

# Kai-Cheng Yang

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| CONTACT INFORMATION | <b>Luddy School of Informatics, Computing, and Engineering</b><br><b>Indiana University Bloomington</b><br>901 E 10th street<br>Bloomington, IN 47408  | <a href="mailto:yangkc@iu.edu">yangkc@iu.edu</a><br><a href="http://kaichengyang.me">kaichengyang.me</a><br>Google Scholar |
| EDUCATION           | Ph.D., Informatics, Complex Systems track, Indiana University<br>M.S., Theoretical Physics, Lanzhou University (China)<br>B.S., Theoretical Physics, Lanzhou University (China)  | August 2017—<br>June 2017<br>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>• <b>NSF Research Trainee scholarship</b> in Complex Networks and Systems (\$5000) 2018</li></ul>   |  |
| RESEARCH PROJECTS   | <b>Social media</b> PI: <b>Filippo Menczer</b> <ul style="list-style-type: none"><li>• Social bot detection [<b>C1</b>, <b>C2</b>, <b>J4</b>], human bias &amp; bots [<b>J3</b>]</li><li>• Misinformation [<b>P2</b>, <b>W1</b>, <b>J2</b>, <b>J8</b>]</li><li>• Abusive behaviors [<b>P6</b>]</li><li>• Social media ecosystem bias [<b>P1</b>, <b>P7</b>]</li></ul> <b>Opioid epidemic</b> PIs: <b>Brea Perry</b> , <b>Yong-Yeol Ahn</b> <ul style="list-style-type: none"><li>• High-risk patient detection [<b>P3</b>, <b>P5</b>, <b>J6</b>]</li><li>• Policy effects [<b>P4</b>]</li></ul> <b>Network science</b> <ul style="list-style-type: none"><li>• Network embedding [<b>P8</b>, <b>P9</b>]</li><li>• Spreading phenomena [<b>J7</b>, <b>J9</b>]</li></ul>   |  |
| PUBLICATIONS        | <b>Journal Articles</b> <ol style="list-style-type: none"><li>J1. <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>J2. 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>J3. 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:<a href="https://doi.org/10.1177/1461444820942744">10.1177/1461444820942744</a> (2020).</li><li>J4. <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><li>J5. Hui, P.-M., <b>Yang, K.-C.</b>, Torres-Lugo, C., Monroe, Z., McCarty, M., Serrette, B., Pentchev, V. &amp; Menczer, F. BotSlayer: real-time detection of bot amplification on Twitter. <i>Journal of Open Source Software</i> <b>4</b>, 1706 (2019).</li></ol> |  |

- J6. 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).
- J7. 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).
- J8. 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).
- J9. **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).
- P9. Zhang, Y.-J., **Yang, K.-C.** & Radicchi, F. Model-free hidden geometry of complex networks. *arXiv preprint arXiv:2011.08103* (2020).

## TOOLS

### Observatory on Social Media (OSoMe)

- Social bot detection: **Botometer**<sup>®</sup> [C2, J4], **BotometerLite** [C1]
- Bot amplification detection & visualization: **BotSlayer** [W2, J5], **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) [J1]

## 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

- Use 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 [J3]  
*IU the Media School Report (Jul. 2020)*
- BotSlayer [W2, J5]  
*IU news (Sep. 2019), IDS news (Sep. 2019), Science Node (Sep. 2019)*
- The spread of low-credibility content by social bots [J8]  
*Salon (Sep. 2020), IU news (Nov. 2018), ScienceNews (Nov. 2018)*

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