

# Chuliang Song | Curriculum Vitae

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## Research interests

- Species coexistence
- Biodiversity conservation
- Ecological networks
- Ecological time series
- Spatial ecology

## Employment

- Starting in **University of California, Los Angeles (UCLA)**  
2024 Assistant Professor in Department of Ecology and Evolutionary Biology
- 2022–pres. **Princeton University**  
Postdoc Researcher, supervised by Prof. Jonathan Levine
- 2020–2022 **McGill University & University of Toronto**  
Postdoc Researcher, co-supervised by Profs. Andrew Gonzalez and Marie-Josée Fortin

## Education

- 2016–2020 **Massachusetts Institute of Technology**  
PhD in Civil and Environmental Engineering, advised by Prof. Serguei Saavedra
- 2013–2016 **Zhejiang University**  
Bachelor of Science in Mathematics (with honor), advised by Prof. Yang-Yu Liu

## Selected Awards and Fellowships

### Awards

- 2023 Outstanding Publication Award  
Early Career Section of the Ecological Society of America
- 2023 Early Career Award  
Gordon Research Conference in Predictive Ecology
- 2022 Early Career Investigator Award  
American Society of Naturalists
- 2022 Early Career Award  
Asian Ecology Section of the Ecological Society of America
- 2022 Best Young Investigator Paper Award  
Sino-Ecologists Association Overseas
- 2020 Outstanding Student Award  
Asian Ecology Section of the Ecological Society of America
- 2020 American Naturalist Student Paper Award  
American Society of Naturalists
- 2020 Trailblazing Ecology Publication Award  
Student Ecology Section of the Ecological Society of America

### Fellowships

- 2017-2019 Arthur T. Ippen Fellowship  
Massachusetts Institute of Technology

- 2018 MISTI Mexico Fellowship  
Massachusetts Institute of Technology
- 2017 MISTI Israel Fellowship  
Massachusetts Institute of Technology
- 2016 Pennell Fellowship  
Massachusetts Institute of Technology
- 2015 Undergraduate Overseas Research Fellowship  
Zhejiang University

## Publications

\* denotes equal contribution | † denotes undergraduate mentee | [Link to Google Scholar](#)

- 24 **Mean species responses predict effects of environmental change on coexistence**  
De Laender F, Carletti T, Carpentier C, **Song C**, Rumschlag S, Mahon M., Hill R, Simonin M, Meszéna G, Barabás G  
**Ecology Letters** (2023) [pdf]
- 23 **Rapid monitoring of ecological persistence**  
**Song\* C**, Simmons\* B, Fortin MJ, Gonzalez A, Kaiser-Bunbury CN, Saavedra, S  
**Proceedings of the National Academy of Sciences** (2023) [pdf]  
- Selected for Outstanding Publication Award, ESA Early Career Section
- 22 **Metapopulation persistence can be inferred from incomplete surveys**  
**Song C**, Fortin MJ, Gonzalez A  
**Proceedings of Royal Society B** (2022) [pdf]
- 21 **Generalization drives abundance: a computational causal discovery approach**  
**Song C**, Simmons BI, Fortin MJ, Gonzalez A  
**PLOS Computational Biology** (2022) [pdf]
- 20 **Untangling the complexity of priority effects in multispecies communities**  
**Song C**, Fukami T, Saavedra S  
**Ecology Letters** (2021) [pdf]  
- Selected for Early Career Award, ESA Asian Ecology Section  
- Selected for Best Young Investigator Paper Award, Sino-Ecologists Association
- 19 **Understanding the emergence of contingent and deterministic exclusion in multi-species communities**  
**Song C**, Uricchio LH, Mordecai EA, Saavedra S  
**Ecology Letters** (2021) [pdf]
- 18 **Synthesizing the effects of individual-level variation on coexistence**  
Stump SM, **Song C**, Saavedra S, Levine JM, Vasseur D  
**Ecological Monographs** (2021) [pdf]
- 17 **Bridging parametric and nonparametric measures of species interactions unveils new insights of non-equilibrium dynamics**  
**Song C**, & Saavedra S  
**Oikos** (2021) [pdf]  
- Editor's choice

- 16 **Coexistence holes characterize the assembly and disassembly of multispecies systems**  
 Angulo MT, Kelley A, Montejano L, **Song\* C**, Saavedra\*, S  
[Nature Ecology & Evolution](#) (2021) [pdf]  
 - *News & Views "Coexistence holes fill a gap in community assembly theory" by Andrew D Letten*
- 15 **Merging dynamical and structural indicators to measure resilience in multispecies systems**  
 Medeiros\* LP, **Song\* C**, Saavedra S  
[Journal of Animal Ecology](#) (2021) [pdf]  
 - *Special Feature: Reconciling Resilience Across Ecological Systems, Species and Subdisciplines*
- 14 **Structural stability: concepts, methods and applications**  
**Song C**  
[Biodiversity Science](#) (2020) [pdf]  
 - *Invited review*
- 13 **Telling ecological networks apart by their structure: an environment-dependent approach**  
**Song C**, & Saavedra S  
[PLOS Computational Biology](#) (2020) [pdf]
- 12 **Towards a probabilistic understanding of transformations of species interactions**  
**Song C**, Von Ahn<sup>†</sup> S, Rohr RP, Saavedra S  
[Trends in Ecology & Evolution](#) (2020) [pdf]
- 11 **Disentangling the effects of external perturbations on coexistence and priority effects**  
**Song C**, Vasseur D, Rohr RP, Saavedra S  
[Journal of Ecology](#) (2020) [pdf]  
 - *Selected for Outstanding Student Award, ESA Asian Ecology Section*
- 10 **Accelerate the emergence of order in swarming systems**  
 Xiao Y-D, **Song C**, Tian L, Yang Y-Y  
[Advances in Complex Systems](#) (2019) [pdf]
- 9 **On the consequences of the interdependence of stabilizing and equalizing mechanisms**  
**Song\* C**, Barabás\* G., Saavedra S  
[The American Naturalist](#) (2019) [pdf]  
 - *Selected for American Naturalist Student Paper Award*  
 - *Selected for Trailblazing Ecology Publication Award, ESA Student Ecology Section*  
 - *Recommended by F1000*
- 8 **Beware z-scores**  
**Song C**, Rohr RP, Saavedra S  
[Journal of Animal Ecology](#) (2019) [pdf]
- 7 **Structural changes within trophic levels are constrained by within-family assembly rules at lower trophic levels**  
**Song C**, Altermatt F, Pearse I, Saavedra S  
[Ecology Letters](#) (2018) [pdf]  
 - *Featured as journal cover*
- 6 **Structural stability as a consistent predictor of phenological events**  
**Song C**, & Saavedra S  
[Proceedings of the Royal Society B](#) (2018) [pdf]

- 5 **Rethinking the importance of the structure of ecological networks under an environment-dependent framework**  
Cenci\* S, **Song\* C**, Saavedra S  
[Ecology & Evolution](#) (2018) [pdf]
- 4 **A guideline to study the feasibility domain of multi-trophic and changing ecological communities**  
**Song C**, Rohr RP, Saavedra S  
[Journal of Theoretical Biology](#) (2018) [pdf]
- 3 **Will a small randomly assembled community be feasible and stable?**  
**Song C**, & Saavedra S  
[Ecology](#) (2018) [pdf]
- 2 **Why are some plant-pollinator networks more nested than others?**  
**Song C**, Rohr RP, Saavedra S  
[Journal of Animal Ecology](#) (2017) [pdf]
- 1 **Existence of positive solutions for an approximation of stationary mean-field games**  
Almayouf N, et al. (25 authors including **Song C**)  
[Involve, a Journal of Mathematics](#) (2020) [pdf]  
[Submitted or under review](#)
- 4 **Landscape ecological consolidations as the game-changer for zoonotic host diversity in human habitats**  
Wang Y, Zhang T, Raghwani J, Li Y, Cheng Y, **Song C**, Dharmarajan G, Dong L, Tan H, Faust C L, Liu Z, Wu P, Chen Y, Tian Y, Xu Y, Liu Q, Qu J, Li S, Wei J, Ma C, Bharti N, Cazelles B, Zhou X, Yang R, Pybus O G, Dobson A P, Yu P, Stenseth N Chr, Tian H. submitted
- 3 **Reconceptualizing beta diversity: a hypervolume geometric approach**  
**Song\* C**, Lu\* M, Fortin MJ, Gonzalez A.  
submitted. [preprint]
- 2 **Multitrophic assembly: a perspective from modern coexistence theory**  
**Song\* C**, Spaak\* JW.  
in revision at Ecology Letters [preprint]
- 1 **Soil microbial influences over coexistence in multispecies plant communities in a subtropical forest**  
Wu H, Wang W, Wu T, Luo Z, Lin W, Liu H, Xiao J, Luo W, Li Y, Wang Y, **Song C**, Kandlikar G, Chu C.  
in revision at Ecology

## R package development

- feasoverlap (author) Compute the overlap between two feasibility domains [link]
- betavolume (author) Compute a newly proposed geometric measure of beta diversity [link]
- tempniche (author) Estimate parameter sensitivity and coexistence in stationary aperiodic environments [link]
- multispat (author) Generate spatial species distributions based on pairwise spatial associations [link]

maxnodf Compute the overlap between two feasibility domains [link]  
(contributor)

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## Teaching

### Teaching assistant

- 2019 Probability and Causal Inference (1.010), MIT
- 2018, 2019 Ecological Dynamics and Modeling (1.087/1.873), MIT
- 2014, 2015 Abstract Algebra, Zhejiang University

### Guest lecture

- 2021 Qiandao Lake training class on ecological data analysis
- 2021 X-idea course, Tsinghua University
- 2018 Computational Ecology (1.871), MIT

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## Mentoring

- 2023 Sergio Picó, University of Cádiz  
Visiting graduate student
- 2020 Jürg Spaak, University of Namur  
Member of PhD dissertation committee
- 2017 Sarah Von Ahn, MIT  
Undergraduate Research Opportunities Program

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## Invited talks

- 2023 College of Life Sciences, Zhejiang University
- 2023 School of Ecology, Sun Yat-Sen University
- 2023 Institute of Botany, Chinese Academy of Science
- 2023 Institute of Ecology, Peking University
- 2023 School of Ecological and Environmental Sciences, East China Normal University
- 2023 Physics of Living Systems, MIT
- 2023 Department of Ecology and Evolutionary Biology, UCLA
- 2023 Department of Integrative Biology, University of Texas at Austin
- 2022 Unifying Ecology Across Scales, Gordon Research Conference
- 2022 American Society of Naturalists Young Investigator Symposium, Evolution Meeting
- 2022 Special Session, ESA & CSEE Joint Annual Meeting
- 2022 Organized oral session, ESA & CSEE Joint Annual Meeting
- 2021 Department of Ecology and Evolutionary Biology, University of Michigan
- 2021 Department of Advanced Manufacturing and Robotics, Peking University
- 2021 Theoretical Ecology Seminar Series, International Initiative for Theoretical Ecology
- 2021 Department of Ecology and Evolutionary Biology, University of Toronto
- 2020 Evolutionary and Ecological Systems Biology Talks, MIT
- 2020 Sino-Eco Seminar, Sino-Ecologists Association Oversea
- 2020 Forum on pollinators, Entomological Society of China
- 2020 CForBio Seminar, Chinese Forest Biodiversity Monitoring Network

- 2020 Channing Network Science Seminar, Harvard Medical School
- 2019 College of Urban and Environmental Sciences, Peking University
- 2018 Department of Ecology, Beijing Normal University
- 2018 School of Ecological and Environmental Sciences, East China Normal University
- 2017 Channing Network Science Seminar, Harvard Medical School
- 2014 Conference on Economic Explanation, Ronald Coase Center for the Study of the Economy

## Conference presentation and poster

- 2017-2023 Ecological Society of America Annual Meeting
- 2023 China Conference on Ecology
- 2023 Predictive Ecology, Gordon Research Conference
- 2023 American Society of Naturalists standalone meeting
- 2022 Department Day, Department of Biology, McGill University
- 2021 Canadian Society for Ecology and Evolution Annual Meeting
- 2021 Virtual Stand Alone Conference by The American Society of Naturalists
- 2020 Festival of Ecology by British Ecological Society
- 2020 American Society of Naturalists standalone meeting
- 2018 International Conference on Complex Networks
- 2017 CEE Research Speed Dating
- 2017 19th Annual Greater Boston Area Statistical Mechanics Meeting

## Visiting Experience

- 2024 **University of Hawai'i, US**  
Hawai'i Institute of Marine Biology
- 2023 **University of Toronto, Canada**  
Fields Institute
- 2019 **University of Fribourg, Switzerland**  
Department of Biology - Ecology and Evolution
- 2018 **National Autonomous University of Mexico, Mexico**  
Ecology Institute
- 2017 **Northeast Forestry University, China**  
College of Wildlife Resources
- 2017 **Technion – Israel Institute of Technology, Israel**  
Faculty of Physics
- 2015–2016 **Harvard University, US**  
Harvard Medical School
- 2015 **King Abdullah University of Science and Technology, Saudi Arabia**  
Mathematics and Computational Science

## Academic and Scientific Service

Journal manuscript referee [verified record in Web of Science]

- Biodiversity Science
- Biology Letters
- Bulletin of Mathematical Biology
- Communications Biology

- Ecological Modelling
- Ecology Letters
- Ecology
- Environmetrics
- Frontiers in Ecology and Evolution
- Hydrobiologia
- Journal of Animal Ecology
- MIT Science Policy Review
- National Science Review
- Nature Ecology & Evolution
- New Phytologist
- Peer Community in Ecology
- Physical Review Letters
- Physical Review X
- Proceedings of Royal Society B
- Scientific Reports
- Theoretical Population Biology
- Ecological Monographs
- Ecology & Evolution
- eLife
- Functional Ecology
- Global Change Biology
- ISME
- Journal of Ecology
- Methods in Ecology & Evolution
- Nature Communications
- Nature
- Oikos
- Physical Review E
- Physical Review Research
- Population Ecology
- Science
- The American Naturalist
- Trends in Ecology and Evolution

#### Editorial service

2022–present Subject-matter Editor, Ecological Monographs

2023–present Data Editor, Ecology Letters

#### Seminar organization

2023 Symposium on “Synthesis and Future of Modern Coexistence Theory”  
American Society of Naturalists Standalone Meeting

#### Book proposal referee

2021 Princeton University Press

2021 Oxford University Press

#### Professional society service

2021-2022 Council Member, Ecological Society of America

2020-2022 Secretary, Theoretical Ecology Section of Ecological Society of America