Department of Mathematics
The University of Chicago
5734 S University Ave
Chicago, IL 60637
✉ *cmarceloservan@uchicago.edu*

Carlos A. Serván

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.

Publications and Preprints

[1] Carlos A. Serván. Local rigidity of Weil–Petersson subvarieties of the moduli space of curves and covering constructions. *Preprint*, 2025.

[2] Seraphina Eun Bi Lee and **Carlos A. Serván**. Lefschetz fibrations with infinitely many sections. *arXiv (In review)*, 2024.

[3] Frederik Benirschke and **Carlos A. Serván**. Isometric embeddings of Teichmüller spaces are covering constructions. *Advances in Mathematics*, 452:109817, 2024.

[4] **Carlos A. Serván**. On the uniqueness of the Prym map. *arXiv (To appear in Journal of Differential Geometry)*, 2022.

[5] **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.

[6] Stefano Allesina, Zachary R Miller, and **Carlos A. Serván**. Intraspecific variation stabilizes classic predator-prey dynamics. *bioRxiv*, 2021.

[7] **Carlos A. Serván** and Stefano Allesina. Tractable models of ecological assembly. *Ecology Letters*, 24(5):1029–1037, 2021.

[8] 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.

[9] 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.

[10] 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.

[11] **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.

[12] 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 uniquenes 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 semminar.

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.

Other talks

21-25 Farb and Friends seminar (5 talks). University of Chicago.

09/18 *Intersection graph models for networks.* Darwinian Cluster Retreat, University of Chicago. *Lightning talk.*

08/14 *Effects of predator-prey body mass ratios on food chain length.* XXIII ICBAR. Lima, Perú.

Honors & Awards

Scholarships

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

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

2015 **Opportunity funds scholarship**, *EducationUSA*.

Academic Awards

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

2013–2015 **Top student**, *School of Mathematical Sciences*, National University of San Marcos.

2012 **Graduated as top student**, *School of Biological Sciences*, National University of San Marcos.

2012 **Academic recognition**, *For having ranked first in academic performance in the Professional Academic School of Biological Sciences*, National University of San Marcos.

2010 **Bronze medal, Diploma of Honor**, *First rank in grades of the Professional Academic School of Biological Sciences*, National University of San Marcos.

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 1300s sequence.
- 2023-2024: MATH 15100-15200 Fall and Winter quarter.
- 2024-2025: MATH 15200 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