Lu Liu

CONTACT INFORMATION

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RESEARCH INTEREST

My research interest is science of science, an interdisciplinary approach that uses tools from complex networks and data mining to explore the opportunities offered by the recent data explosion in science. In particular, my research project aims to understand the individual career trajectories from large-scale scholar datasets.

EDUCATION

Ph.D., Information Sciences and Technology, Pennsylvania State University, University Park, PA, USA — Augest 2015 to present
Advisor: Dr. C. Lee Giles

Predoctoral Fellow, Kellogg School of Management, Northwestern University, Evanston, IL, USA — May 2017 to present
Advisor: Dr. Dashun Wang

Complex System Summer School, Santa Fe Institute, Santa Fe, NM, USA — July 2016

M.S., Physics, Fudan University, Shanghai, China — May 2015

B.S., Physics, Fudan University, Shanghai, China — May 2012

PUBLICATIONS

- **L. Liu**, Y. Wang, R. Sinatra, C. L. Giles, C. Song, and D. Wang (2018). Hot streaks in artistic, cultural, and scientific careers. *Nature*, 559 (7714), p.396.
- Athar Sefid, Jian Wu, Jing Zhao, **Lu Liu**, Allen Ge, Cornelia Caragea, Prasenjit Mitra, and C. Lee Giles (2019). Cleaning Noisy and Heterogeneous Metadata for Record Linking Across Scholarly Big Datasets. *IAAI*, (in press).
- **L. Liu**, J. R. Wei, and J. P. Huang (2013). Scaling and volatility of breakouts and breakdowns in stock price dynamics. *PLoS One*, volume 8, e82771.
- **L. Liu**, J. R. Wei, H. S. Zhang, J. H. Xin, and J. P. Huang. (2013). Statistical physics view of pitch fluctuations in the classical music from Bach to Chopin: Evidence for scaling. *PLoS One*, volume 8, e58710.
- J. P. Huang, **L. Liu**, et al. (2015) Prediction: Pure Technical Analysis Might not Work Satisfactorily, Experimental Econophysics: Properties and Mechanisms of Laboratory Markets Berlin Heidelberg, Berlin, Heidelberg (Book Chapter)

RESEARCH AND PROJECT

Northwestern University, Evanston, IL, USA

Understanding hot streaks in creative careers — Augest 2018 to present

- Conducted time series analyses and developed mathematical techniques to infer the parameters for the hot-streak model

Pennsylvania State University, University Park, PA, USA

Modeling individual career trajectories — Aguest 2015 – October 2017

- Conducted Big Data analysis and time series analyses on creative careers with large-scale publication and auction data.
- Developed computational and mathematical techniques to quantify the dynamical regularities of individual careers

Interpreting predictions of deep neural networks — August - December 2017

- Researched techniques of activation maximization, feature erasure and local/global approximation to understand the predictions of deep neural networks
- Implemented interpretation methods on various tasks and DNN models, including MLP and CNN on image classification, and Bi-RNN on function identification of binary sequences with PyTorch, Theano, and Keras.

Transfer-learning on automatic tag annotation — May 2017

- Researched various transfer learning techniques such as instance transfer, feature augmentation, and learning common feature space to automatically assign tags for questions on online QA forum.

Facebook check-in prediction — December 2016

- Researched various temporal and spatial features that affect individual check-in patterns, and applied KDE and XGBoost to predict Facebook check-in records.

Dig movie success from scripts — July 2016

- Conducted large-scale analysis of digitized footprints and dialogue patterns of over 5000 films spanning 50 years, and analyzed quantitative perspective on gender disparity in films.

PRESENTATIONS

- The International Conference on Computational Social Science, Amsterdam, Netherlands — July 2019
- The International School and Conference on Network Science (NetSci2017) Bloomington, IN — June 2017
- The 4th satellite on quantifying success, Bloomington, IN — June 2017
- Northwestern Institute on Complex Systems (NICO) lab meeting, Evanston, IL — June 2017
- Web of Science as a Research Dataset Workshop, Bloomington, IN — November 2016
- The International Conference on Computational Social Science, Chicago, IL — June 2016
- International Conference on Econophysics & Asia-Pacific Econophysics Conference & NESS Special Session Shanghai, China, — June 2016

TEACHING EXPERIENCE

- **Instructor** for Tutorial on Computational Science of Science, The International Conference on Computational Social Science, Amsterdam, Netherlands — July 2019
- **Teaching Assistant** for Social Dynamics & Network Analytics (MBA class), Kellogg School of Management, Northwestern University, Evanston, IL, USA — Spring 2019
- **Teaching Assistant** for Social Dynamics & Network Analytics (MBA class, Kellogg School of Management, Northwestern University, Evanston, IL, USA — Summer 2017
- **Teaching Assistant** for Network Science, College of Information Science and Technology, Pennsylvania State University, University Park, PA, USA — Spring 2016
- **Teaching Assistant** for Solid-state Physics, Physics Department, Fudan University, Shanghai, China — Spring 2014

INDUSTRY EXPERIENCE

Data Scientist Intern in Spotify, New York, NY, US. — Summer 2018

- Developed machine learning models to predict user consumption behavior in music streaming systems
- Conducted offline evaluations of recommendation algorithms with user behavior model and simulations to predict A/B testing results

HONORS AND AWARDS

- Chinese National Graduate Scholarship Fudan University, Shanghai, China — October 2014
- First Prize of Graduate Academic Scholarship Fudan University, Shanghai, China — October 2013
- The Lu Zonglin Scholarship Fudan University, Shanghai, China — October 2013
- Special Freshman Scholarship Fudan University, Shanghai, China — Augest 2012

RELEVANT COURSES

- Deep learning, data mining, machine learning, neural network, computational informatics, C programming, foundations in human-centered design (HCI), computational phycics, statistical physics

PROGRAMMING SKILLS

- Python, R, C, MATLAB, Mathematica, MySQL, PHP, Apache Solr, HTML, XML, LaTeX