

# Kai-Cheng Yang

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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"><li>• IU School of Public Health Big Idea Challenge (\$250) 2020</li><li>• Informatics Ph.D. Student Conference Travel Awards (\$1000) 2020</li><li>• IU GISA Conference Travel Awards (\$700) 2019</li><li>• Informatics Ph.D. Student Conference Travel Awards (\$1000) 2019</li><li>• NSF Research Trainee scholarship in Complex Networks and Systems (\$5000) 2018</li></ul>	
RESEARCH PROJECTS	<b>Social media</b> PI: Filippo Menczer <ul style="list-style-type: none"><li>• Social bot detection [C1, C2, J5], human bias &amp; bots [J4]</li><li>• Misinformation [P2, W1, J3, J9]</li><li>• Abusive behaviors [P6]</li><li>• Social media ecosystem bias [P1, P7]</li></ul> <b>Opioid epidemic</b> PIs: Brea Perry, Yong-Yeol Ahn <ul style="list-style-type: none"><li>• High-risk patient detection [P3, P5, J7]</li><li>• Policy effects [P4]</li></ul> <b>Network science</b> <ul style="list-style-type: none"><li>• Network embedding [J1, P8]</li><li>• Spreading phenomena [J8, J10]</li></ul>	
PUBLICATIONS	<b>Journal Articles</b> <ul style="list-style-type: none"><li>J1. Zhang, Y.-J., <b>Yang, K.-C.</b> &amp; Radicchi, F. Model-free hidden geometry of complex networks. <i>Physical Reviews E</i> <b>103</b>, 012305 (2021).</li><li>J2. <b>Yang, K.-C.</b>, Aronson, B. &amp; Ahn, Y.-Y. BiRank: Fast and Flexible Ranking on Bipartite Networks with R and Python. <i>Journal of Open Source Software</i> <b>5</b>, 2315 (2020).</li><li>J3. Pasquetto, I. V., Swire-Thompson, B., Amazeen, M. A., Benevenuto, F., Brashier, N., Bond, R. M., Bozarth, L. C., Budak, C., Ecker, U. K., ... &amp; <b>Yang, K.-C.</b> Tackling misinformation: What researchers could do with social media data. <i>The Harvard Kennedy School (HKS) Misinformation Review</i> <b>1</b> (2020).</li><li>J4. Yan, H., <b>Yang, K.-C.</b>, Menczer, F. &amp; Shanahan, J. Asymmetrical Perceptions of Partisan Political Bots. <i>New Media &amp; Society</i>. doi:10.1177/1461444820942744 (2020).</li><li>J5. <b>Yang, K.-C.</b>, Varol, O., Davis, C. A., Ferrara, E., Flammini, A. &amp; Menczer, F. Arming the public with artificial intelligence to counter social bots. <i>Human Behavior and Emerging Technologies</i>, e115 (2019).</li></ul>	

- J6. 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).
- 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 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 (ICWSM)* **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 (WWW)* (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. **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).
- P3. 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](https://osf.io/preprints/socarxiv/hazvs)* (2020).
- P4. 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).

- P5. 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).
- P6. 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).
- P7. Wen, C., Pacheco, D., **Yang, K.-C.** & Menczer, F. Neutral Bots Reveal Political Bias on Social Media. *arXiv preprint arXiv:2005.08141* (2020).
- P8. 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).

## TOOLS

### Observatory on Social Media (OSoMe)

- Social bot detection: **Botometer**<sup>®</sup> [C2, J5], **BotometerLite** [C1]
- Bot amplification detection & visualization: **BotSlayer** [W2, J6], **BEV** [W3], **Hoaxy**<sup>®</sup>
- Accessing Twitter's V2 API: **OSoMeTweet** (**GitHub**, **PyPI**)

### Network Science

- Multi-role representations embedding for networks: **Persoan2vec** (**GitHub**) [P8]
- Bipartite network PageRank: **BiRank** (**GitHub**, **PyPI**, **CRAN**) [J2]

## PRESENTATIONS Tutorials

- Identifying Social Media Manipulation with OSoMe Tools (**video**)  
*IC<sup>2</sup>S<sup>2</sup> 2020 (Virtual)* Jul. 2020

### Talks & Posters

- One talk and four posters  
*NetSci 2020 (Virtual)* Sep. 2020
- Two talks  
*IC<sup>2</sup>S<sup>2</sup> 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 (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 – 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, IEEE Transactions on Knowledge and Data Engineering, Information Processing & Management

### Conference Reviewer

ICWSM'20, '21

## IN THE PRESS

### Selected Media Coverage

- Using OSoMe tools to track inauthentic actors and spread of misinformation online  
*Bloomberg (Nov. 2020) , The New York Times (Oct. 2020), Newsweek (Oct. 2020)*
- Low-credibility information on twitter during the COVID-19 outbreak [W1]  
*IEEE Spectrum (Jul. 2020)*
- Asymmetrical perceptions of partisan political bots [J4]  
*IU the Media School Report (Jul. 2020)*
- BotSlayer [W2, J6]  
*IU news (Sep. 2019), IDS news (Sep. 2019), Science Node (Sep. 2019)*
- The spread of low-credibility content by social bots [J9]  
*Salon (Sep. 2020), IU news (Nov. 2018), ScienceNews (Nov. 2018)*

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