Beiyu Lin

Curriculum Vitae

Assistant Professor
Department of Computer Science
The University of Texas - Rio Grande Valley
E-mail: beiyu.lin@utrgv.edu
Website: https://beiyulincs.github.io

Education

2016–2020	**PhD, Computer Science**, Washington State University, Pullman, WA, Advisor: Diane J. Cook. Topic: Population-level behavior analysis based on smart environment sensor data
2013–2015	**Master of Science in Mathematics**, Washington State University, Pullman, WA.
2011–2013	**Master of Science in Applied Math**, State University of New York, Stony Brook, NY.
2007–2011	**Bachelor of Science in Math and Applied Math**, Shanghai Maritime University, China.

Professional Experience

8/2020-now	**Assistant Professor**, Computer Science, the University of Texas – Rio Grande Valley, Texas, US.
2015-2020	**Graduate Research Assistant**, Electrical Engineering and Computer Science, WSU.
Summer 2019	**Software Engineer Intern**, Dell EMC, Seattle, WA. Wrote an analytic application of sensor data from cars in Brisbane, Australia. This application ingested streaming data, analyzed and predicted the traffic flow. The visualization is an hourly-based heat-map with location markers. When users click a marker, a bar chart will pop up with the predicted traffic flow.
Summer 2019	**Instructor**, School of Electrical Engineering and Computer Science, WSU.
Summer 2018	**Software Engineer Intern**, Honeywell, Atlanta, GA. Worked on the Honeywell Aerospace Development Team for Low Altitude Authorization and Notification Capability Unmanned Aircraft System Service Supplier. Used Python and JavaScript to develop Honeywell USS Product, including developing data/user interface and authorization service. Helped out other projects, including flight plane engine, edge to cloud, memory leak and dashboard.
2014–2015	**Instructor**, Department of Mathematics, WSU.
2013–2014	**Teaching Assistant**, Department of Mathematics, WSU.

Research Projects

2020–present	**Spatio-temporal Imitation Learning**.
2020–present	**Location Preferences Study via Adversarial Inverse Reinforcement Learning**.
2020–present	**Generative Adversarial Imitation Learning on Mobility**.
2020–present	**Drivers' Behavior Study via Imitation Learning**. collaborate with Dr. Apurva Narayan at the University of British Columbia
2020–present	**Software System Behavior Study via Reinforcement Learning**. collaborate with Dr. Apurva Narayan at the University of British Columbia
2020–present	**Sequential Decision Making for Active Learning in Real Time**. collaborate with Dr. Xiaowei Jia at the University of Pittsburgh
2020–present	**Spatial Temporal Analysis on Social Network**. collaborate with Dr. Zhiqian Chen at Mississippi State University
2020–present	**Graph Wavelet Modeling for Transportation**. collaborate with Dr. Zhiqian Chen at Mississippi State University

2019–2020 **Understanding Behavior Differences Among Subpopulations Using Inverse Reinforcement Learning**, *funded by National Institutes of Health (NIH)*.

With a strong relationship between behavior habits and health status, we utilize a data-drive approach to understand behavior patterns and study the dynamic between situations and actions. The findings may allow technology to help improve people's habits and health status.

2018–2019 **Constructing Markov Models of Human Behaviors Based on Smart Home Sensor Data**, *funded by National Science Foundation (NSF); collaborated with College of Nursing*.

While pervasive computing technologies for observing human behavior are becoming mainstream, we construct stochastic models based on smart home sensor data among population subgroups as a purpose of discovering actionable routine strategies that are associated with better health status.

2017–2018 **Iterative Design of Visual Analytics for a Clinician-in-the-loop Smart Home**, *funded by National Institutes of Health (NIH); collaborated with clinicians, psychologists and nurses*.

With the increasing health needs of the coming "age wave", we design a clinician-in-the-loop visual interface, that provides clinicians with patient behavior patterns, derived from smart home data. The technology offers the potential to perform remote monitoring for supporting self-management.

2016–2018 **Designing an Ecologically-Valid Formal Model of Human Activity Patterns**, *funded by National Science Foundation (NSF)*.

Formal modeling and analysis of human behavior is a popular topic in disciplines ranging from psychology to economics. We propose a formal model of indoor routine behavior based on automatically-sensed and recognized activities. These findings may be used to automate diagnoses and design customized behavioral interventions.

2015–2018 **Analyzing the relationship between human behavior and indoor air quality in smart homes**, *funded by Department of Energy (DOE) and Environmental Protection Agency Science To Achieve Results; collaborated with people from civil and environmental engineering*.

Because the quality of the air we experience inside and outside buildings may accompany behavior changes, we apply data science and machine learning technologies in smart home environments to understand the types of behavior that measurably impact indoor air quality.

Patent

2014 Glimm, James, Jimmie Goode, Beiyu Lin, Nicholas Pezolano, and Svetlozar Rachev. "Real time evaluation of financial returns based on nearly elliptical models." U.S. Patent Application 14/163,674, filed July 31, 2014.

Honors and Awards

2019 2nd Place, 3-Minute Thesis Competition, Voiland College of Engineering & Architecture.

2019 The Computer Science Department Representative to Compete Three Minutes Thesis.

2014 Award for Excellent Teaching Assistant (a university-wide), Graduate & Professional Students Association.

2011 Award for Outstanding Undergraduate Thesis, Shanghai Maritime University.

2010 Volunteer Star of the Wold Expo. 2010, Shanghai, China.

2009 Outstanding Individual of China Ocean Shipping Company, Shanghai Maritime University.

2009 Excellent Summer Practice Paper Award, Shanghai Maritime University.

Scholarships

2020 Registration fee waived to attend ACM Conference on Recommender Systems.

2020 Student Registration Award (funded by NSF and SIGKDD) to attend KDD.

2020 Professional Development Grants (funded by graduate & professional student association).

2019 Grace Hopper Celebration of Women in Computing (registration fee was funded by GHC), FL.

2019 ACM-IMS Interdisciplinary Summit on the Foundations of Data Science (funded by NSF), CA.

2019 SIAM International Conference on Data Mining (funded by Intel and an NSF grant), Canada.

2019 Strata Data Conference (funded by O'Reilly Media), CA.

2019	Analytics and Data Summit (registration fee was funded by Oracle Academy), CA.
2018	Google I/O, Mountain View, CA.
2017	Google Summer of Code Mentor Summit, Sunnyvale, CA.
2017	Grace Hopper Celebration (funded by Computer Science Department at WSU), FL.
2015	The Institute for Mathematics and its Applications: Workshop for Women in Analysis and PDE, MN.
2015	Mathematical Science Research Institute: Summer School on Incompressible Fluid Flows, CA.
2010-2011	The Second Prize Scholarship, Shanghai Maritime University.

Invited Talks

10/2020	Computer Science Seminar, the University of British Columbia.
09/2020	Human–Computer Interaction Seminar, the University of Texas Rio Grande Valley.
09/2020	Neuroscience Research Seminar, the University of Texas Rio Grande Valley.
09/2020	Open Problem in Computer Science Seminar, the University of Texas Rio Grande Valley.
09/2020	Society of Photographic Instrumentation Engineers, the University of Texas Rio Grande Valley.
04/2020	Population-level behavior analysis at Singapore Management University, Virginia Wesleyan University (both cancelled since already accepted an offer).
03/2020	Population-level behavior analysis at Zhejiang University at Ningbo (China;virtual), Shandong University of Science and Technology (China;virtual), Merrimack College, Colby College, University of Texas Rio Grande Valley, University of New Haven (virtual), Dominican University (virtual).
03/2020	Programming in C, Pomona College (cancelled).
03/2020	Support Vector Machine, University of Rutgers (virtual).
03/2020	Stack in C, University of Connecticut (virtual).
03/2020	Society of Women Engineers, Undergraduate Research Mixer Event, WSU.
10/2019	Guest lecture, Machine Learning and its Applications at School of Economic Sciences, WSU.
03/2019	Guest lecture, Support Vector Machine for the class Introduction to Machine Learning, WSU.
03/2019	Analysis of Sensor Data Using Oracle Advanced Analytics, Analytics and Data Summit, CA.

Teaching Experience

Fall 2020	Instructor, Seminar in Computer Science, UTRGV (27 graduate students)
Fall 2020	Instructor, Computer Science I (C++) for Majors, UTRGV (45 undergraduate students)
Summer 2019	Instructor, Program Design and Development in C, WSU (10 undergraduate students)
Summer 2015	Instructor, College Algebra, WSU (over 30 undergraduate students)
Fall14/Spring15	Instructor, Mathematics for Business and Economics, WSU (over 90 undergraduate students)

Students

Fall 2020	Shariful Islam (M.S. at the University of Texas Rio Grande Valley)
Fall 2020	Yifeng Yu (B.S. at the University of Southern California, intern in the lab)
Fall 2020	Fanglan Chen (Ph.D. at Virginia Tech, co-advising)
Fall 2020	Kaiqun Fu (Ph.D. at Virginia Tech, co-advising)
Fall 2020	Mingyuan Wang (Ph.D. at Florida State University, co-advising)
Fall 2020	Guangyu Meng (M.S. at Washington University in St. Louis, co-advising)

Volunteer

Fall 2018	Mentor, ACM-W (for a women student from a low socioeconomic family) at WSU
Summer 2018	Instructor, Black Girls CODE, Atlanta, GA
Summer 2018	Mentor, Honeywell STEM program for High School Teachers
Summer 2017	Mentor, Google Summer of Code, Anita Borg Institute

Media Coverage/Impact

07/2019	Journal of Biomedical and Health Informatics: Medical Informatics
06/2019	ScienceDaily: Researchers uncover indoor pollution hazards
06/2019	WSU Insider: Researchers uncover indoor pollution hazards
06/2019	Nexus Newsfeed: Researchers uncover indoor pollution hazards
07/2015	WSU Insider: Researchers look into a future life indoors

Professional Services

Program Committee

Web Mining and Content Analysis track at WWW, 2021

International Workshop on Big Data Reduction, IEEE International Conference on Big Data, 2020

SmartStudents'19, a workshop of IEEE International Conference on Smart Computing 2019

Reviewer

Web Search and Data Mining (WSDM'21)

MDPI Sustainability

Sensors

Remote Sensing

Applied Sciences Journal from MDPI

International Conference on Human-Computer Interaction – INTERACT 2019

DataKind: Reviewer for Google AI Impact Challenge

Journal of Scientific Research and Reports (Science Domain International)

IEEE Transactions on Big Data

Publications

Journal Articles

2020	Beiyu Lin and Diane J Cook. Analyzing Sensor-Based Individual and Population Behavior Patterns via Inverse Reinforcement Learning. *Sensors*, 20, 5207, 2020
2020	Beiyu Lin, Diane J Cook, and Schmitter-Edgecombe Maureen. Using continuous sensor data to formalize a model of in-home activity patterns. *Journal of Ambient Intelligence and Smart Environments*, pages 1–19. IOS Press, 2020.
2019	Yibo Huangfu, Nathan M Lima, Patrick T O'Keeffe, William M Kirk, Brian K Lamb, Shelley N Pressley, Beiyu Lin, Diane J Cook, Von P Walden, and Bertram T Jobson. Diel variation of formaldehyde levels and other vocs in homes driven by temperature dependent infiltration and emission rates. *Building and Environment*, volume 159, page 106153. Elsevier, 2019.
2018	W Max Kirk, Madeline Fuchs, Yibo Huangfu, Nathan Lima, Patrick O'Keeffe, Beiyu Lin, Tom Jobson, Shelley Pressley, Von Walden, Diane Cook, et al. Indoor air quality and wildfire smoke impacts in the pacific northwest. *Science and Technology for the Built Environment*, volume 24, pages 149–159. Taylor & Francis, 2018.

2018   Alireza Ghods, Kathleen Caffrey, Beiyu Lin, Kylie Fraga, Roschelle Fritz, Maureen Schmitter-Edgecombe, Christopher Hundhausen, and Diane J Cook. Iterative design of visual analytics for a clinician-in-the-loop smart home. *IEEE journal of biomedical and health informatics*, volume 23, pages 1742–1748. IEEE, 2018.

2017   Beiyu Lin, Yibo Huangfu, Nathan Lima, Bertram Jobson, Max Kirk, Patrick O'Keeffe, Shelley N Pressley, Von Walden, Brian Lamb, and Diane J Cook. Analyzing the relationship between human behavior and indoor air quality. *Journal of Sensor and Actuator Networks*, volume 6, page 13, 2017.

2013   Zining Sheng, Beiyu Lin, and Zhang Shibing. Testing unit roots of first-order autoregressive process with stable distributions errors. *Chinese Journal of Applied Probability and Statistics*, volume 29, pages 443–448, 2013.

Conference

2018   A. Musser, B. Lin, D. Cook, B. Jobson, M. Kirk, N. Lima, P. O'Keeffe, S. Pressley, V. Walden, Y. Huangfu, and B. Lamb. The major role of temperature on indoor concentrations of air toxic vocs in 9 houses based on in-situ high time resolution measurements. In *the 15th Conference of the International Society of Indoor Air Quality and Climate*, 2018.

2018   A. Musser, B. Lin, D. Cook, B. Jobson, M. Kirk, N. Lima, P. O'Keeffe, S. Pressley, V. Walden, Y. Huangfu, and B. Lamb. Indoor air toxic gases levels in a net-zero energy house under multiple ventilation system settings. In *the 15th Conference of the International Society of Indoor Air Quality and Climate*, 2018.

2018   D. Cook B. Jobson M. Kirk N. Lima P. O'Keeffe S. Pressley V. Walden Y. Huangfu A. Musser, B. Lin and B. Lamb. Simulations of indoor air quality based on future climate conditions. In *the 15th Conference of the International Society of Indoor Air Quality and Climate*, 2018.

Posters/Abstracts

2020   Beiyu Lin. Human location preferences via imitation learning. In *Infrastructure and Construction Webinar - Urban Planning Session*, 2020.

2019   Beiyu Lin. Population level behavior analysis and its applications in healthcare. In *Ph.D. Forum at SIAM International Conference on Data Mining Doctoral Forum, Alberta, Canada*, 2019.

2019   Beiyu Lin. Constructing an ecologically-valid formal markovian model of human activity patterns. In *General Poster Session at Grace Hopper Celebration, Orlando, FL*, 2019.

2018   Beiyu Lin. Identifying and modeling the patterns of human activity routines. In *Research Exposition at Graduate and Professional Student Association, Pullman, WA*, 2018.