

Jun Li

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Research Interest:

symplectic and complex geometry, smooth 4-manifolds, dynamical systems

Employment

2017–now **Post-Doctoral Assistant Professor**, *University of Michigan*, Ann Arbor.
Host: Daniel Burns and Yongbin Ruan

Education

June 30, 2017 **Ph.D. in Mathematics**, *University of Minnesota-Twin Cities*, Minneapolis.
Advisor: Tian-Jun Li

2007– 2011 **B.S. in Mathematics**, *Shandong University*, Jinan, China.

Grants and Awards

2019-2022 **AMS-Simons travel grant**, \$4000.
2020 **Level I teaching technology innovation grant**, **University of Michigan**, \$5000.
2019 Postdoc Travel Award, University of Michigan
Nov. 2016 Graduate Student Travel Award, University of Minnesota
2016-2017 NSF research assistship (PI: T-J Li), University of Minnesota
2011-2012 First-year Graduate Student Fellow, University of Minnesota
2009-2011 National Scholarship for Excellent Students, Shandong University

Publication and Preprints

Latest versions available at www-personal.umich.edu/~lijungeo/papers.html

- [11] **Lie group moment maps and Riemannian Neural Networks**, *With Jun Zhang*, under review at Proceeding of Geometry Science of information 2021.
- [10] **Braid groups and symplectic mapping class groups of rational surfaces**, *With Tian-Jun Li and Weiwei Wu*, (preprint 2020, 49 pages).
- [9] **Chambers in symplectic cone and stability of $Symp$ for non-minimal ruled surfaces**, *With Olga Buse*, (preprint 2020, 20 pages), under review at IMRN.
- [8] **Penner's Pseudo-Anosov constructions via half twists**, *With Anthony Morales*, Zijian Rong*, Wendy Wang*, Bradley Zykoski, Becca Winarski*, preprint 2020, (*stands for an undergraduate co-author) .
- [7] **Symplectic isotopy on non-minimal ruled surfaces**, *With Olga Buse*, (2019, 23 pages), Compositio Math, under review.
- [6] **Stability of the symplectomorphism group of rational surfaces**, *With Sílvia Anjos, Tian-Jun Li, and Martin Pinsonnault*, (2019, 16 pages), Adv. Math, in revision.
- [5] **Symplectic (-2) -spheres and symplectomorphism group of small rational 4-manifolds II**, *With Tian-Jun Li and Weiwei Wu* (2019, 44 pages), accepted by **Transaction of AMS**.
- [4] **Topology of symplectomorphism groups and ball-swappings**, *With Weiwei Wu*, (20 pages), accepted by **ICCM Proceeding 2019**.

- [3] **Symplectic (-2) -spheres and symplectomorphism group of small rational 4-manifolds I**, *With Tian-Jun Li (30 pages)*, 2020 **Pacific Journal of Math**, 304 (2) pp. 561-606 .
- [2] **The Symplectic mapping class group of $\mathbb{C}P^2 \# n \overline{\mathbb{C}P^2}$, $n \leq 4$** , *With Tian-Jun Li and Weiwei Wu*, **Michigan Math. J.** 64.2 (2015), pp. 319 - 333.
- [1] **The Proof that Leap-frog Schemes of Nonlinear Hamiltonian System is Symplectic Scheme**, *With Xiufeng Wang and Lei Zhang*, China Sci. Info., 2010 (pp.1-6, vol.19).
- [0] **Symplectomorphism group of rational 4-manifolds.**
Ph.D Thesis, University of Minnesota
[Work in progress](#)
- [12] **Symplectic dynamics of divisor complements.**
With Daniel Burns, In preparation, draft available
- [13] **Lie group machine learning and moment maps .**
With Jun Zhang, In preparation, draft available
- [14] **Parallelizable statistical manifolds and Kähler structures.**
With Jun Zhang, In preparation.

Teaching

Instructor, University of Michigan

- Fall 2020 Psychology 765, Topics in Information Geometry, co-lecturer
- Fall 2020 Math 214, Applied Linear Algebra, with Matlab, Python, Sagemath, (supported by technology innovation grant)
- Winter 2020 Math 217, Linear Algebra and Intro to Proof (IBL)
- Fall 2019 Math 636, Topics in Differential Geometry (Graduate Course)
- Fall 2019 Math 217, **Manager/coordinator** of Canvas webpage (300-people course)
- Spring 2019 Math 433, Intro to Differential Geometry
- Spring 2019 Math 217, Linear Algebra and Intro to Proof (IBL)
- Fall 2018 Math 217, Linear Algebra and Intro to Proof (IBL)
- Spring 2018 Math 433, Intro to Differential Geometry
- Fall 2017 Math 115, Calculus I

Recitation Instructor or TA, University of Minnesota

- Spring 2017 Math 4428, Mathematical Modelling, using Matlab, **course assistant**
- Spring 2016 Math 2263, Multi-variable Calculus
- Fall 2015 Stat 3021, Introduction to Probability and Statistics, **course assistant**
- Spring 2015 Math 2373, CSE Honor Differential Equation and Linear Algebra
- Fall 2014 Math 2263, Multi-variable Calculus
- Spring 2014 Math 1372, CSE Honor Calculus II
- Fall 2013 Math 1372, CSE Honor Calculus II
- Spring 2013 Math 1271, Calculus I
- Fall 2012 Math 1271, Calculus I
- 2014-2015 **Grader** for Math 8301 Manifold and Topology (Graduate Course)

Undergraduate Research and Mentoring

2020 Summer REU

Summer 2020 **Co-Mentor**, With Prof. Jun Zhang (Professor of Math, statistics, and Psychology) in the Mind, Machine, Mathematics lab, supervised students: Chenxi Fan, Yifan Lu on the project "Fisher-Rao information metric for location scale family of probability distributions."

[Undergraduate Research at Laboratory of Geometry at Michigan, LOG\(M\)](#)

Fall 2019 **Mentor**, LOG(M) project: Curves in surfaces and mapping class groups

LOG(M) is a vertically integrated research experience for undergraduates. Each project is proposed and supervised by a faculty mentor and the undergraduates are advised by the faculty mentor and a graduate student.

Faculty Mentor: **Jun Li**, Becca Winarski

Graduate Assistant: Bradley Zykoski

Students: Anthony Morales, Robin Rong, Wendy Wang

We explore mathematical techniques to construct certain classes of mappings that's important on surfaces, and use Python to visualize/implement these constructions. As of Nov 2019, we reached the state of art on constructing pseudo-Anosov mapping classes in sphere braid groups.

[Other mentor experience](#)

Fall 2020 **Advisor** Independent study (3 credits course Math 399), University of Michigan, mentor of Robin Rong, topic: Statistical behavior of dynamical system and entropy

Mar 2020 **Ph.D. thesis defence committee member**, for *Daniel Irvine*, University of Michigan.

Fall 2019 **Mentor** Michigan Postdoc-Graduate Mixer, mentor of Daniel Irvine

2018-2019 **Mentor** for Math Modelling Contest, 2 teams

Supervising undergraduate students to build model and write code in Sage and Matlab to solve real world problems and write essays.

[Selected Conference/Seminar Talks](#)

May. 2021 **Symplectic and low dimensional topology weekend**, *Conference talk (Virtual)*.

Apr. 2021 **University of Dayton**, *Colloquium (Virtual)*.

Jan. 2021 **Rutgers University-Newark**, *Colloquium (Virtual)*.

Nov. 2020 **Minnesota State University**, *Colloquium (Virtual)*.

Jul. 2020 **Online Zoominar**, *Quantum and Floer theory Seminar*.

Jun. 2020 **Bowdoin College**, *Special Colloquium (Job talk)*.

Apr. 2020 **AMS central sectional meeting**.

Online Special Session on Computational aspects of Symplectic Topology

Nov. 2019 **Columbia University**, *Symplectic Geometry, Gauge and Categorification Seminar*.

Nov. 2019 **AMS Fall Western Sectional Meeting**.

Special Session on Symplectic Geometry and Low Dimensional Topology

Oct. 2019 **University of Georgia**, *Geometry Seminar*.

May 2019 **36th Annual workshop on Geometric Topology**, *Milwaukee*.

Apr 2019 **Workshop on quantitative geometry and topology**, *Ohio State*, lighting talk.

Mar. 2019 **Indiana-Purdue**, *Geometry/Modern Analysis Seminar*.

July 2018 **IST, Lisbon, Portugal**, *Geometria em Lisboa Seminar*.

May 2018 **Mini-workshop on Symplectic Symmetry and J-hol Curves**, *Minneapolis*.

Mar. 2018 **SUNY, Binghamton**, *Topology Seminar*.

- Nov. 2017 **University of Notre Dame**, *Felix Klein Geometry Seminar*.
- Oct. 2017 **University of Michigan-Ann Arbor**, *Geometry Seminar*.
- Mar. 2017 **Shandong University**, *Department talk*.
- Mar. 2017 **Beijing Normal University**, *Geometry Seminar*.
- Nov. 2016 **University of Minnesota**, *Differential Geometry and Symplectic Topology Seminar*.
- Nov. 2016 **University of Iowa**, *Joint Geometry and Topology Seminar*.
- Oct. 2016 **AMS Fall Central Sectional Meeting**.
Special Session on Symplectic Geometry and Contact Geometry
- Sep. 2016 **Minnesota State University**, *Department Colloquium*.
- Mar. 2016 **University of Minnesota**, *Differential Geometry and Symplectic Topology Seminar*.
- Apr. 2016 **AMS Spring Central Sectional Meeting**.
Special Session on Low Dimensional and Symplectic Topology
- Dec. 2015 **Shandong University**, *Geometry/Topology Seminar*.
- Aug. 2013 **Conference on the Topology and Invariants of Smooth 4-Manifolds**, *UMN*.

Synergistic Activities

- Apr 2020 **Co-organizer**, *Computational aspect of symplectic geometry, AMS sectional meeting special section*, With Olguta Buse and Richard Hind, Purdue University.
- May 2019 **Organizer**, *FRG Workshop on symplectic packing/isotopy*, With Tian-Jun Li and Yongbin Ruan, U of Michigan, Ann Arbor.
- 2019- **Referee**, for *Journal of Topology*, *Selecta Mathematica*, and *IMRN*.
- 2015-2017 **Organizer**, *Symplectic and low dimensional topology student seminar*, U of Minnesota.
- 2010-2011 **Co-organizer**, *Undergraduate Math Reading Seminar*, Shandong University.

Department service

- Jan 2019 **Graduate admission reviewer**, University of Michigan.
- May 2018 **Ph.D Written Prelim committee**, *Topology exam*, University of Michigan.
- Aug 2015 **Instructor**, *TA/International Graduate training program*, University of Minnesota.

Educational Outreach

- Spring 2021 **Activity leader for F.E.M.M.E.S (virtual) Capstone** at the University of Michigan
Through engaging, hands-on activities presented in a fun, supportive environment, F.E.M.M.E.S. programs encourage girls to learn and explore their potential in science, technology, math, and engineering (STEM).
- Spring 2020 **Instructor for Wolverine Pathway**, University of Michigan
This is a program for under-served middle and high school students in the Ypsilanti and Southfield school districts. The goal of the program is to offer a pathway to college. Students who complete the rigorous program and are accepted to UM receive a full-tuition scholarship. The math department runs math circles for the students to introduce them to fun and interesting math. I had a student in this program in my class Math 217
- Mar. 2019 **Volunteer for Wolverine Express**, K-12 outreach, University of Michigan
Wolverine Express is a high school visitation program in which a diverse team of U-M faculty, staff and students travel to high schools located across the state of Michigan to promote college access, readiness and success.

Sept 2018 **Volunteer for Math Mondays** in Ypsilanti high schools, Michigan.

Fall 2016 **Volunteer for Math Festival** University of Minnesota.

Pedagogical Training

2020 Training for online instruction, University of Michigan, Ann Arbor, MI.

2019 Inquiry Based Learning (IBL) Workshop, University of Michigan, Ann Arbor, MI.

A three day workshop focused on managing an IBL classroom.

2018 IBL Workshop, University of Michigan, Ann Arbor, MI.

2017 Teacher Training, University of Michigan, Ann Arbor, MI.

The training consisted of a week long orientation on implementing active-learning techniques in the classroom and continues throughout the year with weekly seminars and monthly lunches discussing various style teaching.

Aug 2011 TA/International Graduate training program, University of Minnesota

Membership and associations

2017- Member, the network to advance Faculty of Color at University of Michigan

2012-2017 Member, the Graduate Students of Color Alliance at University of Minnesota

2011- Member, American Mathematics Society

Other activities and skills

Software \LaTeX Matlab, Python, Sage, R, Hadoop, SQL

Language English, Chinese, French(Reading)

References

Daniel Burns (postdoc mentor)

Professor of Mathematics

Professor of Bioinformatics

University of Michigan

E-mail: dburns@umich.edu

Richard Hind

Professor of Mathematics

Math Department Chair

University of Notre Dame

E-mail: Richard.K.Hind.1@nd.edu

Tian-Jun Li (Ph.D. advisor)

Professor of Mathematics

Math Department Associate Chair

University of Minnesota

E-mail: tjli@math.umn.edu

Yongbin Ruan (postdoc mentor)

Professor of Mathematics

University of Michigan

E-mail: ruan@umich.edu

Scott Schneider (teaching)

Lecture IV

University of Michigan

E-mail: sschneider@umich.edu

Ralf Spatzier (teaching)

Professor of Mathematics

IBL center Director

University of Michigan

E-mail: spatzier@umich.edu

Michael Usher

Professor of Mathematics

University of Georgia

E-mail: usher@uga.edu