

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[†] 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)

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

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

Invited talks

- 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 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

- 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 Publons]

- Biodiversity Science
- Bulletin of Mathematical Biology
- Ecological Modelling
- Ecology Letters
- Ecology
- Environmetrics
- Frontiers in Ecology and Evolution
- Hydrobiologia
- Biology Letters
- Communications Biology
- Ecological Monographs
- Ecology & Evolution
- eLife
- Functional Ecology
- Global Change Biology
- ISME

- 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
- 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