

John P. Lalor

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Research Interests

My research is in machine learning and natural language processing. I am particularly interested in model evaluation and quantifying uncertainty, as well as applications in biomedical informatics.

Education

- 2019 **Ph.D. Computer Science**, University of Massachusetts, Amherst, MA.
(expected) Advisor: Hong Yu
- 2015 **M.S. Computer Science**, *with Distinction*, DePaul University, Chicago, IL.
- 2011 **B.B.A. IT Management**, *cum laude*, University of Notre Dame, South Bend, IN.
Minor: Irish Language and Literature

Professional Experience

- Summer 2018 **Applied Scientist Intern**, Amazon Alexa, Cambridge, MA.
Supervisors: Bill Campbell and Eunah Cho
- Summer 2017 **Applied Scientist Intern**, Amazon Alexa, Cambridge, MA.
Supervisors: Imre Kiss and Francois Mairesse
- 2017 - **Research Assistant**, Veterans Affairs Medical Center, Center for Healthcare Organization and Implementation Research, Bedford, MA.
- Summer 2016 **Intern**, ESPN Advanced Technology Group, Bristol, CT.
Supervisor: Zvi Topol
- 2015 - **Research Assistant**, BioNLP Group, Amherst, MA.
Supervisor: Hong Yu
- 2013 - 2015 **Software Developer**, Eze Software Group, Chicago, IL.
- 2011 - 2013 **Advisory Sr. Associate**, KPMG, Philadelphia, PA, Chicago, IL.

Honors and Awards

- 2018 UMass CICS Travel Grant recipient
- 2015 DePaul University Graduate Assistantship
- 2015 Upsilon Pi Epsilon computer science honor society, DePaul chapter
- 2007 - 2011 Dean's List 4 semesters at Notre Dame

Publications

Manuscripts Under Review

- 20 **J.P. Lalor**, H. Wu, H. Yu. Learning Latent Parameters without Human Response Patterns: Item Response Theory with Artificial Crowds.
- 19 **J.P. Lalor**, H. Wu, H. Yu. Comparing Human and DNN-Ensemble Response Patterns for Item Response Theory Model Fitting.
- 18 E. Cho, H. Xie, **J.P. Lalor**, V. Kumar, W. M. Campbell. Efficient Semi-Supervised Learning for Natural Language Understanding by Optimizing Diversity.

Journal and Conference Publications

- 17 J. Chen, **J.P. Lalor**, W. Liu, E. Druhl, H. Yu. Detecting Hypoglycemia Incidents Reported in Patients' Secure Messages: Using Cost-sensitive Learning and Oversampling to Reduce Data Imbalance. *J Med Internet Res* 2019;21(3):e11990. doi:10.2196/11990
- 16 **J.P. Lalor**, B. Woolf, H. Yu. Improving EHR Note Comprehension with NoteAid: A Randomized Trial of EHR Note Comprehension Interventions with Crowdsourced Workers. *J Med Internet Res* 2019;21(1):e10793. doi:10.2196/10793.
- 15 **J.P. Lalor**, H. Wu, T. Munkhdalai, H. Yu. Understanding Deep Learning Performance through an Examination of Test Set Difficulty: A Psychometric Case Study. *EMNLP 2018: Conference on Empirical Methods in Natural Language Processing*, 2018.
Oral presentation, top 9.9% of submitted short papers
- 14 **J.P. Lalor**, H. Wu, L. Chen, K. Mazor, H. Yu. CompreHENotes, an Instrument for Assessing Patient Electronic Health Record Note Reading Comprehension: Development and Validation. *J Med Internet Res* 2018;20(4):e139. doi:10.2196/jmir.9380
- 13 T. Munkhdalai, **J.P. Lalor**, H. Yu. Citation Analysis with Neural Attention Models. *LOUHI 2016 : The Seventh International Workshop on Health Text Mining and Information Analysis*, Austin, TX, USA, November 2016.
- 12 **J.P. Lalor**, H. Wu, H. Yu. Building an Evaluation Scale using Item Response Theory. *EMNLP 2016: Conference on Empirical Methods in Natural Language Processing*, Austin, TX, USA, November 2016.
- 11 C. Miller, A. Settle, **J.P. Lalor**. Learning Object-Oriented Programming in Python: Towards an Inventory of Difficulties and Testing Pitfalls. *SIGITE 2015: The Special Interest Group for Information Technology Education Conference*, Chicago, IL, October 2015
- 10 A. Settle, **J.P. Lalor**, T. Steinbach. Evaluating a Linked-Courses Learning Community for Development Majors. *SIGITE 2015: The Special Interest Group for Information Technology Education Conference*, Chicago, IL, October 2015
- 9 A. Settle, **J.P. Lalor**, T. Steinbach. A Computer Science Linked-Courses Learning Community. *ITiCSE 2015: The 20th Annual Conference on Innovation and Technology in Computer Science Education*. Vilnius, Lithuania, July 2015
- 8 A. Settle, **J.P. Lalor**, T. Steinbach. Reconsidering the Impact of CS1 on Novice Attitudes. *SIGCSE 2015: The ACM Special Interest Group on Computer Science Education*. Kansas City, MO, March 2015

Workshop Papers, Posters, and Abstracts

- 7 **J.P. Lalor**, H. Wu, H. Yu. Learning Latent Parameters without Human Response Patterns: Item Response Theory with Artificial Crowds. *NAACL Workshop on Shortcomings in Vision and Language (SiVL)* Extended Abstract, 2019.
- 6 **J.P. Lalor**, H. Wu, H. Yu. Comparing Human and DNN-Ensemble Response Patterns for Item Response Theory Model Fitting. *NAACL Workshop on Cognitive Modeling and Computational Linguistics (CMCL)* Extended Abstract, 2019.
- 5 J. Chen, **J.P. Lalor**, H. Yu. Detecting Hypoglycemia Incidents from Patients' Secure Messages. *American Medical Informatics Association (AMIA) Annual Symposium* Poster, 2018.
- 4 **J.P. Lalor**, H. Wu, H. Yu. Soft Label Memorization-Generalization for Natural Language Inference. *Workshop on Uncertainty in Deep Learning: Uncertainty in Artificial Intelligence (UAI)* Paper, 2018.
- 3 **J.P. Lalor**, H. Wu, H. Yu. Modeling Difficulty to Understand Deep Learning Performance. *Northern Lights Deep Learning Workshop (NLDL)* Extended Abstract, 2018.
- 2 **J.P. Lalor**, H. Wu, H. Yu. CIFT: Crowd-Informed Fine-Tuning to Improve Machine Learning Ability. *Human Computation and Crowdsourcing (HCOMP)* Works-in-Progress, 2017.
- 1 **J.P. Lalor**, H. Wu, L. Chen, K. Mazor, H. Yu. Generating a Test of Electronic Health Record Narrative Comprehension with Item Response Theory. *American Medical Informatics Association (AMIA) Annual Symposium* Podium Abstract, 2017.

Tutorials and Invited Talks

- 11/2018 Evaluation and Interpretability in Deep Neural Networks. *American Medical Informatics Association (AMIA) Annual Symposium* Instructional Workshop, 2018. With A. Jagannatha and H. Yu.
- 10/2018 CompreHENotes: A New Test of EHR Note Comprehension. *University of Notre Dame Mendoza College of Business*.
- 09/2018 Leveraging Uncertainty for Better DNN Training and Evaluation. *UMass Lowell Data Science Lecture Series*.
- 09/2017 Building Better Evaluations using Item Response Theory. *University of Notre Dame Natural Language Processing Group*.
- 12/2016 Building Evaluation Scales for NLP using Item Response Theory. *UMass CICS Machine Learning and Friends Lunch series*.

Teaching and Mentoring Experience

- Fall 2018 **Instructor**, UMass Lowell Data Science Lecture Series, University of Massachusetts Lowell. Prepared and gave three lectures on evaluation and interpretability in deep neural networks
- Fall 2018 **Instructor**, CICS First Year Seminar, University of Massachusetts Amherst. Seminar for first year students on Artificial Intelligence in Healthcare. I am the sole instructor for this course, and designed the syllabus, lectures, and assignments.
- 2018 **Research Mentor**, Long Le, B.S. in Computer Science, University of Massachusetts Amherst. Project: Analysis of Easy/Difficult Images for CNN Models

- 2018 **Research Mentor**, UMass CICS Industry Mentor Program.
Project: Analyzing Users within Organizations with NLP
- 2017-2018 **Research Mentor**, Nikhil Titus, M.S. in Computer Science, University of Massachusetts Amherst.
Project: Neural Question Generation
- 2015 **Teaching Assistant**, Introduction to Computer Science, Amherst College, Amherst, MA.
Professor: Crystal Valentine
As TA I held weekly office hours, assisted students during weekly lab session, and graded weekly lab programming assignments. I also prepared and gave two lectures during the semester.
- 2014 - 2015 **Tutor**, DePaul University.
Tutor for masters and undergraduate students in Computer Science on courses involving Python, SQL, and HTML/CSS

Media Coverage

- 02/20/2019 VA Research News Briefs, "Educational tool helps patient understand electronic health records."
https://www.research.va.gov/in_brief.cfm
- 04/11/2017 NYU Center for Data Science, "Can deep learning models learn like the human brain?"
<https://cds.nyu.edu/machine-learning-intelligence/>

Service

- 2019 **Reviewer**, NAACL, ACL, AMIA, JMIR.
- 2018 - **Co-organizer**, UMass CICS Machine Learning and Friends Lunch..
present
- 2018 **Reviewer**, American Journal of Preventative Medicine (AJPM), American Medical Informatics Association (AMIA) Annual Symposium, Journal of Medical Internet Research (JMIR).
- 2017 **Reviewer**, Journal of Medical Internet Research (JMIR).
- 2014 - 2015 **Graduate Ambassador**, DePaul University.
Spoke with prospective graduate students about DePaul and the MS program.