for pre-doctoral candidates in Epidemiology and teaches Design and Conduct of Case-Control Studies.



Sandro Galea, MD, MPH, DrPH

Boston University School of Public Health

Sandro Galea, a physician and an epidemiologist, is Dean and Robert A. Knox Professor at Boston University School of Public Health. Dr Galea's scholarship has been at the intersection of social and psychiatric epidemiology with a focus on the behavioral health consequences of trauma, including firearms. He has published more than 700 scientific journal articles, 50 chapters, and 13 books, and his research has been featured extensively in current periodicals and newspapers. Dr. Galea holds a medical degree from the University of Toronto and graduate degrees from Harvard University and Columbia University. He also holds an honorary doctorate from the University of Glasgow. Galea was named one of Time magazine's epidemiology innovators, and has been listed by Thomson Reuters as one of the "World's Most Influential Scientific Minds." He is past president of the Society for Epidemiologic Research and an elected member of the National Academy of Medicine and the American Epidemiological Society.



Natural Language Processing Symposium

Evaluation and Feedback

Ratings

	1 = Poor	2 = Fair	3 = Satisfactory	4 = Good	5 = Excellent
How valuable was the content of today's session for you overall?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

Please indicate the effectiveness of the speakers:

	1 = Poor	2 = Fair	3 = Satisfactory	4 = Good	5 = Excellent
Peter Szolovits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Azer Bestavros	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brian Kulis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Katherine Liao	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
William Adams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kate Saenko	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guergana Savova	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sandro Galea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	1 = Poor	2 = Fair	3 = Satisfactory	4 = Good	5 = Excellent
How helpful was the content presented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

Should BMC pursue NLP for our EMR, even if it takes programming resources?
Please indicate, on a scale of 0 (not at all) to 10 (definitely).

Comments

Which topics might be a focus of initial NLP work?

Please identify one take-away from today's session that you can implement.

What topic/questions on NLP and machine learning did you wish to get from today's symposium?

Evaluation

	1 = Poor	2 = Fair	3 = Satisfactory	4 = Good	5 = Excellent
Overall Rating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>