

John P. Lalor

✉ john.lalor@nd.edu

🌐 <http://nd.edu/~jllalor1/>

Employment History

- 2020 – present 📌 **Assistant Professor.** IT, Analytics, and Operations Department, University of Notre Dame Mendoza College of Business
Computer Science and Engineering Department (concurrent), College of Engineering
Department of Medicine (adjunct), Indiana University School of Medicine South Bend
- 2019 📌 **Instructor.** IT, Analytics, and Operations Department, University of Notre Dame Mendoza College of Business
- 2017 – 2018 📌 **Applied Scientist Intern.** Amazon Alexa, Cambridge, MA
- 2016 📌 **Research Intern.** ESPN Advanced Technology Group, Bristol, CT
- 2013 – 2015 📌 **Software Developer.** Eze Software Group, Chicago, IL
- 2011 – 2013 📌 **Advisory Associate.** KPMG, Chicago, IL




Education

- 2020 📌 **Ph.D. Computer Science, University of Massachusetts, Amherst**
Thesis title: Learning Latent Characteristics of Data and Models using Item Response Theory.
Advisor: Dr. Hong Yu
- 2015 📌 **M.Sc. Computer Science, DePaul University**
- 2011 📌 **B.B.A. IT Management, University of Notre Dame**
Minor: Irish Language and Literature







Research Publications

Journal Articles

- [J1] **John P Lalor**, Ahmed Abbasi, Kezia Oketch, Yi Yang, and Nicole Forsgren. “Should Fairness be a Metric or a Model? A Model-based Framework for Assessing Bias in Machine Learning Pipelines”. In: *ACM Transactions on Information Systems* (2024). Selected for presentation at ACM SIGIR (approximately 10-12% of annual TOIS publications are invited). 🌐 URL: <https://dl.acm.org/doi/full/10.1145/3641276>.
- [J2] Hani Safadi, **John P Lalor**, and Nicholas Berente. “The Effect of Bots on Human Interaction in Online Communities”. In: *MIS Quarterly (forthcoming)* (2024).
- [J3] **John P Lalor** and Pedro Rodriguez. “py-irt: A Scalable Item Response Theory Library for Python”. In: *INFORMS Journal on Computing* 35.1 (2023), pp. 5–13. 🌐 URL: <https://pubsonline.informs.org/doi/abs/10.1287/ijoc.2022.1250>.
- [J4] **John P Lalor**, Hao Wu, Kathleen M Mazor, and Hong Yu. “Evaluating the Efficacy of NoteAid on EHR Note Comprehension among US Veterans through Amazon Mechanical Turk”. In: *International Journal of Medical Informatics* 172 (2023), p. 105006. 🌐 URL: <https://www.sciencedirect.com/science/article/abs/pii/S1386505623000230>.
- [J5] Kaitlin D Wowak, **John P Lalor**, Sriram Somanchi, and Corey Angst. “Business Analytics in Healthcare: Past, Present, and Future Trends”. In: *Manufacturing and Service Operations Management* 25.3 (2023), pp. 975–995. 🌐 URL: <https://pubsonline.informs.org/doi/full/10.1287/msom.2023.1192>.

- [J6] **John P Lalor**, Wen Hu, Matthew Tran, Hao Wu, Kathleen M Mazor, and Hong Yu. "Evaluating the Effectiveness of NoteAid in a Community Hospital Setting: Randomized Trial of Electronic Health Record Note Comprehension Interventions With Patients". In: *Journal of Medical Internet Research* 23.5 (2021), e26354.  URL: <https://www.jmir.org/2021/5/e26354/>.
- [J7] Jinying Chen, **John P Lalor**, Weisong Liu, Emily Druhl, Edgard Granillo, Varsha G Vimalananda, and Hong Yu. "Detecting Hypoglycemia Incidents Reported in Patients' Secure Messages: Using Cost-Sensitive Learning and Oversampling to Reduce Data Imbalance". In: *Journal of Medical Internet Research* 21.3 (2019).  URL: <https://www.jmir.org/2019/3/e11990/>.
- [J8] **John P Lalor**, Beverly Woolf, and Hong Yu. "Improving Electronic Health Record Note Comprehension with Noteaid: Randomized Trial of Electronic Health Record Note Comprehension Interventions with Crowdsourced Workers". In: *Journal of Medical Internet Research* 21.1 (2019), e10793.  URL: <https://www.jmir.org/2019/1/e10793/>.
- [J9] **John P Lalor**, Hao Wu, Li Chen, Kathleen M Mazor, and Hong Yu. "ComprehENotes, an Instrument to Assess Patient Reading Comprehension of Electronic Health Record Notes: Development and Validation". In: *Journal of Medical Internet Research* 20.4 (2018), e9380.  URL: <https://www.jmir.org/2018/4/e139/>.

Conference Proceedings

- [C1] **John P Lalor**, Corey Angst, Fred Nwanganga, and John D'Arcy. "It's Not What You Say, It's How You Say It: How Cultural Dimensions Impact GDPR Fine Summaries". In: *Academy of Management Annual Meeting*. 2024.
- [C2] Xiaojing Duan and **John P Lalor**. "H-COAL: Human Correction of AI-Generated Labels for Biomedical Named Entity Recognition". In: *Conference on Information Systems and Technology (CIST)*. 2023.  URL: <https://arxiv.org/abs/2311.11981>.
- [C3] **John P Lalor**. "Ranking Pull Requests in Open Source Software". In: *Academy of Management Annual Meeting*. 2023.
- [C4] **John P Lalor**, Yi Yang, Kendall Smith, Nicole Forsgren, and Ahmed Abbasi. "Benchmarking Intersectional Biases in NLP". In: *Proceedings of the 2022 Annual Conference of the North American Chapter of the Association for Computational Linguistics*. Association for Computational Linguistics, 2022.  URL: <https://aclanthology.org/2022.naacl-main.263/>.
- [C5] Ahmed Abbasi, David Dobolyi, **John P Lalor**, Richard G Netemeyer, Kendall Smith, and Yi Yang. "Constructing a Psychometric Testbed for Fair Natural Language Processing". In: *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing*. Authors listed alphabetically. 2021, pp. 3748–3758.  URL: <https://aclanthology.org/2021.emnlp-main.304/>.
- [C6] Nicholas Berente, **John P Lalor**, Sriram Somanchi, and Ahmed Abbasi. "The Illusion of Certainty and Data-Driven Decision Making in Emergent Situations". In: *International Conference on Information Systems (ICIS)*. 2021.  URL: https://aisel.aisnet.org/icis2021/gen_topics/gen_topics/10/.
- [C7] Pedro Rodriguez, Joe Barrow, Alexander Miserlis Hoyle, **John P Lalor**, Robin Jia, and Jordan Boyd-Graber. "Evaluation Examples Are Not Equally Informative: How Should That Change NLP Leaderboards?" In: *Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing (Volume 1: Long Papers)*. 2021, pp. 4486–4503.  URL: <https://aclanthology.org/2021.acl-long.346/>.
- [C8] Hani Safadi, **John P Lalor**, and Nicholas Berente. "The Effect of Bots on Human Interaction in Online Communities". In: *International Conference on Information Systems (ICIS)*. 2021.  URL: https://aisel.aisnet.org/icis2021/ai_business/ai_business/1/.

- [C9] **John P Lalor** and Hong Yu. "Dynamic Data Selection for Curriculum Learning via Ability Estimation". In: *Findings of the Association for Computational Linguistics: EMNLP 2020*. Vol. 2020. 2020, p. 545.  URL: <https://aclanthology.org/2020.findings-emnlp.48/>.
- [C10] **John P Lalor**, Hao Wu, and Hong Yu. "Learning Latent Parameters without Human Response Patterns: Item Response Theory with Artificial Crowds". In: *Proceedings of the Conference on Empirical Methods in Natural Language Processing. Conference on Empirical Methods in Natural Language Processing*. Vol. 2019. 2019, p. 4240.  URL: <https://aclanthology.org/D19-1434/>.
- [C11] Jinying Chen, **John P Lalor**, and Hong Yu. "Detecting Hypoglycemia Incidents from Patients' Secure Messages". In: *American Medical Informatics Association (AMIA) Annual Symposium*. 2018.
- [C12] **John P Lalor**, Hao Wu, Tsendsuren Munkhdalai, and Hong Yu. "Understanding Deep Learning Performance through an Examination of Test Set Difficulty: A Psychometric Case Study". In: *Proceedings of the Conference on Empirical Methods in Natural Language Processing. Conference on Empirical Methods in Natural Language Processing*. Vol. 2018. 2018, p. 4711.  URL: <https://aclanthology.org/D18-1500/>.
- [C13] **John P Lalor**, Hao Wu, and Hong Yu. "Building an Evaluation Scale Using Item Response Theory". In: *Proceedings of the Conference on Empirical Methods in Natural Language Processing. Conference on Empirical Methods in Natural Language Processing*. Vol. 2016. 2016, p. 648.  URL: <https://aclanthology.org/D16-1062/>.
- [C14] Craig Miller, Amber Settle, and **John P Lalor**. "Learning Object-Oriented Programming in Python: Towards an Inventory of Difficulties and Testing Pitfalls". In: *Proceedings of the 16th Annual Conference on Information Technology Education*. 2015.  URL: <https://dl.acm.org/doi/10.1145/2808006.2808017>.
- [C15] Amber Settle, **John P Lalor**, and Theresa Steinbach. "A Computer Science Linked-Courses Learning Community". In: *Proceedings of the 2015 ACM Conference on Innovation and Technology in Computer Science Education*. 2015, pp. 123–128.  URL: <https://dl.acm.org/doi/10.1145/2729094.2742621>.
- [C16] Amber Settle, **John P Lalor**, and Theresa Steinbach. "Evaluating a Linked-Courses Learning Community for Development Majors". In: *Proceedings of the 16th Annual Conference on Information Technology Education*. 2015, pp. 127–132.  URL: <https://dl.acm.org/doi/10.1145/2808006.2808031>.
- [C17] Amber Settle, **John P Lalor**, and Theresa Steinbach. "Reconsidering the Impact of CS1 on Novice Attitudes". In: *Proceedings of the 46th ACM Technical Symposium on Computer Science Education*. 2015, pp. 229–234.  URL: <https://dl.acm.org/doi/10.1145/2676723.2677235>.

Research Projects

Under Review/Revision

- [UR1] Ahmed Abbasi, Faizan Ahmad, **John P Lalor**, and Daniel Zeng. *MoveCast: Modeling Spatio-Temporal Movements Using Graph Neural Networks*. Under review (1st round) at IEEE Transactions on Pattern Analysis and Machine Intelligence.
- [UR2] Yixing Chen, John Costello, **John P Lalor**, Wenchang Li, and Robert Guo. *Advancing the Design of Reputation and Feedback Systems in Education: A Field Experiment on Multidimensional Ratings*. Under review (2nd round) at MIS Quarterly.
- [UR3] **John P Lalor**, Ishita Chakraborty, and Vamsi Kanuri. *Extracting Style from Social Media Content to Predict Engagement*. Under review (1st round) at Journal of Marketing Research.
- [UR4] **John P Lalor**, David Levy, Harmon Jordan, Jenni Smirnova, and Hong Yu. *Evaluating Expert-Layperson Agreement in Identifying Jargon Terms in Electronic Health Record Notes: An Observational Study*. Under review (2nd round) at JMIR.

- [UR5] David Levy, Harmon Jordan, **John P Lalor**, Jenni Smirnova, and Hong Yu. *Individual Factors That Affect Laypeople's Understanding of Definitions of Medical Jargon*. Revise and resubmit (after 1st round) at Health Policy and Technology.
- [UR6] Mareike Mohlmann, **John P Lalor**, Yoon Son, and Nicholas Berente. *Inflation in Reputation Systems? Newcomers, Veterans, and Socialization into a Platform Context*. Major revision (after 2nd round) at Information Systems Research.
- [UR7] Yi Yang, Hanyu Duan, Ahmed Abbasi, **John P Lalor**, and Kar Yan Tam. *Bias Ahead? A Unified Bias Analysis Framework for Transformer-Based Language Models*. Under review at ACL ARR.  URL: <https://arxiv.org/abs/2311.10395>.
- [UR8] Yi Yang, **John P Lalor**, Ahmed Abbasi, and Daniel Zeng. *Hierarchical Deep Document Model*. Under review (2nd round) at IEEE Transactions on Knowledge and Data Engineering.
- [UR9] Shuang Zheng, **John P Lalor**, Yixing Chen, and Lei Wang. *The Matthew Effect in Recommender Systems: Dynamics, Methodology, and Impact*. Under review (1st round) at Marketing Science.



Working Papers

- [WP1] **John P Lalor**, Corey Angst, Fred Nwanganga, and John D'Arcy. *It's Not What You Say, It's How You Say It: How Cultural Dimensions Impact GDPR Fine Summaries*. Target: MIS Quarterly.
- [WP2] **John P Lalor**, Hong Guo, Nicholas Berente, Ahmed Abbasi, and Jan Recker. *Measuring Algorithmic Interpretability: A Human-Learning-Based Framework and the Corresponding Cognitive Complexity Score*. Target: Information Systems Research.
- [WP3] **John P Lalor** and Hong Yu. *Learning Difficulties for Curriculum Learning*. Status: Reject and resubmit, Journal of Machine Learning Research.

Projects


- [P1] **John P Lalor** and René Just. *Ranking Pull Requests in Open-Source Software*. Target: Information Systems Research.
- [P2] Zifeng Zhao, Shawn Qu, **John P Lalor**, and Ahmed Abbasi. *Learning from the Curve: Predicting Successful Projects Using Functional PCA*. Target: Information Systems Research.

Other Talks/Presentations


- [T1] Wenchang Li, Yixing Chen, Shuang Zheng, Lei Wang, and **John P Lalor**. "Stars Are All You Need: A Distantly Supervised Pyramid Network for Unified Sentiment Analysis". In: *Proceedings of the Ninth Workshop on Noisy and User-generated Text (W-NUT 2024)*. 2024, pp. 104–118.  URL: <https://aclanthology.org/2024.wnut-1.10/>.
- [T2] **John P Lalor**. "On-the-Fly Difficulty Estimation for Deep Neural Networks". In: *INFORMS Annual Meeting*. 2022.
- [T3] Pedro Rodriguez, Phu Mon Htut, **John P Lalor**, and João Sedoc. "Clustering Examples in Multi-Dataset Benchmarks with Item Response Theory". In: *Proceedings of the Third Workshop on Insights from Negative Results in NLP*. 2022, pp. 100–112.  URL: <https://aclanthology.org/2022.insights-1.14/>.
- [T4] **John P Lalor** and Hong Guo. "Measuring Algorithmic Interpretability". In: *INFORMS Annual Meeting*. 2021.
- [T5] **John P Lalor**, Wen Hu, Matthew Tran, Kathleen Mazor, and Hong Yu. "Does Defining Medical Jargon In A Community Hospital Setting Improve Comprehension?" In: *INFORMS Healthcare Conference*. 2021.

- [T6] **John P Lalor**, Nicholas Berente, and Hani Safadi. "Bots versus Humans in Online Social Networks: A Study of Reddit Communities". In: *INSNA Sunbelt Conference*. 2020.
- [T7] **John P Lalor** and Hong Guo. "Towards Measuring Algorithmic Interpretability". In: *INFORMS Workshop on Data Science*. 2020.
- [T8] Ming-Cheng Ma and **John P Lalor**. "An Empirical Analysis of Human-Bot Interaction on Reddit". In: *Proceedings of the Sixth Workshop on Noisy User-generated Text (W-NUT 2020)*. 2020, pp. 101–106.  URL: <https://aclanthology.org/2020.wnut-1.14/>.
- [T9] Eunah Cho, He Xie, **John P Lalor**, Varun Kumar, and William M Campbell. "Efficient Semi-Supervised Learning for Natural Language Understanding by Optimizing Diversity". In: *ASRU 2019: the IEEE Automatic Speech Recognition and Understanding Workshop*. 2019.  URL: <https://arxiv.org/abs/1910.04196>.
- [T10] **John P Lalor**, Hao Wu, and Hong Yu. "Comparing Human and DNN-Ensemble Response Patterns for Item Response Theory Model Fitting". In: *Workshop on Cognitive Modeling and Computational Linguistics (CMCL)*. 2019.
- [T11] **John P Lalor**, Hao Wu, and Hong Yu. "Learning Latent Parameters without Human Response Patterns: Item Response Theory with Artificial Crowds". In: *Workshop on Shortcomings in Vision and Language (SiVL)*. 2019.
- [T12] Jinying Chen, **John P Lalor**, and Hong Yu. "Detecting Hypoglycemia Incidents from Patients' Secure Messages". In: *American Medical Informatics Association (AMIA) Annual Symposium*. 2018.
- [T13] **John P Lalor**, Hao Wu, and Hong Yu. "Modeling Difficulty to Understand Deep Learning Performance". In: *Northern Lights Deep Learning Workshop (NLDL)*. 2018.
- [T14] **John P Lalor**, Hao Wu, and Hong Yu. "Soft Label Memorization-Generalization for Natural Language Inference". In: *UAI Workshop on Uncertainty in Deep Learning*. 2018.  URL: <https://arxiv.org/abs/1702.08563v3>.
- [T15] **John P Lalor**, Hao Wu, Li Chen, Kathleen Mazor, and Hong Yu. "Generating a Test of Electronic Health Record Narrative Comprehension with Item Response Theory". In: *American Medical Informatics Association (AMIA) Annual Symposium*. 2017.
- [T16] **John P Lalor**, Hao Wu, and Hong Yu. "CIFT: Crowd-Informed Fine-Tuning to Improve Machine Learning Ability". In: *Human Computation and Crowdsourcing (HCOMP)*, *arXiv preprint arXiv:1702.08563*. 2017.  URL: <https://arxiv.org/abs/1702.08563v2>.
- [T17] Tsendsuren Munkhdalai, **John P Lalor**, and Hong Yu. "Citation Analysis with Neural Attention Models". In: *Workshop on Health Text Mining and Information Analysis*. 2016.  URL: <https://aclanthology.org/W16-6109/>.

Awards and Achievements

- 2022  **Zac Plantz Memorial Achievement Award**, IT, Analytics, and Operations Department, Mendoza College of Business, University of Notre Dame.
- 2021  **ICIS Best Theory Paper**, The Effect of Bots on Human Interaction in Online Communities.

Research Support

- 2020 – 2021  PI. "Development and validation of a multidimensional mental health screening instrument." Atlantic Coast Conference Innovation Initiative. \$5,500

Research Support (continued)

- Subaward recipient. "Resource Curation and Evaluation for EHR Note Comprehension." National Library of Medicine. \$10,000
- 2020 PI. "Towards Automatic Generation of Electronic Health Record Note Comprehension Questions." Notre Dame Faculty Research Support Program - Initiation Grant. \$10,000

Tutorials and Talks


- 05/2024 AI and Ethics: Growing the Good in Business, *Notre Dame Tech Forum*, invited panelist
- 03/2022 UT Austin PhD Seminar, invited lecturer
- Item Response Theory for Natural Language Processing, Notre Dame NL+ seminar
- 10/2020 Dynamic Data Selection for Curriculum Learning via Ability Estimation. *Notre Dame Data, Inference, Analysis, and Learning Lab*.
- 09/2019 Learning Latent Parameters Without Human Response Patterns: Item Response Theory with Artificial Crowds. *Notre Dame Department of Computer Science and Engineering Seminar Series*.
- 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.
- 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

University of Notre Dame


- 2022- ITAO 80810: Machine Learning and Natural Language Processing
PhD students in Business Analytics
- MSSA 60230: Data Analysis with Python
Masters-level students
- 2019- ITAO 40250: Unstructured Data Analytics
Advanced undergraduate students

Teaching (continued)

2019-2022  **ITAO 70810: Data Wrangling with R**
Masters-level students

University of Massachusetts Amherst

Fall 2018  UMass Lowell Data Science Lecture Series University of Massachusetts Lowell


 CICS First Year Seminar University of Massachusetts Amherst

2015  Introduction to Computer Science, Amherst College Amherst, MA
Teaching Assistant

Advising

Thesis Committee Member


2022  Phu Mon Htut, PhD, Computer Science, New York University

2021  Pedro Rodriguez, PhD, Computer Science, University of Maryland College Park


Research Supervisor


2021-2023  Yu Chu Huang, MS, Business Analytics


 Kaitlin Ryan, MS, Business Analytics

2021  Aiden McFadden, BBA, Business Analytics

2020-2021  Keagan McLaughlin, BBA, Business Analytics

2019  Vincent Buono, BBA, Business Analytics


2019-2020  Ming-Cheng Ma, MS, Business Analytics

2018  Long Le, BS, Computer Science





2017-2018  Nikhil Titus, MS, Computer Science

Other Advising

2018  UMass CICS Industry Mentor Program Research Mentor




2014 - 2015  DePaul University Computer Science Tutor

Media Coverage





- Spring 2023  “Research - Single-Sourcing is Better Patient Care.” <https://bizmagazine.nd.edu/issues/2023/spring-2023/research-single-sourcing-is-better-patient-care/>
- 07/20/2021  Mendoza News, “Artificial intelligence tool could increase patient health literacy, study shows.” <https://mendoza.nd.edu/news/ai-tool-increases-health-literacy/>
- 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

Program Committees

- 2023  Area Editor
ACL, ICIS
- 2022  Session Chair
INFORMS Annual Meeting
-  Senior Program Committee
SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)

Conference Reviewing

-  ACL Rolling Review (ARR), Rep4NLP, Workshop on Insights from Negative Results in NLP, ACL Workshop on Representation Learning for NLP (RepL4NLP), Pacific Asia Conference on Information Systems (PACIS), Workshop on Dynamic Adversarial Data Collection (DADC)
- 2021  North American Chapter of the Association of Computational Linguistics (NAACL), International Conference on Information Systems (ICIS), Association of Computational Linguistics (ACL), International Conference on Design Science Research in Information Systems and Technology (DESIST)
- 2020  International Conference on Information Systems (ICIS), Association of Computational Linguistics (ACL), Empirical Methods in Natural Language Processing (EMNLP), American Medical Informatics Association (AMIA), ACL Workshop on Representation Learning for NLP (RepL4NLP), Asia-Pacific Chapter of the Association for Computational Linguistics (AACL)
- 2019  North American Chapter of the Association of Computational Linguistics (NAACL), Association of Computational Linguistics (ACL), Empirical Methods in Natural Language Processing (EMNLP), American Medical Informatics Association (AMIA), The SIGNLL Conference on Computational Natural Language Learning (CoNLL)

Service (continued)

Journals I've Reviewed For

- MIS Quarterly, Information Systems Research (ISR), Management Science, IEEE Intelligent Systems, Journal of the Association for Information Systems (JAIS), American Journal of Preventative Medicine (AJPM), Journal of Medical Internet Research (JMIR), Journal of the American Medical Informatics Association (JAMIA)

Additional Service

- 2020 - ■ Co-organizer Notre Dame NL+ Natural Language Processing Lunch Seminar.
- 2018 - 2019 ■ Co-organizer UMass CICS Machine Learning and Friends Lunch.
- 2014 - 2015 ■ Graduate Ambassador DePaul University

Last Updated: June 2024