

Joyce C. Ho

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Education

- 2011–2015 **University of Texas at Austin**, *Ph.D in Electrical and Computer Engineering*,
Thesis: Clinically interpretable models for health data
Advisors: Dr. Joydeep Ghosh and Dr. Sriram Vishwanath
- 2003–2004 **Massachusetts Institute of Technology**, *M.A. in Electrical Engineering and Computer Science*,
Interruptions: Using activity transitions to trigger proactive messages
Advisor: Dr. Stephen Intille
- 1999–2003 **Massachusetts Institute of Technology**, *B.S in Electrical Engineering and Computer Science*

Professional Experience

- 1/16–Present **Computer Science Department at Emory University**, *Assistant Professor*
- 5/16–Present **Guest Researcher**, *Centers for Disease Control and Prevention*
- 6/14–5/16 **ORISE Fellow**, *Centers for Disease Control and Prevention*, Atlanta, GA
- 9/13–1/16 **Co-founder, Chief Data Scientist**, *Accordion Health*, Austin, TX
- 6/13–8/13 **Research Intern**, *IBM T.J.Watson Research Center*, Yorktown Heights, NY
- 6/12–8/12 **Research Intern**, *Center for Clinical and Research Informatics at NorthShore Health System*, Evanston, IL
- 9/04–8/11 **System Engineer**, *Lawrence Livermore National Laboratory*, Livermore, CA

Publications

* Graduate students working under my supervision.

° Undergraduate students working under my supervision.

Peer-Reviewed Journals

- [J4] Zelalem Gero* and Joyce Ho. “PMCVec: Distributed Phrase Representation for Biomedical Text Processing.” In: *Journal of Biomedical Informatics* (2019), p. 100047.
- [J3] Jette Henderson, Junyuan Ke°, **Joyce C Ho**, Joydeep Ghosh, and Byron C Wallace. “Phenotype instance verification and evaluation tool (PIVET): A scaled phenotype evidence generation framework using web-based medical literature.” In: *Journal of Medical Internet Research* 20.5 (2018).
- [J2] **Joyce C Ho**, Joydeep Ghosh, Steve R Steinhubl, Walter F Stewart, Joshua C Denny, Bradley A Malin, and Jimeng Sun. “Limestone: High-throughput candidate phenotype generation via tensor factorization.” In: *Journal of Biomedical Informatics* 52 (2014), pp. 199–211.
- [J1] **Joyce C Ho**, Cheng H Lee, and Joydeep Ghosh. “Septic shock prediction for patients with missing data.” In: *ACM Transactions on Management Information Systems* 5.1 (2014), 1:1–1:15.

Peer-Reviewed Conferences

- [C23] Zelalem Gero* and **Joyce C Ho**. “NamedKeys: Unsupervised keyphrase extraction for biomedical documents.” In: *Proceedings of the 10th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics*. 2019.
- [C22] Bonggun Shin*, Sungsoo Park, Keunsoo Kang, and **Joyce C Ho**. “Self-attention based molecule representation for predicting drug-target interaction.” In: *Machine Learning for Healthcare*. 2019.

- [C21] Huan He*, Jette Henderson, and **Joyce C Ho**. "SGranite: Distributed tensor decomposition for large scale health analytics." In: *Proceedings of The Web Conference*. 2019.
- [C20] Jette Henderson, Bradley A Malin, Joshua C Denny, Abel N Kho, Jimeng Sun, Joydeep Ghosh, and **Joyce C Ho**. "CP tensor decomposition with cannot-link intermode constraints." In: *Proceedings of the 2019 SIAM International Conference on Data Mining*. 2019, pp. 711–719.
- [C19] Eric W Lee* and **Joyce C Ho**. "FuzzyGap: Sequential pattern mining for predicting chronic heart failure in clinical pathways." In: *AMIA Informatics Summits*. 2019.
- [C18] Jasmine Y Nakayama, Vicki Hertzberg, and **Joyce C Ho**. "Making sense of abbreviations in nursing notes: A case study on mortality prediction." In: *AMIA Informatics Summits*. 2019.
- [C17] Mani Sotoodeh* and **Joyce C Ho**. "Improving length of stay prediction using a hidden Markov model." In: *AMIA Informatics Summits*. 2019.
- [C16] Jette Henderson, Huan He*, Bradley A Malin, Joshua C Denny, Abel N Kho, Joydeep Ghosh, and **Joyce C Ho**. "Phenotyping through Semi-Supervised Tensor Factorization (PSST)." In: *AMIA Annual Symposium*. 2018.
- [C15] Ardavan Afshar, Ioakeim Perros, Evangelos E Papalexakis, Elizabeth Searles, **Joyce C Ho**, and Jimeng Sun. "COPA: Constrained PARAFAC2 for sparse & large datasets." In: *Proceedings of the 27th ACM International Conference on Information and Knowledge Management*. 2018, pp. 793–802.
- [C14] Ardavan Afshar, **Joyce C Ho**, Bistra Dilkina, Ioakeim Perros, Elias B Khalil, Li Xiong, and Vaidy Sunderam. "CP-ORTHO: An orthogonal tensor factorization framework for spatio-temporal data." In: *Proceedings of the 25th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*. 67. 2017.
- [C13] Jette Henderson, **Joyce C Ho**, and Joydeep Ghosh. "gamAID: Greedy CP tensor decomposition for supervised EHR-based disease trajectory differentiation." In: *Proceedings of the 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. 2017, pp. 3644–3647.
- [C12] **Joyce C Ho** and Yubin Park. "Learning from different perspectives: Robust cardiac arrest prediction via temporal transfer learning." In: *Proceedings of the 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. 2017, pp. 1672–1675.
- [C11] Jette Henderson, **Joyce C Ho**, Abel N Kho, Joshua C Denny, Bradley A Malin, Jimeng Sun, and Joydeep Ghosh. "Granite: Diversified, sparse tensor factorization for electronic health record-based phenotyping." In: *2017 IEEE International Conference on Healthcare Informatics*. 2017, pp. 214–223.
- [C10] Jette Henderson, Ryan Bridges, **Joyce C Ho**, Byron C Wallace, and Joydeep Ghosh. "PheKnow-Cloud: A tool for evaluating high-throughput phenotype candidates using online medical literature." In: *AMIA 2017 Joint Summits on Translational Science*. 2017, pp. 149–157.
- [C9] **Joyce C Ho**, Joydeep Ghosh, and Jimeng Sun. "Marble: High-throughput phenotyping from electronic health records via sparse nonnegative tensor factorization." In: *Proceeding of the 20th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*. 2014, pp. 115–124.
- [C8] **Joyce C Ho**, Joydeep Ghosh, and Jimeng Sun. "Extracting phenotypes from patient claim records using nonnegative tensor factorization." In: *Proceedings of the 2014 International Conference on Brain Informatics and Health*. 2014, pp. 142–151.
- [C7] **Joyce C Ho**, Yubin Park, Carlos M Carvalho, and Joydeep Ghosh. "DYNACARE: Dynamic cardiac arrest risk estimation." In: *Proceedings of the 16th International Conference on Artificial Intelligence and Statistics*. 2013, pp. 333–341.
- [C6] **Joyce C Ho**, Joydeep Ghosh, and K P Unnikrishnan. "Risk prediction of a multiple sclerosis diagnosis." In: *2013 IEEE International Conference on Healthcare Informatics*. 2013, pp. 175–183.
- [C5] Yubin Park, **Joyce C Ho**, and Joydeep Ghosh. "Multivariate temporal symptomatic characterization of cardiac arrest." In: *Proceedings of the 35th International Conference of the IEEE Engineering in Medicine and Biology Society*. 2013, pp. 3222–3225.
- [C4] Cheng H Lee, Natalia M Arzeno, **Joyce C Ho**, Haris Vikalo, and Joydeep Ghosh. "An imputation-enhanced algorithm for ICU mortality prediction." In: *Computing in Cardiology*. 2012, pp. 253–256.

- [C3] **Joyce Ho**, John Fisher, Joshua Gordon, Larry Lagin, and Susan West. "Java tool framework for automation of hardware commissioning and maintenance procedures." In: *Proceedings of ICALEPCS07*. 2007, p. 547.
- [C2] John Fisher, Greg Bowers, Robert Carey, Stephanie Daveler, Kelley H Ford, **Joyce Ho**, Larry Lagin, Chris Lambert, Jessica Mauvais, Eric Stout, and Susan West. "User interface framework for the National Ignition Facility (NIF)." In: *Proceedings of ICALEPCS07*. 2007, p. 146.
- [C1] **Joyce Ho** and Stephen S Intille. "Using context-aware computing to reduce the perceived burden of interruptions from mobile devices." In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. 2005, pp. 909–918.

Refereed Workshops

- [W6] Jette Henderson, Bradley A Malin, **Joyce C Ho**, and Joydeep Ghosh. "PIVETed-Granite: Computational phenotypes through constrained tensor factorization." In: *KDD Workshop on Machine Learning for Medicine and Healthcare*. 2018.
- [W5] Yubin Park, **Joyce C Ho**, and Joydeep Ghosh. "ACDC: α -Carving Decision Chain for Risk Stratification." In: *2016 ICML Workshop on Human Interpretability in Machine Learning*. 2016.
- [W4] Ryan Bridges, Jette Henderson, **Joyce C Ho**, Byron C Wallace, and Joydeep Ghosh. "Automated verification of phenotypes using PubMed." In: *Proceedings of the 7th ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics*. New York, New York, USA, 2016, pp. 595–602.
- [W3] Jette Henderson, **Joyce C Ho**, Joydeep Ghosh, Suriya Gunasekar, and Jimeng Sun. "Personalized diversified tensor factorization for phenotyping." In: *Neural Information Processing Systems 2015 Workshop on Machine Learning in Healthcare*. 2015.
- [W2] **Joyce C Ho**, Carlos M Carvalho, and Joydeep Ghosh. "DYNACARE-OP: Dynamic cardiac arrest risk estimation incorporating ordinal features." In: *2013 International Conference on Machine Learning Workshop: Role of Machine Learning in Transforming Healthcare*. 2013.
- [W1] **Joyce C Ho**, Cheng H Lee, and Joydeep Ghosh. "Imputation-enhanced prediction of septic shock in ICU patients." In: *2012 ACM SIGKDD Workshop on Health Informatics*. 2012.

Refereed Abstracts

- [A4] Robert Chen, **Joyce C Ho**, and Jin-Mann Sally Lin. "Extracting medication information from unstructured public health data: A demonstration on data from population-based and tertiary-based samples." CSTE Annual Conference. 2019.
- [A3] **Joyce C Ho**, Lisa Staimez, K M Venkat Narayan, Roy L Simpson, and Vicki S Hertzberg. "Comparison of the Framingham risk score, SCORE, and UKPDS risk engine for predicting cardiovascular disease complications in people with diabetes." American Diabetes Association's 79th Scientific Sessions. 2019.
- [A2] Robert Chen, **Joyce C Ho**, and Jin-Mann Sally Lin. "Application of tensor factorization technique to uncover medication usage patterns in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS): Population-based and tertiary-based samples." American Public Health Association Annual Meeting. 2017.
- [A1] **Joyce C Ho**, Jin-Mann S Lin, Brian M Gurbaxani, Jimeng Sun, and Joydeep Ghosh. "Uncovering medication usage patterns of patients with chronic fatigue syndrome via nonnegative tensor factorization." AMIA Joint Summits on Translational Science. 2015.

Working Papers

- [P2] Yubin Park and **Joyce C Ho**. *PaloBoost: An Overfitting-robust TreeBoost with Out-of-Bag Sample Regularization Techniques*. In arXiv. 2018.
- [P1] Suriya Gunasekar, **Joyce C Ho**, Joydeep Ghosh, Stephanie Kreml, Abel N Kho, Joshua C Denny, Bradley A Malin, and Jimeng Sun. *Phenotyping using structured collective matrix factorization of multi-source EHR data*. In arXiv. 2016.

Presentations

- Invited Talk
 - o "Assessing machine learning methods for predicting cardiovascular disease complications in people with diabetes", Global Health Seminar, Emory University, 2019
 - o "Bridging the gap between electronic health records and tensor factorization", Department of Computer Science and Engineering, the Chinese University of Hong Kong, 2017
 - o "Understanding high-dimensional health data via tensor factorization", School of Nursing, Emory University, 2017
 - o "Extracting medically interpretable concepts from complex health data", Department of Computer Science, University of Southern California, 2015
 - o "Extracting medically interpretable concepts from complex health data", Mathematics and Computer Science Department, Emory University, 2015
 - o "Computational phenotyping from electronic health records using tensor factorization", INFORMS Annual Meeting, 2015
 - o "Septic shock prediction for patients with missing data", INFORMS Annual Meeting, 2014
- Tutorial
 - o "Large-scale Spatiotemporal Analysis using Tensor Factorization", SIAM International Conference on Data Mining, 2019
- Panel
 - o "Computational Phenotyping on Diverse Data Sources", AMIA Annual Symposium, 2017

Grants & Contracts

- o Leveraging modern analytics approaches to improve diabetes outcomes
National Institute of Health, National Library of Medicine, 1K01LM012924
\$520,869, 07/10/2018-06/30/2021
Role: PI
- o TIMES: A tensor factorization platform for spatio-temporal data
National Science Foundation, Big Data Science & Engineering, 1838200
\$943,057 (Emory portion), 10/1/2018-09/30/2022
Role: PI
Co-PIs: Li Xiong (Emory), Jimeng Sun (Georgia Tech)
- o Computational Prediction and Functional Validation of Novel Risk Loci of Alzheimer's Disease
National Institute of Health, National Institute of Aging, 1R56AG060757
\$788,200, 09/30/2018-08/31/2019
Role: Co-Investigator
PIs: Peng Jin, Zhaohui Qin, Thomas Spurgeon Wingo

Awards & Honors

- 2019 Nomination for Best Student Paper at the 2019 AMIA Informatics Summits
- 2018 Best Student Paper at KDD Workshop on Machine Learning for Medicine and Healthcare
- 2018 Grace Hopper Conference Faculty Scholar
- 2018 Emory Center for Faculty Development and Excellence Teaching Fellow
- 2017 Distinguished Clinical Research Informatics Paper Award
- 2015 INFORMS Annual Meeting Artificial Intelligence Cluster Travel Award Winner
- 2014 Dr. Brooks Carlton Fowler Endowed Presidential Graduate Fellowship in Electrical and Computer Engineering
- 2014 KDD Student Travel Award Winner
- 2012 Innovative Signal Analysis Fellowship
- 2011–2014 Cockrell School of Engineering Doctoral Fellowship
- 2011 Microelectronics and Computer Development Fellowship

Teaching

Emory Assistant Professor.

- o CS171 Introduction to Computer Science II (undergraduate): Fall 2017 (34 students)
- o CS377 Database Systems (undergraduate): Spring 2016/Spring 2017/Spring 2018 (46/58/56 students)
- o CS584 Big Data Analytics (graduate): Spring 2016 (14 students)
- o CS534 Machine Learning (graduate): Spring 2017/Fall 2017/Fall 2018 (21/34/33 students)

UT-Austin Teaching Assistant.

- o MIS382N Advanced Predictive Analytics (graduate): Spring 2014 (40 students)
- o EE380L Data Mining (graduate): Spring 2013 (45 students)

Student Advising

- PhD
- o Huan He, 1st year PhD Student
 - o Jing Ma, 1st year PhD Student (co-advised with Li Xiong)
 - o Eric W Lee, 2nd year PhD Student
 - o Payam Karisani, 3rd year PhD Student (co-advised with Eugene Agichtein)
 - o Mani Sotoodeh, 3rd year PhD Student (co-advised with Li Xiong)
 - o Zelalem Gero, 3rd year PhD Student
 - o Bonggun Shin, 4th year PhD Student

- Honors Thesis
- o Colin Jiang, BS Student
 - o Wenqin Dong, BS Student
 - o Sihan Yue, BS 2019
Honors Thesis: Smoothing tensor factorization on spatio-temporal data
Recognition: Emory Math Evans Award (Outstanding Academic Achievement)
 - o Tianhui Mao, BS 2019 (co-advised with Yuanzhe Xi)
Honors Thesis: Smart initialization for smooth and sparse tensor factorization

- PhD Thesis Committee
- o Safoora Yousefi, Emory University, 2019
Dissertation: Neural networks for cancer survival analysis using high-dimensional genomic data
 - o Samy Wu Fung, Emory University, 2019
Dissertation: Large-scale parameter estimation in Geophysics and machine learning
 - o Xiaobo Sun, Emory University, 2018
Dissertation: The applications of NoSQL systems and ensemble learning in managing, processing and analyzing big omics data
 - o Daniel Garcia Ulloa, Emory University, 2017
Dissertation: Recommender systems and information fusion in spatial crowdsourcing
 - o Layla Pournajaf, Emory University, 2017
Dissertation: Privacy preserving task management for mobile crowd sensing
 - o Haoran Li, Emory University, 2016
Dissertation: Privacy preserving data release and analytics

- MS / Honors Thesis Committee
- o Mingyang Sun, Emory University, 2019
Honors Thesis: Towards personality trait prediction from chatbot conversations using machine learning with domain adaptation
 - o Jennifer A McGuire, Emory University, 2018
Honors Thesis: Role of glassy-rubbery interfaces on the physical gging of glassy polymer thin films
 - o Rongmei Lin, Emory University, 2017
MS Thesis: A Decision Support System for Heparin Dosing

Service

Org Committee SDM 2020 Scholarship Co-chair
 CIKM 2017 Short Research Papers Track Co-chair

PC Member WWW (2019)
 CIKM (2018, 2019)
 Grace Hopper Data Science program (2018)
 ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (2017)
 IEEE International Conference on Healthcare Informatics (2015, 2016, 2017)
 KDD 2019 Workshop on Applied Data Science for Healthcare
 KDD 2019 Workshop on Tensor Methods for Emerging Data Science Challenges
 AMIA 2016 Workshop on Data Mining for Medical Informatics
 NIPS 2016 Workshop on Machine Learning for Health
 ACM-BCB 2016 Workshop on Methods and Applications in Healthcare Analytics
 AIME 2015 Workshop: Matrix Computations for Biomedical Informatics
 AMIA 2014 Workshop on Data Mining for Medical Informatics: Electronic Phenotyping
 BigMUD 2013: ICDM Workshop on Mining and Understanding from Big Data

Reviewer NeurIPS Workshops (2019)
 Machine Learning for Healthcare (2016, 2017, 2018, 2019)
 AMIA Annual Symposium (2018, 2019)
 AMIA Informatics Summits (2019, 2020)
 AMIA Joint Summits on Translational Science (2015, 2016, 2017, 2018)
 Journal of the American Medical Informatics Association
 Journal of Machine Learning
 Computer Methods and Programs in Biomedicine
 Transactions on Knowledge and Data Engineering
 Data Mining and Knowledge Discovery
 Transactions on Knowledge Discovery from Data

Panel Reviewer National Science Foundation (2018, 2019)

Institutional Faculty Experience Master Planning Committee, Emory University, 2018-2019

Service Faculty Search Committee, Department of Mathematics and Computer Science, Emory University, 2017-2018
 Graduate Student Committee, Department of Mathematics and Computer Science, Emory University, 2017-2018
 Faculty Advisor, Girls Who Code, Emory University, 2016-Present
 Faculty Advisor, Association for Computing Machinery-Women in Computing, Emory University, 2016-Present