Alexander T. J. Barron

CONTACT INFORMATION

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EDUCATION

School of Informatics, Computing, and Engineering, Indiana University, Bloomington, USA
Ph.D. in Informatics, Complex System track May 2022
- Advisor: Johan Bollen

University of New Mexico, Albuquerque, New Mexico, USA
B.S. double major in Physics and Applied Mathematics August 2011

RESEARCH INTERESTS

Cultural innovation
- Developing measurements of innovation and the *effectiveness* of innovation on new content in different contexts. Application of this approach in multiple cultural domains, including language, music, and visual artforms.

Identity, social group formation, and language use.
- Does identity inspire group formation, or vice versa? Measurement of these concepts using language as data.

SKILLS

- **Languages**: Python, R, Matlab, Bash
- **Python tools**: numba, IPython, Jupyter notebook, pandas, scipy, numpy, matplotlib, scikit-learn, statsmodels, gensim, NLTK, Stanford NLP suite, others as necessary
- **Databases**: mongodb, MySQL, SQLite
- **Algorithms/techniques**: natural language processing, data mining, information-theoretical tools, sentiment analysis, nonparametric statistics, regression, machine learning
- **Other**: Git, Github, *NIX systems, Gephi, LaTeX
- **Most importantly**: Jazz Drumset (since 7 years old!)

PUBLICATIONS

Journals

Alexander T. J. Barron, Johan Bollen. (2022). Quantifying collective identity online from self-defining hashtags. *Scientific Reports*, 12, 15044.

Johan Bollen, Marijn Ten Thij, Fritz Breithaupt, **Alexander T. J. Barron**, Lauren A Rutter, Lorenzo Lorenzo-Luaces, Marten Scheffer. (2021). Reply to Schmidt et al.: A robust surge of cognitive distortions in historical language. *Proceedings of the National Academy of Sciences*, 118 (45).

Johan Bollen, Marijn Ten Thij, Fritz Breithaupt, **Alexander T. J. Barron**, Lauren A Rutter, Lorenzo Lorenzo-Luaces, Marten Scheffer. (2021). Historical language records reveal a surge of cognitive distortions in recent decades. *Proceedings of the National Academy of Sciences*, 118 (30).

Alexander T. J. Barron, Jenny Huang, Rebecca L. Spang, Simon DeDeo. (2018). Individuals, institutions, and innovation in the debates of the French Revolution. *Proceedings of the National Academy of Sciences*, 115 (18).
- (This research won the 2018 Cozzarelli prize in Behavioral and Social Sciences, and was covered by multiple media including Christian Science Monitor, Ars Technica, and MIT Technology Review)

Rui Fan, Ali Varamesh, Onur Varol, **Alexander T. J. Barron**, Ingrid A. van de Leemput, Marten Scheffer, Johan Bollen. (2018). The minute-scale dynamics of online emotions reveal the effects of affect labeling. Nature Human Behavior, 20 (1).

Conference Presentations

Alexander T. J. Barron and Johan Bollen. *Social Media Analysis Bias Due to Performative Self-identification*. Data and Algorithm Bias Workshop, Conference on Information and Knowledge Management 2017, Singapore.

Alexander T. J. Barron and Johan Bollen. *Developing a Moral NLP Toolkit*. Conference on Complex Systems 2017, Cancún, Mexico.

Alexander T. J. Barron, Jenny Huang, and Simon DeDeo. *Speech Innovation During the French Revolution*. Conference on Complex Systems 2015, Phoenix, AZ.

Alexander T. J. Barron, Emilio Ferrara, Giovanni Ciampaglia, Alessandro Flammini. *Price, Popularity, and Growth Dynamics of Bitcoin*. Computational Approaches to Social Modeling Satellite, Websci 2014, Bloomington, IN.

Posters

Alexander T. J. Barron, Jenny Huang, Rebecca L. Spang. *Speech Innovation During the French Revolution*. Conference on Complex Systems 2015, Phoenix, AZ.

- (This poster won Honorable Mention in the Language, Linguistics, Cognition and Social Ecology Track)

Employment History

Associate Instructor 2020-2022

IU School of Informatics, Computing, and Engineering

- *Informatics Capstone*: assisted teams of undergraduates conceptualize, plan, execute, and publish capstone projects incorporating database and code management, security, ethics, and web design.
- *Information Infrastructure II*: assisted teaching introductory Python and unix tools focused on harvesting data from the web and elementary dynamic webpage generation.

Research Assistant 2014-2020

IU School of Informatics, Computing, and Engineering

- analyzing Twitter and Reddit content, part of the DARPA Next Generation Social Science grant. We study the interplay between identity and group formation, focusing on word use and adoption, sentiment analysis, word embeddings, and Moral Foundations Theory (with Johan Bollen).
- developed information-theoretical tools to measure novelty and resonance of political speeches in parliament during the French Revolution, resulting in measurement of individual and group power dynamics (with Simon DeDeo).
- parsed the Bitcoin block chain and developed an indicator of anonymity-conscious decision-making by entities using Bitcoin (with Alessandro Flammini).

Associate Instructor 2012-2014

IU School of Informatics and Computing

- *Research Methods in Informatics: Large-scale Social Phenomena*: assisted in covering a number of quantitative techniques for measuring social information, including: information theory, measuring "distance" between social groups' texts using information-theoretical tools, introductory game theory, probability (and Bayesian interpretation), social status using PageRank. Responsibilities also included coaching students in Python.
- *Mathematical Foundations of Informatics*: ran supplementary lectures/labs and graded for a wide selection of foundational and discrete mathematics: mathematical logic, proofs, induction, sets, functions, formal languages and strings, finite state machines, graph theory, graph algorithms.

Student Technical Specialist 2007-2011

UNM Department of Physics and Astronomy

- I worked with the PHENIX Collaboration on multiple aspects of the silicon-based Forward Vertex (FVTX) particle detector at Brookhaven National Laboratory:
  - creation of a custom detector control GUI in Python
  - constructing test instruments for silicon detectors, subsequently testing them
  - constructing test apparatus for developing FPGA-based electronics and code
  - on-site and clean room work at Fermilab, Brookhaven, and Los Alamos National Laboratories

AWARDS, GRANTS AND HONORS

- 2021: Excellence in Teaching Assistance Award at IU Luddy School of Informatics, Computing, and Engineering.
- 2019 and 2020: Summer Affiliate of the NSF Research Traineeship award in Complex Networks and Systems. Total amount: $10,000.
- 2019: CNetS PhD Award. "In recognition of leadership and service to the welfare of the Center for Complex Networks and Systems Research and the School at large and of excellence in academic achievement." School of Informatics, Computing, and Engineering, Indiana University, USA. Amount: $500.
- 2019: **Winner of the Cozzarelli Prize in Behavioral and Social Sciences for 2018**, one of six such yearly prizes reflecting "scientific excellence and originality" from the National Academy of Sciences, USA.
- 2015: Poster Honorable Mention in Language, Linguistics, Cognition and Social Ecology Track and CCS'15. Amount: $200.
- 2006-2010: UNM Regents' Scholarship awardee: a competitive award that includes leadership within the school and a renewable scholarship covering tuition, expenses, and stipend. Amount: more than $10,000 combined over 4 years.
- 2006: Louis Armstrong award for jazz drumset.
- 2005: New Mexico Jazz All-state band position winner.