

Kai-Cheng Yang

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EDUCATION Ph.D., Informatics, Complex Systems track, Indiana University August 2017—
M.S., Theoretical Physics, Lanzhou University (China) June 2017
B.S., Theoretical Physics, Lanzhou University (China) June 2014

AWARDS

- IU School of Public Health Big Idea Challenge (\$250) 2020
- Informatics Ph.D. Student Conference Travel Awards (\$1000) 2020
- IU GISA Conference Travel Awards (\$700) 2019
- Informatics Ph.D. Student Conference Travel Awards (\$1000) 2019
- NSF Research Trainee scholarship in Complex Networks and Systems (\$5000) 2018

RESEARCH PROJECTS **Social media** PI: Filippo Menczer

- Social bot detection [C1, C2, J3]
- Misinformation & bots [W1, J7]
- Human bias & bots [J2]
- Abusive behaviors [P5]
- Social media ecosystem bias [P1, P6]

Opioid epidemic PIs: Brea Perry, Yong-Yeol Ahn

- High risk patients detection [P2, P4, J5]
- Policy effects [P3]

Network science

- Network embedding [P7, P8]
- Spreading phenomena [J6, J8]

PUBLICATIONS **Journal Articles**

- J1. **Yang, K.-C.**, Aronson, B. & Ahn, Y.-Y. BiRank: Fast and Flexible Ranking on Bipartite Networks with R and Python. *Journal of Open Source Software* **5**, 2315 (2020).
- J2. Yan, H., **Yang, K.-C.**, Menczer, F. & Shanahan, J. Asymmetrical Perceptions of Partisan Political Bots. *New Media & Society*. doi:10.1177/1461444820942744 (2020).
- J3. **Yang, K.-C.**, Varol, O., Davis, C. A., Ferrara, E., Flammini, A. & Menczer, F. Arming the public with artificial intelligence to counter social bots. *Human Behavior and Emerging Technologies*, e115 (2019).
- J4. Hui, P.-M., **Yang, K.-C.**, Torres-Lugo, C., Monroe, Z., McCarty, M., Serrette, B., Pentchev, V. & Menczer, F. BotSlayer: real-time detection of bot amplification on Twitter. *Journal of Open Source Software* **4**, 1706 (2019).
- J5. Perry, B. L., **Yang, K.-C.**, Kaminski, P., Odabas, M., Park, J., Martel, M., Oser, C. B., Freeman, P. R., Ahn, Y.-Y. & Talbert, J. Co-prescription network reveals social dynamics of opioid doctor shopping. *PLoS one* **14**, e0223849 (2019).

- J6. Zhang, Y.-J., Wu, Z.-X., Holme, P. & **Yang, K.-C.** Advantage of Being Multicomponent and Spatial: Multipartite Viruses Colonize Structured Populations with Lower Thresholds. *Physical Reviews Letters* **123**. (Editors' Suggestion), 138101 (2019).
- J7. Shao, C., Ciampaglia, G. L., Varol, O., **Yang, K.-C.**, Flammini, A. & Menczer, F. The spread of low-credibility content by social bots. *Nature communications* **9**, 4787 (2018).
- J8. **Yang, K.-C.**, Wu, Z.-X., Holme, P. & Nonaka, E. Expansion of cooperatively growing populations: Optimal migration rates and habitat network structures. *Physical Reviews E* **95**, 012306 (2017).

Peer-reviewed Conference Proceedings

- C1. **Yang, K.-C.**, Varol, O., Hui, P.-M. & Menczer, F. *Scalable and Generalizable Social Bot Detection through Data Selection in Proceedings of the AAAI Conference on Artificial Intelligence* **34** (New York, NY, USA, 2020), 1096–1103.
- C2. Sayyadiharikandeh, M., Varol, O., **Yang, K.-C.**, Flammini, A. & Menczer, F. *Detection of Novel Social Bots by Ensembles of Specialized Classifiers in Proceedings of the 29th ACM International Conference on Information & Knowledge Management* (2020), 2725–2732.

Peer-reviewed Workshop/Demo Papers

- W1. **Yang, K.-C.**, Torres-Lugo, C. & Menczer, F. *Prevalence of Low-Credibility Information on Twitter During the COVID-19 Outbreak in Proceedings of the ICWSM International Workshop on Cyber Social Threats (CySoc)* (Virtual, 2020).
- W2. Hui, P.-M., **Yang, K.-C.**, Torres-Lugo, C. & Menczer, F. *BotSlayer: DIY Real-Time Influence Campaign Detection in Proceedings of the International AAAI Conference on Web and Social Media* **14** (Virtual, 2020), 980–982.
- W3. **Yang, K.-C.**, Hui, P.-M. & Menczer, F. *Bot Electioneering Volume: Visualizing Social Bot Activity During Elections in Companion Proceedings of The 2019 World Wide Web Conference* (San Francisco, CA, USA, 2019), 214–217.

Working Papers

- P1. **Yang, K.-C.**, Hui, P.-M. & Menczer, F. How Twitter Data Sampling Biases U.S. Voter Behavior Characterizations. *arXiv preprint arXiv:2006.01447* (2020).
- P2. Aronson, B., **Yang, K.-C.**, Odabas, M., Ahn, Y. Y. & Perry, B. L. Comparing Measures of Centrality in Bipartite Social Networks: A Study of Drug Seeking for Opioid Analgesics. *SocArXiv preprint. osf.io/preprints/socarxiv/hazvs* (2020).
- P3. Lee, B., Zhao, W., **Yang, K.-C.**, Ahn, Y.-Y. & Perry, B. L. Unintended Consequences of State Policy Interventions in the US Opioid Crisis. *In submission* (2020).
- P4. Perry, B. L., Odabas, M., **Yang, K.-C.**, Lee, B., Kaminski, P., Aronson, B. & Ahn, Y.-Y. New means, new measures: Assessing traditional and social network indicators of prescription drug seeking behavior over ten years of the opioid epidemic. *In submission* (2020).
- P5. Torres-Lugo, C., **Yang, K.-C.** & Menczer, F. The Manufacture of Political Echo Chambers by Follow Train Abuse on Twitter. *arXiv preprint arXiv:2010.13691* (2020).
- P6. Wen, C., Pacheco, D., **Yang, K.-C.** & Menczer, F. Neutral Bots Reveal Political Bias on Social Media. *arXiv preprint arXiv:2005.08141* (2020).
- P7. Yoon, J., **Yang, K.-C.**, Jung, W.-S. & Ahn, Y.-Y. Persona2vec: A Flexible Multi-role Representations Learning Framework for Graphs. *arXiv preprint arXiv:2006.04941* (2020).
- P8. Zhang, Y.-J., **Yang, K.-C.** & Radicchi, F. Model-free hidden geometry of complex networks. *In submission* (2020).

TOOLS

Observatory on Social Media (OSoMe)

- Social bot detection: Botometer® [C2, J3], BotometerLite [C1]
- Bot amplification detection & visualization: BotSlayer [W2, J4], BEV [W3], Hoaxy®

Network Science

- Multi-role representations embedding for networks: Persoan2vec (GitHub) [P7]
- Bipartite network PageRank: BiRank (GitHub, PyPI, CRAN) [J1]

PRESENTATIONS Tutorials

- Identifying Social Media Manipulation with OSoMe Tools (Video)
IC²S² 2020 (Virtual) July 2020

Talks & Posters

- Detection of Novel Social Bots by Ensembles of Specialized Classifiers
CIKM 2020 (Virtual) October 2020
- Neutral Bots Reveal Political Bias on Social Media
TTO 2020 (Virtual) October 2020
- One talk and four posters
NetSci 2020 (Virtual) September 2020
- Four talks and one poster
IC²S² 2020 (Virtual) July 2020
- Prevalence of Low-Credibility Information on Twitter During the COVID-19 Outbreak
CySoc 2020 (Virtual) June 2020
- BotometerLite
AAAI 2020 (New York, USA) February 2020
- Bot Electioneering Volume
CyberSafety 2019 (San Francisco, USA) May 2019
- Expansion of Cooperatively Growing Populations on Networks
Chinese Physical Society Fall Meeting (Beijing, China) September 2016

Demos

- BotSlayer: DIY Real-Time Influence Campaign Detection
ICWSM 2020 (Virtual) June 2020

TEACHING

Associate Instructor, Indiana University

I590 Applied Data Science

Fall 2017, Spring 2018

APPOINTMENTS Research Assistant, Indiana University

Doctor shopping project

Fall 2018 – Fall 2020

SERVICE

Journal Reviewer

- Social Network Analysis and Mining
- ACM Digital Threats: Research and Practice
- IEEE Internet Computing
- PeerJ Computer Science
- Humanities & Social Sciences Communications

Conference Reviewer

- ICWSM'20, '21

Selected Media Coverage

- Use OSoMe tools to track conspiracy and misinformation online
 - *Newsweek* (October 2020)
- Low-credibility information on twitter during the COVID-19 outbreak [W1]
 - *IEEE Spectrum* (July 2020)
- Asymmetrical perceptions of partisan political bots [J2]
 - *IU the Media School Report* (July 2020)
- BotSlayer [W2, J4]
 - *IU news* (September 2019)
 - *IDS news* (September 2019)
 - *Science Node* (September 2019)
- The spread of low-credibility content by social bots [J7]
 - *Salon* (September 2020)
 - *IU news* (November 2018)
 - *ScienceNews* (November 2018)

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