

Lvzhou Chen

Department of Mathematics
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Employment

- 2022–current **Assistant Professor**, *Purdue University, USA*.
2020–2022 **R. H. Bing Instructor**, *The University of Texas at Austin, USA*.

Education

- 2014–2020 **Ph.D. in Mathematics**, *The University of Chicago, USA*.
Advisor: Danny Calegari
Thesis: Surfaces in graphs of groups and the stable commutator length
2015 **M.S. in Mathematics**, *The University of Chicago, USA*.
2014 **B.S. in Mathematics and Applied Mathematics**, *Fudan University, China*.
Thesis Advisors: Zhi Lü and Yijun Yao
Thesis: \mathbb{Z}_2 -cohomological rigidity of small covers over n -Löbell

Research Interests

Geometry, topology, geometric/combinatorial group theory, and dynamics in low dimensions, with an emphasis on stable commutator length and mapping class groups (of infinite-type surfaces)

Publications

1. **Scl in graphs of groups**, *Invent. Math.*, **221** (2020), no. 2, 329–396.
2. **(with Danny Calegari) Big mapping class groups and rigidity of the simple circle**, *Ergodic Theory and Dynamical Systems*, **41** (2021), no. 7, 1961–1987.
3. **(with Danny Calegari) Normal subgroups of big mapping class groups**, *Trans. Amer. Math. Soc. Ser. B*, **9** (2022), 957–976.
4. **(with Nicolaus Heuer) Stable commutator length in right-angled Artin and Coxeter groups**, *J. Lond. Math. Soc.*, **107** (2023), no. 1, 1–60.
5. **(with Chloe I. Avery) Stable torsion length**, *Int. Math. Res. Not. (IMRN)*, (2023), no. 16, 13817–13866.
6. **(with Alexander J. Rasmussen) Laminations and 2-filling rays on infinite type surfaces**, *Ann. Inst. Fourier*, **73** (2023), no. 6, 2305–2369.
7. **Scl in free products**, *Algebr. Geom. Topol.*, **18** (2018), no.6, 3279–3313.
8. **Spectral gap of scl in free products**, *Proc. Amer. Math. Soc.*, **146** (2018), no.7, 3143–3151.

9. (with Santana Afton, Danny Calegari, Rylee Alanza Lyman) **Nielsen realization for infinite-type surfaces**, *Proc. Amer. Math. Soc.*, **149** (2021), no. 4, 1791–1799.
10. (with Sebastian Hurtado, Homin Lee) **A height gap in $GL_d(\overline{\mathbb{Q}})$ and almost laws**, *Groups Geom. Dyn.*, to appear, arXiv: 2110.15404, 13 pages.
11. (with Nicolaus Heuer) **Spectral gap of scl in graphs of groups and 3-manifolds**, *submitted*, arXiv: 1910.14146, 69 pages.
12. **The Kervaire conjecture and the minimal complexity of surfaces**, *submitted*, arXiv:2302.09811, 33 pages.
13. (with Alexander J. Rasmussen) **Irrational rotations and 2-filling rays**, *submitted*, arXiv:2403.00097, 21 pages.

Awards

- 2020 **Wirszup Fellowship**, *University of Chicago*, USA.
given to an excellent finishing graduate student

Invited Talks

- July 2024 **Shanghai Geometric Group Theory Workshop 2024**, Shanghai Center for Mathematical Sciences.
- May 2024 **Geometric Group Theory Seminar**, Cambridge.
- April 2024 **Low Dimensional Actions Conference**, Inst. Henri Poincaré, Paris.
- March 2024 **Dynamics Seminar**, IUPUI.
- Sept. 2023 **Geometry Seminar**, Lehigh.
- May 2023 **Geometry and Analysis on Groups research seminar**, Vienna.
- May 2023 **Online Seminar on Bounded Cohomology and Simplicial Volume**.
- May 2023 **Knot Online Seminar (K-OS)**.
- April 2023 **Colloquium**, University of Hawaii at Manoa.
- March 2023 **Loo-Keng Hua Forum for Young Mathematicians**, Academy of Mathematics and Systems Science, Chinese Academy of Sciences.
- Nov. 2022 **Topology Seminar**, Notre Dame.
- Oct. 2022 **Geometry and Topology Seminar**, Caltech.
- Aug. 2022 **Wasatch Topology Conference 2022**.
- Aug. 2022 **Geometric Group Theory Summer School**, Shanghai Center for Mathematical Sciences.
- Aug. 2022 **Metric Geometry for Young Scholars**, Capital Normal University.
- March 2022 **Semi-plenary talk**, 2022 Spring Topology and Dynamics Conference.
- March 2022 **Colloquium**, Purdue University.
- Nov. 2021 **Geometric Analysis Seminar**, Purdue University.
- Nov. 2021 **CMSA Interdisciplinary Science Seminar**, Harvard University.
- June 2021 **International Young Seminar on Bounded Cohomology and Simplicial Volume**.
- June 2021 **GGT Seminar**, University of Münster.

June 2021 **Infinite-type surfaces and big mapping class groups session, NCNGT Conference.**
 June 2021 **Oberseminar Groups and Geometry, Universität Bielefeld Bielefeld.**
 May 2021 **Topology Festival, Cornell University.**
 May 2021 **GGT session, 2021 Spring Topology and Dynamics Conference.**
 March 2021 **Geometry Topology Seminar, Georgia Tech.**
 Nov. 2020 **Big Surfaces Seminar, online.**
 Oct. 2020 **Topology/Geometry Seminar, Rutgers.**
 Sept. 2020 **GGT Seminar, Ohio State University.**
 Aug. 2020 **Topology Seminar, University of Texas at Austin.**
 June 2020 **Hyperbolic Lunch, University of Toronto.**
 June 2020 **Hyperbolic geometry and manifolds session, NCNGT Conference.**
 Feb. 2020 **ANT-CoG Seminar, University of North Carolina at Greensboro.**
 Feb. 2020 **Geometry Seminar, University of Michigan.**
 Jan. 2020 **Geometry and Topology Seminar, Caltech.**
 Dec. 2019 **Topology Seminar, Fudan University.**
 Oct. 2019 **Geom/Top Seminar, Washington University in St. Louis.**
 Oct. 2019 **Geometry and Topology Seminar, University of Chicago.**
 Sept. 2019 **Dynamics Seminar, Boston College.**
 March 2019 **Topology and Geometric Group Theory Seminar, Cornell University.**
 Nov. 2018 **Fall AMS southeastern sectional meeting, University of Arkansas.**
 Sept. 2017 **Fall AMS eastern sectional meeting, University at Buffalo.**

Referee Experience

J. AMS, Invent. Math. (twice), GAFA, Adv. Math. (twice), J. Topol., T. AMS, Math. Z., Comment. Math. Helv., Algebr. Geom. Topol. (three times), P. AMS, BLMS, J. Topol. Anal. (twice), L'Enseign Math, Topology and its Applications, Ann. Fenn. Math.

Teaching Experience

Instructor at Purdue

Fall 2023 **M 351**, *Elementary Linear Algebra*.
 Spring 2023 **M 351**, *Elementary Linear Algebra (two sections)*.

Instructor at UT Austin

Spring 2022 **M 392 C**, *The Gromov norm and bounded cohomology (grad. topic course)*.
 Fall 2021 **M 408 S**, *Integral Calculus for Science*.
 Spring 2021 **M 427 L**, *Advanced Calculus for Applications II*.
 Fall 2020 **M 328 K**, *Introduction to Number Theory*.

Instructor at UChicago

2019–2020 **Math 152 and 153**, *Calculus*.
 2018–2019 **Math 152 and 153**, *Calculus*.

- 2017–2018 **Math 152 and 153**, *Calculus*.
 2016–2017 **Math 151, 152 and 153**, *Calculus*.
[College Fellow \(Teaching Assistant\) at UChicago](#)
 Spring 2016 **Math 263**, *Introduction to Algebraic Topology*.
 Winter 2016 **Math 262**, *Point-set Topology*.
 Fall 2015 **Math 267**, *Introduction to Representation Theory of Finite Groups*.
[Grader at UChicago](#)
 Spring 2019 **Math 319**, *Graduate Riemannian Geometry*.
 Fall 2016 **Math 317**, *Graduate Algebraic Topology*.
 Winter 2016 **Math 318**, *Graduate Differential Topology*.

--- Service and Mentorship

- 2022–current **Advising PhD students**, *Purdue*.
 Geoffrey Baring (current)
- 2022–current **Mentoring undergraduate students**, *Purdue*.
 Minseung Son (Point-set Topology, Spring 2024)
- 2023–current **Advising the Organization of Purdue Directed Reading Program**, *Purdue*.
 Provide guidance to graduate students (Ani Giokas) organizing the DRP, including suggestions on the format and timeline of the program, pairing mentors and mentees
- Spring 2023 **Co-organizer of the Midwest Topology Seminar**, *Purdue*.
 Suggested several speakers, contributed ideas about the structure of the conference, advertised it, and partially supported it with funding
- 2022–current **Co-organizer of the Purdue Geometry and Geometric Analysis Seminar**.
 Invited and hosted speakers
- 2020–2022 **Co-organizer of the Topology Seminar at UT Austin**.
 Suggested, invited and hosted speakers
- Fall 2021 **Mentor of the Texas Geometry Lab**.
 Guided a group of three undergraduates (Simon Xiang, Jimmy Xin, Ruiqi Zou) to explore stable commutator length in free groups using computer experiments from a topological/combinatorial point of view
- Spring 2020 **Organizer of Geometric Group Theory session in NCNGT conference**.
 Designed mini-sessions, invited speakers and hosted the session online
- Fall 2018 **Organizer of Reading Group**, *on surface subgroups*.
 Divided papers into manageable parts for one-hour talks, assigned talks to participating postdocs and graduate students, gave several talks
- 2017–2018 **Mentor for Directed Reading Program**.
 Found suitable topics and textbooks for undergraduate students to study
 ○ Mentee: Mary Stelow. Topic: 1-dimensional Complex Dynamics
 ○ Mentee: Jeremy Atos. Topic: Fundamental Groups and Homology Groups