

# Kai-Cheng Yang

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## CONTACT INFORMATION

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## EDUCATION

Ph.D., Informatics, Complex Systems track, Indiana University August 2017,—  
• Minor in computer science with focus on machine learning  
M.S., Theoretical Physics, Lanzhou University (China) June 2017  
B.S., Theoretical Physics, Lanzhou University (China) June 2014

## HONORS AND AWARDS

### Awards

- NSF Research Trainee scholarship in Complex Networks and Systems (\$5000), 2018

## PUBLICATIONS

### Journal Articles

- [J1] **Kai-Cheng Yang**, Onur Varol, Clayton A Davis, Emilio Ferrara, Alessandro Flammini, and Filippo Menczer. “Arming the public with artificial intelligence to counter social bots”. In: *Human Behavior and Emerging Technologies* (2019), e115. DOI: [10.1002/hbe2.115](https://doi.org/10.1002/hbe2.115).
- [J2] Brea Perry, **Kai-Cheng Yang**, Patrick Kaminski, Jaehyuk Park, Michelle Martel, Carrie Oser, Patricia Freeman, Yong-Yeol Ahn, and Jeffery Talbert. “Co-prescription network reveals social dynamics of opioid doctor shopping”. In: *Under review* (2019). DOI: [10.31235/osf.io/5v2z4](https://doi.org/10.31235/osf.io/5v2z4). SocArXiv: [5v2z4](https://arxiv.org/abs/1902.02339).
- [J3] Chengcheng Shao, Giovanni Luca Ciampaglia, Onur Varol, **Kai-Cheng Yang**, Alessandro Flammini, and Filippo Menczer. “The spread of low-credibility content by social bots”. In: *Nature communications* 9.1 (2018), p. 4787. DOI: [10.1038/s41467-018-06930-7](https://doi.org/10.1038/s41467-018-06930-7).
- [J4] **Kai-Cheng Yang**, Zhi-Xi Wu, Petter Holme, and Etsuko Nonaka. “Expansion of cooperatively growing populations: Optimal migration rates and habitat network structures”. In: *Physical Reviews E* 95 (2017), p. 012306. DOI: [10.1103/PhysRevE.95.012306](https://doi.org/10.1103/PhysRevE.95.012306).

### Workshop Papers

- [W1] **Kai-Cheng Yang**, Pik-Mai Hui, and Filippo Menczer. “Bot Electioneering Volume: Visualizing Social Bot Activity During Elections”. In: *Companion Proceedings of the 2019 World Wide Web Conference (WWW '19 Companion)*. Accepted as short presentation. San Francisco, CA, USA, May 2019. arXiv: [1902.02339](https://arxiv.org/abs/1902.02339).

## RESEARCH PROJECTS

### Spread of misinformation

This project aims to study the spread of misinformation on social media. In this project I’m (1) maintaining [Hoaxy<sup>®</sup>](https://hoaxy.com), a tool that tracks and visualizes the spread of low-credibility and fact-checking articles on Twitter; (2) revealing how social bots amplify the spread of misinformation [J3]; (3) using network science approach to identify new misinformation sources; (4) characterizing how users consume misinformation.

PI: [Filippo Menczer](#)

### Social bots

This project aims to study social bots which are algorithm controlled social media accounts that automatically post/share contents and initiate interactions with other users. In this project I'm (1) maintaining [Botometer<sup>®</sup>](#), a machine learning social bot detection tool that handles 250,000 requests every day and serves as the standard for bot detection researches [J1]; (2) developing BotometerLite, a scalable bot detection tool that is 200 times faster than Botometer, but still yields comparable results; (3) developing [Bot Electioneering Volume](#), a web application that visualizes the activity of bot-like accounts during elections [W1]; (4) conducting human subject experiments to study how humans' biases are affecting their efficacy of identifying social bots.

PI: [Filippo Menczer](#)

### Doctor shopping

Doctor shopping refers to the behavior of visiting multiple physicians to obtain controlled substance. This project aims to characterize the doctor shopping behavior for opioid drugs in response to the severe opioid crisis in US using 11 years' longitudinal medical records of over 20 million patients. In this project, I'm (1) building a pipeline that manages, cleans, wrangles the sensitive, large scale dataset for the whole team; (2) proposing new network based indicator for doctor shopping as traditional indicators have been played and become less useful [J2]; (3) using various machine learning techniques like latent variable models, embedding through deep learning to quantify and classify the patients' behavior and predict potential overdoses.

PIs: [Brea Perry](#), [Yong-Yeol Ahn](#)

### Spread of population

This project utilizes mathematical models to study the spread of population on complex networks. In this project, I modeled (1) cooperatively growing populations' expansion [J4] and catastrophic collapsing on networked habitats; (2) epidemic process of multi-partite viruses on networks.

PI: [Zhi-Xi Wu](#)

### TALKS

- Expansion of Cooperatively Growing Populations on Networks  
Chinese Physical Society Fall Meeting (Beijing, China) 09/04/2016

### TEACHING

#### Associate Instructor, Indiana University

I590 Applied Data Science

Fall 2017, Spring 2018

### APPOINTMENTS

#### Research Assistant, Indiana University

Doctor shopping project

Fall 2018, Spring 2019

### SKILLS

#### Computational

Frequent user of Python (Pandas, Matplotlib, Scikit-learn, NetworkX, etc), SQL for data analysis.

Familiar with HTML, CSS, JavaScript and Flask for web applications

Last updated: March 4, 2019