

Kai-Cheng Yang

CONTACT INFORMATION	Luddy School of Informatics, Computing, and Engineering Indiana University Bloomington 901 E 10th street Bloomington, IN 47408	yangkc@iu.edu kaichengyang.me Google Scholar
EDUCATION	Ph.D., Informatics, Complex Systems track, Indiana University M.S., Theoretical Physics, Lanzhou University (China) B.S., Theoretical Physics, Lanzhou University (China)	August 2017— June 2017 June 2014
AWARDS	<ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• Social bot detection [C1, C2, J6], human perception of bots [J5]• Misinformation [P1, P3, W2, J4, J9]• Abusive behaviors [P7]• Social media ecosystem bias [P2, P8] Opioid epidemic PIs: Brea Perry, Yong-Yeol Ahn <ul style="list-style-type: none">• High-risk patient detection [P4, P6, J7]• Policy effects [J1] Network science <ul style="list-style-type: none">• Network embedding [J2, J3]• Spreading phenomena [J8, J10]	
PUBLICATIONS	Journal Articles <ul style="list-style-type: none">J1. Lee, B., Zhao, W., Yang, K.-C., Ahn, Y.-Y. & Perry, B. L. Systematic Evaluation of State Policy Interventions Targeting the US Opioid Epidemic, 2007-2018. <i>JAMA network open</i> 4, e2036687 (2021).J2. Yoon, J., Yang, K.-C., Jung, W.-S. & Ahn, Y.-Y. Persona2vec: A Flexible Multi-role Representations Learning Framework for Graphs. <i>PeerJ Computer Science</i> 7, e174 (2021).J3. Zhang, Y.-J., Yang, K.-C. & Radicchi, F. Model-free hidden geometry of complex networks. <i>Physical Reviews E</i> 103, 012305 (2021).J4. Pasquetto, I. V., Swire-Thompson, B., Amazeen, M. A., Benevenuto, F., Brashier, N., Bond, R. M., Bozarth, L. C., Budak, C., Ecker, U. K., ... & Yang, K.-C. Tackling misinformation: What researchers could do with social media data. <i>The Harvard Kennedy School (HKS) Misinformation Review</i> 1 (2020).J5. Yan, H., Yang, K.-C., Menczer, F. & Shanahan, J. Asymmetrical Perceptions of Partisan Political Bots. <i>New Media & Society</i>. doi:10.1177/1461444820942744 (2020).	

- J6. **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).
- J7. 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).
- J8. 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).
- J9. 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).
- J10. **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 (AAAI)* **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 (CIKM)* (Virtual, 2020), 2725–2732.

Peer-reviewed Workshop/Demo/Dataset/Software Papers

- W1. **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).
- W2. **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).
- W3. 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 (ICWSM)* **14** (Virtual, 2020), 980–982.
- W4. **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 (WWW)* (San Francisco, CA, USA, 2019), 214–217.
- W5. 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).

Working Papers

- P1. Pierri, F., Perry, B., DeVerna, M., **Yang, K.-C.**, Flammini, A., Menczer, F. & Bryden, J. The impact of online misinformation on U.S. COVID-19 vaccinations. *arXiv preprint arXiv:2104.10635* (2021).
- P2. **Yang, K.-C.**, Hui, P.-M. & Menczer, F. How Twitter Data Sampling Biases U.S. Voter Behavior Characterizations. *arXiv preprint arXiv:2006.01447* (2020).

- P3. **Yang, K.-C.**, Pierri, F., Hui, P.-M., Axelrod, D., Torres-Lugo, C., Bryden, J. & Menczer, F. The COVID-19 Infodemic: Twitter versus Facebook. *arXiv preprint arXiv:2012.09353* (2020).
- P4. 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).
- P5. DeVerna, M., Pierri, F., Truong, B. T., Bollenbacher, J., Axelrod, D., Loynes, N., Torres-Lugo, C., **Yang, K.-C.**, Menczer, F. & Bryden, J. CoVaxxy: A global collection of English Twitter posts about COVID-19 vaccines. *arXiv preprint arXiv:2101.07694* (2020).
- P6. 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).
- P7. 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).
- P8. Wen, C., Pacheco, D., **Yang, K.-C.** & Menczer, F. Neutral Bots Reveal Political Bias on Social Media. *arXiv preprint arXiv:2005.08141* (2020).

TOOLS

Observatory on Social Media (OSoMe)

- **Botometer**[®] [C2, J6], **BotometerLite** [C1]: popular bot detection tools with 250,000 daily requests from researchers, journalists, and social media users
- **BotSlayer** [W3, W5], **BEV** [W4], **Hoaxy**[®]: bot amplification detection & visualization tools with thousands of users
- OSoMeTweet (**GitHub**, **PyPI**): Python library for accessing Twitter's V2 API
- **CoVaxxy** [P5]: dashboard for COVID-19 vaccine Twitter discussion

Network Science

- **Persoan2vec** (**GitHub**) [J2]: multi-role representations embedding for networks
- **BiRank** (**GitHub**, **PyPI**, **CRAN**) [W1]: bipartite network PageRank

PRESENTATIONS Tutorials

- Identifying Social Media Manipulation with OSoMe Tools (**video**)
IC²S² 2020 (Virtual) Jul. 2020

Talks & Posters

- The COVID-19 Infodemic: Twitter versus Facebook
Computation + Journalism Symposium — C+J 2021 (Virtual) Feb. 2021
- The COVID-19 Infodemic in online social networks: Twitter versus Facebook
The 3rd North American Social Networks Conference — NASN 2021 (Virtual) Jan. 2021
- One talk and four posters
NetSci 2020 (Virtual) Sep. 2020
- Two talks
IC²S² 2020 (Virtual) Jul. 2020
- Prevalence of Low-Credibility Information on Twitter During the COVID-19 Outbreak
CySoc 2020 (Virtual) Jun. 2020
- **BotometerLite**
AAAI 2020 (New York, USA) Feb. 2020
- Bot Electioneering Volume
CyberSafety 2019 (San Francisco, USA) May 2019

- Expansion of Cooperatively Growing Populations on Networks
Chinese Physical Society Fall Meeting 2016 (Beijing, China) Sep. 2016

Demos

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

TEACHING **Associate Instructor, Indiana University**
I590 Applied Data Science Fall 2017, Spring 2018

APPOINTMENTS **Research Assistant, Indiana University**
Doctor shopping project Fall 2018 – Spring 2021

SERVICE **Journal Reviewer**
Social Network Analysis and Mining; ACM Digital Threats: Research and Practice; IEEE Internet Computing; PeerJ Computer Science; Humanities & Social Sciences Communications; IEEE Transactions on Knowledge and Data Engineering; Information Processing & Management; Online Social Networks and Media; Information, Communication and Society
Conference Reviewer
ICWSM'20, '21

IN THE PRESS **Selected Media Coverage**

- Using **OSoMe tools** to track inauthentic actors and spread of misinformation online
USA Today (Mar 2021); IndyStar (Mar 2021); AXIOS (Feb. 2021); Scientific American (Jan. 2021); Bloomberg News (Nov. 2020); The New York Times (Oct. 2020); Newsweek (Oct. 2020); Bloomberg News (Mar. 2020); The National Interest (Nov. 2019); The Conversation (Nov. 2019); IU news (Sep. 2019); IDS news (Sep. 2019); Science Node (Sep. 2019); Reuters (Nov. 2018)
- Low-credibility information on Twitter during the COVID-19 outbreak [W2]
IEEE Spectrum (Jul. 2020)
- Asymmetrical perceptions of partisan political bots [J5]
IU the Media School Report (Jul. 2020)
- The spread of low-credibility content by social bots [J9]
Salon (Sep. 2020), IU news (Nov. 2018), ScienceNews (Nov. 2018)

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