

Carlos A. Serván

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Education

2008–2012 **Bachelor of Science, Biology, with mention in Hydrobiology & Fisheries**, National University of San Marcos, Lima, Perú
Advisor: Walter Cabrera-Fébola

2013–2015 **Bachelor of Science candidate, Mathematics**, National University of San Marcos, Lima, Perú

2016–2020 **PhD, Ecology & Evolution, University of Chicago**, Thesis: Assembling large ecological communities: A theoretical exploration
Advisor: Stefano Allesina.

2020–Present **PhD candidate, Mathematics, University of Chicago**
Advisor: Benson Farb.

Honors & Awards

Academic Awards

2025-2026 **William Rainey Harper Dissertation Fellowship, Physical Sciences Division**, University of Chicago

2021 **Shortlisted, Early Career Researcher Award**, Ecology Letters

Scholarships

2017-18 **International student fellowship (2nd year), Biological Sciences Division, University of Chicago**

2015 **Opportunity funds scholarship, EducationUSA**

Publications and Preprints

- [1] Seraphina Eun Bi Lee and **Carlos A. Serván**. Infinitely many Lefschetz pencils on ruled surfaces. *In preparation*, 2025.
- [2] Seraphina Eun Bi Lee and **Carlos A. Serván**. Appendix to Section conjectures over \mathbb{C} and Kodaira fibrations by Simon Shufeng Xu. *arXiv*, 2025.
- [3] Carlos A. Serván. Local rigidity of Weil–Petersson subvarieties of the moduli space of curves and covering constructions. *arXiv*, 2025.
- [4] Seraphina Eun Bi Lee and **Carlos A. Serván**. Lefschetz fibrations with infinitely many sections. *arXiv (In review)*, 2024.

- [5] Frederik Benirschke and **Carlos A. Serván**. Isometric embeddings of Teichmüller spaces are covering constructions. *Advances in Mathematics*, 452:109817, 2024.
- [6] **Carlos A. Serván**. On the uniqueness of the Prym map. *arXiv (To appear in Journal of Differential Geometry Nov 2025)*, 2022.
- [7] **Carlos A. Serván**, José A. Capitán, Zachary R. Miller, and Stefano Allesina. Effects of phylogeny on coexistence in model communities. *The American Naturalist*, 205(2):E34–E48, 2025.
- [8] Stefano Allesina, Zachary R Miller, and **Carlos A. Serván**. Intraspecific variation stabilizes classic predator-prey dynamics. *bioRxiv*, 2021.
- [9] **Carlos A. Serván** and Stefano Allesina. Tractable models of ecological assembly. *Ecology Letters*, 24(5):1029–1037, 2021.
- [10] George T Cantwell, Yanchen Liu, Benjamin F Maier, Alice C Schwarze, **Carlos A. Serván**, Jordan Snyder, and Guillaume St-Onge. Thresholding normally distributed data creates complex networks. *Physical Review E*, 101(6):062302, 2020.
- [11] Daniel S Maynard, **Carlos A. Serván**, Jose A Capitan, and Stefano Allesina. Phenotypic variability promotes diversity and stability in competitive communities. *Ecology letters*, 22(11):1776–1786, 2019.
- [12] Daniel S Maynard, J Timothy Wootton, **Carlos A. Serván**, and Stefano Allesina. Reconciling empirical interactions and species coexistence. *Ecology letters*, 22(6):1028–1037, 2019.
- [13] **Carlos A. Serván**, José A Capitán, Jacopo Grilli, Kent E Morrison, and Stefano Allesina. Coexistence of many species in random ecosystems. *Nature ecology & evolution*, 2(8):1237–1242, 2018.
- [14] Daniel S Maynard, **Carlos A. Serván**, and Stefano Allesina. Network spandrels reflect ecological assembly. *Ecology letters*, 21(3):324–334, 2018.

Presentations

Invited Talks

- 01/25 *Isometric embeddings of Teichmüller spaces*. JMM 2025, AMS Special session on Cohomology of Arithmetic Groups, Mapping Class Groups, and Moduli Spaces.
- 12/24 *Isometric embeddings of Teichmüller spaces are covering constructions*. University of Michigan, Geometry Seminar.
- 04/24 *Examples of Lefschetz fibrations admitting infinitely many sections*. Cornell University, Topology Seminar.
- 10/22 *On the uniqueness of the Prym map*. University of Notre Dame, Topology seminar.
- 09/22 *On the uniqueness of the Prym map*. Virginia Commonwealth University, Geometry and Topology seminar.

12/19 *Trait dimensionality effects on model ecological communities.* Lotka-Volterra Models: when Random Matrix Theory meets theoretical Ecology Workshop. Paris, France.

02/19 *Assembly of many-species ecosystems.* Computational and Applied Mathematics Student Seminar, University of Chicago.

12/13 *Interaction networks and metabolic ecology: prospectus of a unified theory of ecology.* National University of San Marcos, Lima, Perú.

Teaching Experience

University of Chicago

Mentoring REU

- Yili Wen: Configuration spaces.
- Akash Ganguly: Mapping class groups of surfaces.
- Yuyuan Chen: Low dimensional topology.
- Zach Marks: Riemann surfaces, branched coverings, and field extensions.

2022- Graduate student lecturer

- 2022-2023: MATH 1310-1330: Elementary functions and Calculus I-III.
- 2023-2024: MATH 15100-15200:Calculus I-II, Fall and Winter quarter.
- 2024-2025: MATH 15200:Calculus II, Fall quarter.
- 2025: MATH 15200:Calculus II, Fall quarter.

2021-22 College fellow

- MATH 24400, Introduction to Algebraic geometry.
- MATH 26500, Introduction to Riemannian geometry.
- MATH 27400, Introduction to Smooth manifolds and integration on manifolds.

2018 Teaching assistant, Networks in Ecology & Evolution (ECEV 44500)

2017 Teaching assistant, Ecology in the Anthropocene (BIOS 13132)

National University of San Marcos

2013-15 Introduction to Biomathematics, Undergraduate course

- Six lectures, *Ecological modeling: from single population to community models*
- *Introduction to Island Biogeography theory* (twice)
- *A primer on predator-prey models*
- *Scaling predator-prey interactions: metabolic parameterizations of predator-prey models*

2013-15 Community Ecology, Undergraduate course

- *Mathematics in Ecology*
- *Food webs: a short introduction* (twice)

2013 Theoretical Ecology, Undergraduate course

- *Food web theory: untangling Darwin's entangled bank*

Workshops and Schools

- 3/22 Braids in Symplectic and Algebraic geometry. ICERM, Brown University.
- 9/17 London StructInst Workshop: A synthesis of recent approaches to structural instability of ecological communities. Queen Mary University of London, England.
- 2/14 III Southern Summer School on Mathematical Biology. ICTP-SAIFR, São Paulo, Brazil.
- 6/13 Mini-course: Energetic approach to Food webs. ICTP-SAIFR, São Paulo, Brazil.
- 1/13 II Southern Summer School on Mathematical Biology. ICTP-SAIFR, São Paulo, Brazil.

Computational Skills

- Advanced \LaTeX , Python, R
- Intermediate C, Emacs
- Basic Bash, Git, Java, Mathematica

Languages

- Native Spanish
- Proficient English