

# 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, Yi Yang, Kezia Oketch, 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 (accepted)* (2024).
- [J2] Hani Safadi, **John P Lalor**, and Nicholas Berente. “The Effect of Bots on Human Interaction in Online Communities”. In: *MIS Quarterly (accepted) (UTD-24)* (2024).
- [J3] **John P Lalor** and Pedro Rodriguez. “py-irt: A Scalable Item Response Theory Library for Python”. In: *INFORMS Journal on Computing (UTD-24)* 35.1 (2023), pp. 5–13.
- [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 (Impact factor: 4.9)* 172 (2023), p. 105006.
- [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 (UTD-24)* 25.3 (2023), pp. 975–995.
- [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 (Impact factor: 7.4)* 23.5 (2021), 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* (**Impact factor: 7.4**) 21.3 (2019).
- [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* (**Impact factor: 7.4**) 21.1 (2019), 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* (**Impact factor: 7.4**) 20.4 (2018), e9380.

## Conference Proceedings

- [C1] 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.
- [C2] **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.
- [C3] 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.
- [C4] 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.
- [C5] 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.
- [C6] 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.
- [C7] 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.
- [C8] **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.
- [C9] 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.
- [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.

- [C11] **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.
- [C12] **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.
- [C13] 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.
- [C14] 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.
- [C15] 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.
- [C16] 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.

## Research Projects

### Under Review/Revision

- [UR1] Yixing Chen, **John P Lalor**, Wenchang Li, and Robert Guo. *Advancing the Design of Reputation and Feedback Systems in Education: A Field Experiment on Multidimensional Ratings*. Major revision (after 1st round) at MIS Quarterly. First two authors contributed equally.
- [UR2] David Levy, Harmon Jordan, **John P Lalor**, Jenni Smirnova, and Hong Yu. *Evaluating Expert-Layperson Agreement in Identifying Jargon Terms in Electronic Health Record Notes*. Under review (1st round) at Health Policy and Technology.
- [UR3] Wenchang Li, Yixing Chen, Qiangming Yan, and **John P Lalor**. *End-to-End Sentiment Analysis with a Distantly Supervised Pyramid Network*. Status: Under review at EACL 2024.
- [UR4] Mareike Mohlmann, **John P Lalor**, Yoon Son, and Nicholas Berente. *Inflation in Reputation Systems? Newcomers, Veterans, and Socialization into a Platform Context*. Under review (2nd round) at Information Systems Research.
- [UR5] Yi Yang, **John P Lalor**, Ahmed Abbasi, and Daniel Zeng. *Hierarchical Deep Document Model*. Major revision (after 1st round) at IEEE Transactions on Knowledge and Data Engineering.

### Working Papers

- [WP1] Hanyu Duan, Yi Yang, Ahmed Abbasi, **John P Lalor**, and Kar Yan Tam. *Bias Ahead? A Unified Bias Analysis Framework for Transformer-Based Language Models*.
- [WP2] **John P Lalor**, Hong Guo, Nicholas Berente, and Ahmed Abbasi. *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.

- [WP4] Shuang Zheng, **John P Lalor**, Yixing Chen, and Lei Wang. *The Matthew Effect in Recommender Systems: Dynamics, Methodology, and Impact*. Target: Marketing Science.

## Projects

- [P1] **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.
- [P2] **John P Lalor**, Ishita Chakraborty, and Vamsi Kanuri. *Extracting Style from Social Media Content to Predict Engagement*. Target: Marketing Science.
- [P3] **John P Lalor** and René Just. *Ranking Pull Requests in Open-Source Software*. Target: Information Systems Research.
- [P4] 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] **John P Lalor**. *Ranking Pull Requests in Open Source Software*. 83rd Annual Meeting of the Academy of Management. 2023.
- [T2] **John P Lalor**. *On-the-Fly Difficulty Estimation for Deep Neural Networks*. 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.
- [T4] **John P Lalor** and Hong Guo. *Measuring Algorithmic Interpretability*. 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?* 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*. INSNA Sunbelt Conference. 2020.
- [T7] **John P Lalor** and Hong Guo. *Towards Measuring Algorithmic Interpretability*. 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.
- [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*. ASRU 2019: the IEEE Automatic Speech Recognition and Understanding Workshop. 2019.
- [T10] **John P Lalor**, Hao Wu, and Hong Yu. *Comparing Human and DNN-Ensemble Response Patterns for Item Response Theory Model Fitting*. 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*. 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*. American Medical Informatics Association (AMIA) Annual Symposium. 2018.
- [T13] **John P Lalor**, Hao Wu, and Hong Yu. *Modeling Difficulty to Understand Deep Learning Performance*. Northern Lights Deep Learning Workshop (NLDL). 2018.

- [T14] **John P Lalor**, Hao Wu, and Hong Yu. *Soft Label Memorization-Generalization for Natural Language Inference*. UAI Workshop on Uncertainty in Deep Learning. 2018.
- [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*. 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*. Human Computation and Crowdsourcing (HCOMP), arXiv preprint arXiv:1702.08563. 2017.
- [T17] Tsendsuren Munkhdalai, **John P Lalor**, and Hong Yu. *Citation Analysis with Neural Attention Models*. Workshop on Health Text Mining and Information Analysis. 2016.







## 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
-  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

- 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*.

## Tutorials and Talks (continued)





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- 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

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### 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
- 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

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### 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

## Advising (continued)

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- 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




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- 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](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

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### 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)

## Service (continued)

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### 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 (DESRIST)
- 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)

### 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: January 2024