

# CHRISTOPHER K. TOKITA

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## EDUCATION

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- Ph.D.** **Princeton University**, Ecology and Evolutionary Biology<sup>‡</sup> **2021**  
<sup>‡</sup> *Graduate Certificate* in Computational Science and Engineering  
National Science Foundation Graduate Research Fellow  
Dissertation: “Networks, Collective Behavior, and Information in Social Systems—From Ant Colonies to Social Media”  
Advisor: Corina E. Tarnita
- M.A.** **Princeton University**, Ecology and Evolutionary Biology **2018**
- B.S.** **Yale University**, Ecology and Evolutionary Biology, with Distinction in the Major **2014**  
Thesis: “Defective Interfering Particles in Filamentous Bacteriophage—Microscopic Game Theory.” (Advised by Paul E. Turner)

## PUBLICATIONS

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\* denotes equal contribution & authorship

### Peer-reviewed

9. **Tokita CK**, Aslett K, Godel WP, Sanderson ZN, Tucker JA, Bonneau RA. (In prep) Measuring belief in misinformation at the scale of the social media ecosystem.
8. Bak-Coleman JB, **Tokita CK**, Morris DH, Rubenstein DI, Couzin ID. (Accepted) Collective wisdom in polarized groups. *Collective Intelligence*.
7. **Tokita CK**, Guess AM\*, Tarnita CE\*. (2021) Polarized information ecosystems can reorganize social networks via information cascades. *Proceedings of the National Academy of Sciences*, 118(50). doi: 10.1073/pnas.2102147118
6. Ulrich Y\*, Kawakatsu M\*, **Tokita CK**, Saragosti J, Chandra V, Tarnita CE\*, Kronauer DJC\*. (2021) Response thresholds alone cannot explain empirical patterns of division of labor in social insects. *PLoS Biology*, 19(6): e3001269. doi:10.1371/journal.pbio.3001269.
5. **Tokita CK**, Tarnita CE. (2020) Social influence and biased interactions can drive emergent behavioural specialization and modular social networks across systems. *Journal of the Royal Society Interface*, 17: 20190564. doi:10.1098/rsif.2019.0564.
4. Ulrich Y, Saragosti J, **Tokita CK**, Tarnita CE, Kronauer DJC. (2018) Fitness benefits and emergent division of labour at the onset of group-living. *Nature*, 560(7720): 635-638. doi:10.1038/s41586-018-0422-6.
3. Henry LP\*, **Tokita CK\***, Misra M, Forrow AB, Rubenstein DI. (2018) Mutualistic acacia ants exhibit lower defensive behavior and higher off-tree movement near termite mounds. *Biotropica*, 50(4): 559–562. doi:10.1111/btp.12572.
2. **Tokita CK**, Doane WEJ, Zuckerman BL. (2016) Reframing participation in postsecondary STEM education with a representation metric. *Bulletin of Science, Technology, and Society*, 35(5-6), 125-133. doi: 10.1177/0270467616645222
1. **Tokita CK**, Oliver JC, Monteiro A. (2013) A survey of eyespot sexual dimorphism across nymphalid butterflies. *International Journal of Evolutionary Biology*, 2013(2013), 1-6. doi:10.1155/2013/926702

### Government Reports

3. Clavin CT, Petropoulos ZE, Gupta N, **Tokita CK**. (2017) Case studies of community resilience and disaster recovery from the 2013 Boulder County floods. *National Institute Standards and Technology, United States Department of Commerce*. Grant/Contract Reports (NISTGCR) - 16-011. doi:10.6028/NIST.GCR.16-011
2. Tinkle SS, Mary JC, Snavely JE, Pomeroy-Carter CA, **Tokita CK**. (2016) An outcome evaluation of the National Institutes of Health Director's New Innovator Award Program for fiscal years 2007-2009. *IDA Science and Technology Policy Institute\**. IDA Paper P-8478. \*Prepared for the National Institutes of Health
1. Tinkle SS, Mary JC, Snavely JE, Pomeroy-Carter CA, **Tokita CK**. (2016) An evaluation of the National Institutes of Health Director's New Innovator Award Program Finalists for fiscal years 2007-2009. *IDA Science and Technology Policy Institute\**. IDA Paper P-8478. \*Prepared for the National Institutes of Health

## RESEARCH EXPERIENCE

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<b>Tarnita Lab - Princeton University</b> , Princeton, NJ <i>National Science Foundation Graduate Research Fellow</i>	2016 - 2021
<b>The IDA Science and Technology Policy Institute</b> , Washington, DC <i>Data Analyst (Science Policy Fellow)</i>	2014 - 2016
<b>Turner Lab - Yale University</b> , New Haven, CT <i>Senior Thesis Researcher</i>	2013 - 2014
<b>Organization for Tropical Studies</b> , Puerto Viejo de Sarapiquí, Costa Rica <i>National Science Foundation REU Research Fellow</i>	2013
<b>Alonzo Lab - Yale University</b> , New Haven, CT <i>Undergraduate Researcher</i>	2013
<b>Monteiro Lab - Peabody Museum of Natural History</b> , New Haven, CT <i>Peabody Summer Research Intern</i>	2012
<b>Post Lab - Yale University</b> , New Haven, CT <i>Science, Technology, and Research Scholar (STARS) Program Summer Researcher</i>	2011

## PROFESSIONAL EXPERIENCE

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<b>Phylum</b> , Los Angeles, CA <i>Data Scientist</i>	2021 - Present
<p>Phylum is a cybersecurity startup whose platform detects risk and vulnerabilities in the open-source software ecosystem, protecting customers from malware, vulnerabilities, and supply chain attacks. Using extremely large datasets, I analyze software's social ecosystem—the behavior, networks, and discussions of millions of software authors—to detect security risks and bad actors:</p> <ul style="list-style-type: none"> <li>• Constructed an unsupervised ML model to flag anomalous behavior among software authors.</li> <li>• Constructed and deployed an NLP + supervised ML model to detect online discussion of new security vulnerabilities far before they are officially documented by the US Government.</li> <li>• Visualized large networks of authors + packages that comprise the open-source software ecosystem.</li> </ul>	
<b>Office of Assemblyman Andrew Zwicker, PhD</b> , Skillman, NJ New Jersey State Legislature <i>Policy Intern</i>	2017 - 2018
<p>Performed policy research in support of the Assemblyman's duties as Chair of the Assembly Committee on Science, Technology, and Innovation. Researched and wrote policy briefings that are in use now to craft future bills related to autonomous vehicles and state-backed venture capital. Responded to policy-related constituent inquiries and assisted in day-to-day operation of the Assemblyman's office.</p>	
<b>The IDA Science and Technology Policy Institute</b> , Washington, DC Institute for Defense Analyses <i>Data Analyst - Science Policy Fellow</i>	2014 - 2016
<p>Conducted science policy research and analysis for the White House Office of Science and Technology Policy (OSTP) and other science-conducting Federal Agencies. Worked with PhDs and other policy experts to evaluate research programs and other S&amp;T issues through quantitative methods. Research used statistical analyses and coding in R. Specific projects and activities:</p> <ul style="list-style-type: none"> <li>• Analyzed NSF research grant programs using social network analyses and topic modeling.</li> <li>• Evaluated underrepresented minority participation in STEM fields at undergraduate</li> </ul>	

- institutions using novel statistical metric for participation rates.
- Analyzed NIH biomedical research grant programs using bibliometrics and recipient surveys.

## TEACHING & PUBLIC OUTREACH

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<b>Department of Ecology and Evolutionary Biology</b> , Princeton University, Princeton, NJ	
Assistant in Instruction, EEB313 Behavioral Ecology	Fall 2017
Assistant in Instruction, EEB211 Life on Earth: Chaos and Clockwork of Biological Design	Fall 2016
<b>Science and Quantitative Reasoning Center</b> , Yale University, New Haven, CT	2012 - 2014
Science and QR Tutor	
<b>Yale College Dean's Office</b> , Yale University, New Haven, CT	2012 - 2014
Science, Technology, and Research Scholar (STARS) Peer Mentor	
<b>Office of Undergraduate Admissions</b> , Yale University, New Haven, CT	2010 - 2014
Student Ambassador	

## DIVERSITY, EQUITY, & INCLUSION WORK

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<b>Científico Latino</b>	2021 – Present
<i>Mentor</i>	
Científico Latino aims to help undergraduate, graduate, and professional students from underrepresented backgrounds by providing mentorship. Mentored a student applying to PhD programs and helped guide them through the graduate school application process.	
<b>Office of the Associate Dean for Access, Diversity, and Inclusion</b> , The Graduate School, Princeton University	
<i>Head Diversity Fellow</i>	2020 - 2021
<i>Diversity Fellow</i>	2018 - 2020
Building community among graduate students from underrepresented backgrounds by program development, event planning, and recruitment events. Events were developed in collaboration with university offices and centers, including the Center for Career Services, PACE Center for Civic Engagement, and the Princeton University Art Museum. Promoted to Head Diversity Fellow in 2020, which added the responsibilities of mentoring and taking lead of the 8-person team of Fellows.	
<b>EEB Scholars Program</b> , Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ	2017 - 2019
<i>Co-Founder and Program Coordinator</i>	
Planned and executed our department's first-ever preview program aimed explicitly at increasing access and diversity to the fields of ecology and evolutionary biology. Each year, the program brings prospective students from both domestic and international institutions. Coordinated team of graduate student volunteers to put on various programs for participants, including graduate application workshops, meetings with faculty, and a poster session. Ran program for first two years before handing to other members of the department.	
<b>Committee on Diversity, Inclusion, and Departmental Climate</b> , Department of Ecology and Evolutionary Biology, Princeton University	2017 - 2019
<i>Graduate Student Representative</i>	
Member of departmental diversity and inclusion committee—which includes representatives from graduate students, postdoctoral researchers, staff, and faculty. Advocated for graduate student concerns related to inclusivity.	

## PRESENTATIONS

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### TALKS

8. How polarized information ecosystems can reorganize social networks. (2022) *Meta Computational Social Science Seminar*. Meta, Menlo Park, CA.
7. How polarized social networks emerge from organic information cascades. (2021) *Organizing meeting for PNAS Special Issue on Political Polarization*. Princeton University, Princeton, NJ.
6. The emergence of polarized social networks via information cascades. (2020) *Princeton Workshop on Political Polarization*. Princeton University, Princeton, NJ.
5. The self-organizing parallels between division of labor & political polarization. (2019) *Social Decisions Workshop*. University of Houston, Houston, TX.
4. Social influence & biased interactions can drive social organization across systems. (2019) *The Columbia-Rutgers-Princeton-Penn-Yale Annual EEB Graduate Student Symposium*. Princeton University, Princeton, NJ. **\*Winner for Best Behavior Talk**
3. Social interactions can drive emergent behavioral diversity and modular social network structure. (2018) *Social Insects in the Northeast Regions Conference*. Drexel University, Philadelphia, PA.
2. Social interactions can drive emergent behavioral diversity and modular social network structure. (2018) *Ki-Net Young Researchers Workshop: Kinetic descriptions in theory and applications*. University of Maryland, College Park, MD.
1. Reframing Participation and Equality in STEM Education. (2015) *Atlanta Conference on Science and Innovation Policy*. Atlanta, GA.

### POSTERS

1. Towards Complex Societies: Group Size and Division of Labor Help Early Social Groups Succeed. (2018) *The Annual Meeting of the American Association for the Advancement of Science (AAAS)*. Austin, TX. **\*Winner for Best Student Poster, Brain and Behavior Section**

## AWARDS & HONORS

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Institutional Nominee for the Schmidt Science Fellowship	<b>2020</b>
Katherine S. McCarter Graduate Student Policy Award, Ecological Society of America	<b>2019</b>
National Science Foundation Graduate Research Fellowship	<b>2016 – 2021</b>
IDA Science and Technology Policy Institute Science Policy Fellowship	<b>2014 – 2016</b>
<i>Distinction in the Ecology and Evolutionary Biology Major</i> , Yale University	<b>2014</b>
National Science Foundation Research Experience for Undergraduates Fellowship	<b>2013</b>
Peabody Museum of Natural History Research Fellowship	<b>2012</b>
Yale Science, Technology, and Research Scholar (STARS) Fellowship	<b>2011</b>
National College Match Finalist, Questbridge Scholarship	<b>2009</b>

## RESEARCH FUNDING & GRANTS

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Data-Driven Social Science Initiative, Princeton University	\$6,260	<b>2020</b>
Research Seed Funding, Department of Ecology & Evolutionary Biology, Princeton University	\$2,500	<b>2017</b>
National Science Foundation Graduate Research Fellowship	\$138,000	<b>2016</b>