

Marzyeh Ghassemi

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Academic Employment

- **Assistant Professor, Faculty of Computer Science/Faculty of Medicine**
University of Toronto, July 2018
- **Faculty Member**
Vector Institute, July 2018
- **Visiting Researcher**
Verily, July 2017 – June 2018
- **Post-doctoral Fellow**
Computer Science and Artificial Intelligence Laboratory at MIT, July 2017 – June 2018

Education

- **Doctor of Philosophy, Computer Science**
Massachusetts Institute of Technology, February 2011 – June 2017
Thesis on “Representation Learning in Multi-dimensional Clinical Timeseries for Risk and Event Prediction”
- **Master of Science (MSc by Research), Biomedical Engineering**
Oxford University, October 2008 – October 2011
Thesis on “Methods and Models for Acute Hypotensive Episode Prediction”
- **Bachelors of Science, Electrical Engineering**
- **Bachelors of Science, Computer Science with Minor in Applied Math**
New Mexico State University, August 2000 – December 2005

Publications

Refereed Conferences

- **Semi-supervised Biomedical Translation with Cycle Wasserstein Regression GANs.**
McDermott, M.B.A., Yan, T., Naumann, T., Hunt, N., Suresh, H., Szolovits, P. and Ghassemi, M.
Proceedings of the 32th AAAI Conference on Artificial Intelligence (AAAI 2018)
- **Clinical Intervention Prediction and Understanding using Deep Networks.**
Suresh, H., Hunt, N., Johnson, A., Celi, L.A., Szolovits, P. and Ghassemi, M.
Proceedings of the 2nd Machine Learning for Healthcare Conference. (MLHC 2017)
33% Acceptance Rate
- **Continuous State-Space Models for Optimal Sepsis Treatment-a Deep Reinforcement Learning Approach.**
Raghu, A., Komorowski, M., Celi, L.A., Szolovits, P. and Ghassemi, M.
Proceedings of the 2nd Machine Learning for Healthcare Conference. (MLHC 2017)
33% Acceptance Rate

* Authors contributed equally.

- **Predicting intervention onset in the ICU with switching state space models.**
Ghassemi, M.*, Wu, M.* , Hughes, M.C.* , Szolovits, P., and Doshi-Velez, F.
Proceedings of the AMIA Summit on Clinical Research Informatics (CRI), 2017.
- **Uncovering Voice Misuse Using Symbolic Mismatch.**
Ghassemi, M., Syed, Z., Mehta, D.D., Van Stan, J.H., Hillman, R.E. and Guttag, J.V.
Proceedings of the 1st Machine Learning for Healthcare Conference, pp. 239–252, 2016. (MLHC 2016)
JMLR Workshop and Conference Track Volume 56.
33% Acceptance Rate
- **Prediction Using Patient Comparison vs. Modeling: A Case Study for Mortality Prediction.**
Hoogendoorn, M., elHassouni, A., Mok, K., Ghassemi, M., and Szolovits, P.
Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2016) FL.
- **A Multivariate Timeseries Modeling Approach to Severity of Illness Assessment and Forecasting in ICU with Sparse, Heterogeneous Clinical Data.**
Ghassemi, M.*, Pimentel, M.A.F*, Naumann, T., Brennan, T., Clifton, D.A., Szolovits, P. and Feng, M.
Proceedings of the 29th AAAI Conference on Artificial Intelligence (AAAI 2015) TX.
27% Acceptance Rate
- **Unfolding Physiological State: Mortality Modelling in Intensive Care Units.**
Ghassemi, M., Naumann, T., Doshi-Velez, F., Brimmer, N., Joshi, R. Rumshisky, A., and Szolovits, P.
Proceedings of the 20th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2014) NY.
15% Acceptance Rate

Journals

- **Predicting early psychiatric readmission with natural language processing of narrative discharge summaries.**
Rumshisky, A., Ghassemi, M., Naumann, T., Szolovits, P., Castro, V., McCoy, T., and Perlis, R. Translational Psychiatry, vol. 6, no. 10, p. e921, 2016.
- **Understanding vasopressor intervention and weaning: Risk prediction in a public heterogeneous clinical time series database.**
Ghassemi, M.*, Wu, M.* , Feng, M., Celi, L.A., Szolovits, P., and Doshi-Velez, F. (2016) Journal of the American Medical Informatics Association (JAMIA).
- **Using ambulatory voice monitoring to investigate common voice disorders: Research update.**
Mehta, D. D., Van Stan, J. H., Zañartu, M., Ghassemi, M., et al. (2015). Frontiers in Bioengineering and Biotechnology, vol 3, no 155.
- **State of the art review: the data revolution in critical care.**
Ghassemi, M., Celi, L. A & Stone, D. J. Critical Care 2015, vol 19, no. 118.
- **Short-term mortality prediction for elderly patients using medicare claims data.**
Makar, M., Ghassemi, M., Cutler, D.M., and Obermeyer, Z. International Journal of Machine Learning and Computing vol. 5, no. 3, pp. 192-197, 2015.

- **Making big data useful for health care: A summary of the inaugural MIT critical data conference.**
Ghassemi, M.*, et al. (2014). JMIR Medical Informatics, 2(2), e22.
- **Learning to detect vocal hyperfunction from ambulatory neck-surface acceleration features: Initial results for vocal fold nodules.**
Ghassemi, M., Van Stan, J. H., Mehta, D.D., Zañartu, M., Cheyne, H.A., Hillman, R.E. and Guttag, J.V. (2014). IEEE Transactions on Biomedical Engineering, 61(6): 1668–1675.
Selected for a TBME Spotlight.
- **Long-term outcomes of minor troponin elevations in the intensive care unit.**
Ghassemi, M.*, Velasquez, A*, Szolovits, P., Park, S., Osorio, J., Dejam, A., & Celi, L. (2014). Anaesthesia and intensive care, 42(3), 356-364.
- **Leveraging a critical care database: selective serotonin reuptake inhibitor use prior to ICU admission is associated with increased hospital mortality.**
Ghassemi, M., Marshall, J., Singh, N., Stone, D. J., & Celi, L. A. (2014). Chest, 145(4), 745-752.

Refereed Workshops

- **An Open Benchmark for Causal Inference Using the MIMIC-III Dataset**
Celi, L.A.*, Jung, K.*, Ghassemi, M.*, Guzman, C.*, Shalit, U.*, Sontag, D*. (2016) OHDSI Collaborator Showcase in OHDSI Symposium. Washington DC.
- **Uncovering voice misuse using symbolic mismatch.**
Ghassemi, M., Syed, Z., and R.E., Guttag, J.V. (2015) Neural Information Processing Systems (NIPS 2015) Workshop on Machine Learning in Healthcare.
- **Discrete switching-state systems for ICU vasopressor intervention and weaning predictions.**
Ghassemi, M. Wu, M., Feng, M. Celi, L.A., Szolovits, P. Doshi-Velez, F. (2015) Neural Information Processing Systems (NIPS 2015) Workshop on Machine Learning in Healthcare.
- **Confirming the themes and interpretive unity of Ghazal poetry using topic models.**
Asgari, E., Ghassemi, M. and Finlayson, M. (2013) Neural Information Processing Systems (NIPS 2013) Workshop on Topic Models: Computation, Application, and Evaluation.
- **Detecting voice modes for vocal hyperfunction prevention.**
Ghassemi, M., Shih, E., Mehta, D.D., Feng, S., Van Stan, J.H., Hillman, R.E., Guttag, J.V. (2012) Women in Machine Learning (WiML 2012) Workshop, collocated with NIPS 2012.
- **Topic models for mortality modeling in intensive care units.**
Ghassemi, M., Naumann, T., Joshi, R. Rumshisky, A. (2012) International Conference on Machine Learning (ICML 2012) Workshop on Machine Learning for Clinical Data Analysis

Book Chapters

- **Data Analysis.**
Raffa, J.D., Ghassemi, M., Naumann, T., Feng, M. and Hsu, D., 2016. In *Secondary Analysis of Electronic Health Records* (pp. 205-261). Springer International Publishing.

- **State of the art review: The data revolution in critical care**
Ghassemi, M., Celi, L. A & Stone, D. J. Annual Update in Intensive Care and Emergency Medicine 2015. Springer International Publishing, 2015. 573-586

Teaching Experience

- **Graduate Teaching Assistant: Sept 2015 – Dec 2015**
Taught recitations and lab sections for 6.867, the graduate-level machine learning course in the computer science department, with 280 enrolled graduate students at start of term. MIT; Cambridge, MA.
- **Graduate Mentor: Jun 2013 – August 2013**
Was the primary supervisor and mentor for an MIT undergraduate student. The student successfully contributed code to an active research topic and published her work at KDD 2014. MIT; Cambridge, MA.
- **Graduate Teaching Assistant: Jan 2010 – August 2010**
Assisted with recitation and lab time for undergraduate courses in “Control Theory”, “Intro to C”, and “Intro to Java”. Oxford University; Oxford, UK.

Academic Service

University and Departmental Service

- **Committee on Foreign Scholarships, Massachusetts Institute of Technology: 2014-Present**
Coached students applying for foreign scholarships and participated in mock interviews.
- **Committee on MIT Graduate Admissions in Area II (CS): 2015**
Reviewed incoming EECS PhD applications for Machine Learning/Artificial Intelligence admission.
- **Corporation Joint Advisory Committee on Institute-wide Affairs Grad Member: 2014-2015**
Recommended direction on Institute-wide issues requiring Corporation attention.
- **MIT Graduate Student Council Housing and Community Affairs Co-Chair: 2013-2014**
Worked to create a \$1M+ fundraising target for a needs-based child-care grant, successfully negotiated a 4% stipend increase for MIT graduate students for the 2014 fiscal year, and expanded new transportation options.
- **MIT Graduate Student Council Family Subcommittee Lead: 2012-2013**
Created a funded back-up childcare option for graduate students with MIT Administration.
- **MIT Computer Science and Artificial Intelligence Lab (CSAIL) Student Committee Treasurer: 2012-2013**
Monitored student spending for the CSAIL Student Committee.

Workshops Organized

- **MIT's Hacking Discrimination Workshop: 2016**
Was responsible for inviting speakers and emceeding inaugural workshop on hacking discrimination at MIT.
- **NIPS Machine Learnign for Healthcare (ML4HC) Workshop: 2016**
Co-organized and ran multidisciplinary workshop at NIPS focused on machine learning for healthcare.

- **Workshop for Women in Machine Learning, Organizer (WiML): 2014**
Duties involved raising \$25K from industry sponsors, program chairing, and managing publicity. The conference drew 134 attendees, 81 poster presenters, 5 student oral presentations, and 4 invited speakers.
- **MIT Critical Data Conference and Hackathon, Organizer: 2013 & 2014**
Helped organize, publicize and run multidisciplinary conference/hackathon on big data in critical care medicine. Guest speakers included Jeff Drazen and John Ioannidis.

Honors and Awards

During MIT PhD

- First Place at 2014 MIT \$100K Accelerate \$10,000 Daniel M. Lewin Accelerate Prize, Kohana Student Team
- First Place at 2013 MIT Sloan-ILP Innovators Showcase, Sana AudioPulse Student Team
- First Place at 2012 GSMA Mobile Health Student Challenge, Sana AudioPulse Student Team
- NIH/NLM Biomedical Informatics Research Training Fellowship, Fall 2012 - Present
- Jacobs Presidential Fellowship (MIT), Spring 2011
- Xerox Fellowship, Fall 2011 – Spring 2012

During Oxford MsC

- British Marshall Scholarship, Fall 2008

During Intel Employment

- Intel Division Recognition Award, Fall 2007

During NMSU BSEE/BSCS

- College of Engineering Outstanding Senior of the Year, Fall 2005
- College of Arts and Sciences Outstanding Senior of the Year, Fall 2005
- Barry Goldwater Scholarship, Fall 2005 - Spring 2006
- USA TODAY Second All-American Academic Team Member, 2006
- Undergraduate Scholarships, including Hugh M. Milton II Scholarship (Fall 2004), Ford/Golden Key Scholarship (Spring 2003), Boeing Undergraduate Scholarship (Spring 2003), Agilent Mentoring Scholarship (Spring 2003) and Klipsch/HKN Scholarship (Fall 2002 – Spring 2004)

Industry Experience

- **Microsoft Research Intern: Jun 2016 – August 2016**
Investigated the use of trajectories over claims codes to separate patients in different chronic conditions, and create data-driven subtyping.
- **Quanta Research Intern: Jun 2012 – August 2012**
Created methods for the analysis of mobile vocal fold monitoring systems deployed by Massachusetts General Hospital in patients with vocal hyperfunction.
- **Intel Market Development Manager: Mar. 2007 – Aug. 2008**
Owned the delivery of the market development strategy, collateral, training, and events supporting the Emerging Market Platforms Group in general and the Intel-powered classmate PC specifically. Led Intel's commitment to the Partnership for Lebanon, a public-private initiative to revitalize the Lebanese economy.

- **Intel Rotational Engineer: Feb. 2006 – Mar. 2007**
Selected for 3 rotations over 13 months that included the creation of Power Profiling software to determine the best network communication protocol for a Parkinson's healthcare device, the completion of two projects related to integrate technology into impaired households, and the management of several projects across geographies, including a private partnership fund for the Chairman's office, the UN Global Alliance for ICT Development Community of Expertise and Intel's PC Donation Program in 2 regions.
- **IBM Extreme Blue Tech Intern: May. 2005 – August 2005**
Designed and implemented tool using Java that allows customers to communicate real-time feedback.
- **IBM Verification Intern: May 2004 – August 2004**
Completed project related to cell processors on memory verification in C++. Also assisting with hardware to software interface and documentation using Perl and VHDL analysis.

Patents

- **US #8063375 (Issued Nov, 2011)**
"Sensible motion detector"
- **USPTO Application #20090171695**
"System and method for interactive management of patient care"
- **USPTO Application #20070239682**
"System and method for browser context based search disambiguation using a viewed content history"

Outreach

- AAI Women in Machine Learning Mentoring Breakfast Organizer, Fall 2015
- Graduate Women at MIT Keynote Co-lead, Fall 2011
- Oxford Engineers Without Borders President, Fall 2009 – Fall 2010
- Oxford Student Consultancy Team Lead, Spring 2009
- Sexual Assault Resource Center Crisis Line Volunteer, Spring 2006 – Spring 2008
- Hillsboro High School Tech Wizards Volunteer, Spring 2006
- Doña Ana Detention Center Math Teacher, Fall 2003