Siran Li

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Education

University of Oxford, UK *2013–2017*
D. Phil. in Mathematics, supervised by Prof. Gui-Qiang G. Chen
Columbia University, New York, USA *2009–2013*
B. A. in Mathematics; Phi Beta Kappa; Magna cum Laude

Employment History

Shanghai Jiao Tong University *September 2021 — Now*
Tenure-Track Associate Professor *Shanghai, China*
- School of Mathematical Sciences

New York University—Shanghai *September 2020 — August 2022*
Visiting Assistant/Adjunct Associate Professor *Shanghai, China*
- Department of Mathematics

Rice University *August 2017 — June 2020*
G. C. Evans Instructor *Houston, Texas, USA*
- Mentor: Robert Hardt

Centre de Recherches Mathématiques *June 2018 — May 2019*
CRM–ISM Postdoctoral Fellow *Montreal, Quebec, Canada*
- Hosts: Galia Dafni, Pengfei Guan, Dmitry Jakobson, Adam Oberman, and Alexander Shnirelman

University of Oxford *October 2015 — June 2017*
Stipendiary Lecturer *Oxford, UK*
- Tutor in mathematics at Exeter and Oriel Colleges, University of Oxford

Research Publications

1. A. Acharya, G.-Q. Chen, **S. Li**, M. Slemrod, and D. Wang, Fluids, elasticity, geometry, and the existence of wrinkled solutions, **Arch. Ration. Mech. Anal.** 226 (2017), 1009–1060.
2. G.-Q. Chen and **S. Li**, Global weak rigidity of the Gauss–Codazzi–Ricci equations and isometric immersions of Riemannian manifolds with lower regularity, **J. Geom. Anal.** 28 (2018), 1957–2007.
3. **S. Li**, On one-dimensional compressible Navier–Stokes equations for a reacting mixture in unbounded domains, **Z. Angew. Math. Phys.** 68 (2017), 106–127.
4. **S. Li**, Dimension reduction of compressible fluid models over product domains, **J. Diff. Eqs.** 266 (2019), 87–113.
5. **S. Li**, On the existence of $C^{1,1}$-isometric immersions of several classes of negatively curved surfaces into $\mathbb{R}^3$, **Arch. Ration. Mech. Anal.** 236 (2020), 419–449.

6. **S. Li**, Geometric regularity criteria for incompressible Navier–Stokes equations with Navier boundary conditions, **Nonlinear Anal.** 188 (2019), 202–235.
7. **S. Li**, Counterexamples to the L^p-Calderón–Zygmund estimate on open manifolds, **Ann. Glob. Anal. Geom.** 57 (2020), 61–70.
8. **S. Li**, A remark on the non-compactness of $W^{2,d}$-immersions of d-dimensional hypersurfaces, **Proc. Amer. Math. Soc.** 148 (2020), 2245–2255.
9. **S. Li**, A note on generic transversality of Euclidean submanifolds, **Manuscripta Math.** 162 (2020), 213–219.
10. **S. Li** and X. Zheng, A generalization of Lemma 1 in Kotlarski (1967), **Statist. Probab. Lett.** 165 (2020), 108814.
11. **S. Li**, J. Wu, and K. Zhao, On the degenerate Boussinesq equations on surfaces, **J. Geom. Mech.** 12 (2020), 107–140.
12. **S. Li**, Towards a theory of multi-parameter geometrical variational problems: fibre bundles, differential forms, and Riemannian quasiconvexity, **Quart. Appl. Math.** 78 (2020), 469–483.
13. **S. Li**, A note on Alberti's Luzin-type theorem for gradients, **Ricerche Mat.** 70 (2021), 479–488.
14. **S. Li**, Regularity of desingularised models for vortex filaments in incompressible viscous flows: a geometrical approach, **Quart. Jl. Mech. Appl. Math.** 73 (2020), 217–230.
15. **S. Li** and A. Schikorra, $W^{s,\frac{n}{s}}$-maps with positive distributional Jacobians, **Potential Anal.** 55 (2020), 403–417.
16. **S. Li**, On vortex alignment and boundedness of L^q-norm of vorticity in incompressible viscous fluids, **Acta Math. Scientia**, 40 (2020) 1700–1708.
17. **S. Li**, The Weyl problem of isometric immersions revisited, **Bull. Lond. Math. Soc.** 53 (2021), 220–230.
18. **S. Li**, Volume decay and concentration of high-dimensional Euclidean balls — a PDE and variational perspective, **Analysis (Germany)** 41 (2021), 25–29.
19. **S. Li**, Stability of minimising harmonic maps under $W^{1,p}$-perturbations of boundary data: $p \geq 2$, **J. Diff. Eqs.** 296 (2021), 279–298.
20. G.-Q. Chen and **S. Li**, Weak continuity of Cartan's structural equation on semi-Riemannian manifolds with lower regularity, **Arch. Ration. Mech. Anal.** 241 (2021), 579–641.
21. G.-Q. Chen, **S. Li**, and M. Slemrod, On asymptotic rigidity and continuity problems in nonlinear elasticity, **J. Math. Pures Appl.** (9) 160 (2022), 29–53.
22. **S. Li** and H. Ni, Expected signature of stopped Brownian motions on d-dimensional $C^{2,\alpha}$-domains has finite radius of convergence everywhere: $2 \leq d \leq 8$. **J. Funct. Anal.** 282 (2022), No. 109447.
23. **S. Li** and M. Slemrod, From the Nash–Kuiper theorem of isometric embeddings to the Euler equations for steady fluid motions: analogues, examples, and extensions, **J. Math. Phys.** 64 (2023), No. 011511.
24. **S. Li**, A new proof of the Gaffney's inequality for differential forms on manifolds-with-boundary: the variational approach *à la* Kozono–Yanagisawa, **Acta Math. Scientia** 42 (2022), 1427–1452.
25. **S. Li**, A remark on stress of a spatially uniform dislocation density field, accepted by **J. Elasticity**

(2022), ArXiv preprint: 2003.08065.

26. X. Meng, J. K. Taylor, **S. Li**, and S. B. Taieb, Scoring functions for multivariate distributions and level sets, under revision with **Operations Research** (2020), ArXiv preprint: 2002.09578.
27. **S. Li**, M. R. Pakzad, and A. Schikorra, Fractional Sobolev isometric immersions of planar domains, accepted by **Annali della Scuola Normale Superiore di Pisa** (2022), ArXiv Preprint: 2103.01723.
28. H. Lou, **S. Li**, and H. Ni, Path development network with finite-dimensional Lie group representation; submitted to **Journal of Machine Learning Research**, ArXiv Preprint: 2204.00740.
29. **S. Li**, On analysis of the exponential map of volume-preserving diffeomorphism group on closed orientable surfaces through the vorticity, ArXiv Preprint: 2204.09497, submitted to **J. Funct. Anal.** (2022).
30. **S. Li**, Gaussian kernels on non-simply-connected closed Riemannian manifolds are never positive definite, ArXiv Preprint: 2303.06558, submitted to **Bull. London Math. Soc.** (2023).
31. **S. Li**, H. Ni, and Q. Zhu, Small mass limit of expected signature for physical Brownian motion, ArXiv Preprint: 2305.00343, submitted to **Proc. London Math. Soc.** (2023).
32. H. Lou, **S. Li**, and H. Ni, PCF-GAN: generating sequential data via the characteristic function of measures on the path space, ArXiv Preprint: 2305.12511, submitted to conference proceedings (2023).
33. [*expository] G.-Q. Chen and **S. Li**, Compensated compactness in Banach spaces and weak rigidity of isometric immersions of manifolds, in: **Nonlinear partial differential equations, mathematical physics, and stochastic analysis** (Helge Holden's 60^{th} birthday volume), pp.73–95, EMS Ser. Congr. Rep., Eur. Math. Soc., Zürich, 2018.

Invited Talks and Visits

June 2023	Calabi flow and related topics, USTC Shanghai Institute for Advanced Studies
May 2023	PDE conference, Xiamen University
April 2023	PDE conference, Nanjing University
Nov. 2022	Maths Colloquium, Duke Kunshan University
Aug. 2022	Minicourse on Geometric Measure Theory, Tianyuan Maths Centre, Sichuan
Aug. 2022	Analysis Seminar, Wuhan Science and Technology University
Oct. 2021	Conference on Hyperbolic PDE, South Western University of Economics & Finance
Oct. 2021	Yangtze Delta PDE Forum, Nantong University
Sep. 2021	Geometric Analysis Seminar, Peking University
July 2021	Mathematical Congress of the Americas, special session invited talk
May 2021	Online Seminar for Analysis and PDE
Apr. 2021	Seminar, Wuhan University
Jan. 2021	Seminar, Chinese Academy of Sciences, China
Dec. 2020	Youth Forum, Shanghai Jiao Tong University, China
Dec. 2020	Colloquium, Shanghai Centre of Mathematical Sciences, China
Nov. 2020	Seminar, Peking University, China

Nov. 2020	Seminar, East China Normal University, China
Oct. 2020	Seminar, Fudan University, China
Sep. 2020	Seminar, Shenzhen University, China
Sep. 2020	Seminar, Duke Kunshan University, China
Sep. 2020	Workshop on integral geometry, Prague, Czechoslovakia (postponed)
Jun. 2020	Special session, AIMS Conference, USA (postponed)
May 2020	Alumni Seminar, University of Oxford, UK (postponed)
Apr. 2020	Pittsburgh–Freiburg–Salzburg–Halle Geometric Analysis Seminar (online)
Apr. 2020	PDE seminar, Kansas State University, USA (cancelled)
Feb. 2020	Special seminar, NYU Courant, USA
Feb. 2020	Special seminar, University of Alabama-Birmingham, USA
Dec. 2019	Special seminar, Durham University, UK
Nov. 2019	Special seminar, Warwick University, UK
Nov. 2019	OxPDE special seminar, University of Oxford, UK
Oct. 2019	Tulane University, USA
Sep. 2019	Geometry and analysis seminar, Rice University, US
Apr. 2019	Geometric analysis seminar, McGill University, Canada
Feb. 2019	Analysis seminar, Université Laval, Canada
Nov. 2018	PDE seminar, University of Oxford, UK
Oct. 2018	Analysis and PDE seminar, Heriot-Watt University, Scotland, UK
Oct. 2018	Analysis seminar, University of South Carolina, USA
Oct. 2018	Geometry and analysis seminar, Rice University, USA
Jun. 2018	SIAM sectional meeting, Louisiana State University, USA
Jun. 2018	Canadian Mathematical Society sectional meeting, Fredericton, Canada
Mar. 2018	PDE Workshop, Pittsburgh University, USA
Mar. 2018	OxPDE Lunchtime seminar, University of Oxford, UK
Feb. 2018	Analysis seminar, Tulane University, USA
Oct. 2017	Analysis seminar, University of Houston, USA
Sep. 2017	Geometry and analysis seminar, Rice University, USA
Jun. 2017	Harmonic analysis seminar, Concordia University, Canada
Jun. 2017	CRM Seminar, McGill University, Canada
Mar. 2016	City University of Hong Kong, China
Feb. 2016	PDE seminar, University of Oxford, UK
Aug. 2016	International workshop on hyperbolic PDE, Chinese Academy of Sciences, China
Aug. 2015	International workshop on hyperbolic PDE, Chinese Academy of Sciences, China
May 2015	"CAKE" seminar in analysis, University of Cambridge, UK
Mar. 2015	Annual OxBridge conference on PDE, University of Oxford, UK
Mar. 2015	International conference on PDE, Pittsburgh University, USA
Feb. 2015	Junior topology and geometry seminar, University of Oxford, UK

Honours and Awards

May 2021	Shanghai Thousand Talent Programme, China
Oct. 2019	AMMSC Kolmogorov–Wiener Prize for Young Researchers, Waterloo, Canada
Oct. 2018	SIAM travel award, USA
May 2014, 15, 16	Keble Association Study Award, University of Oxford, UK
2017 – 2019	CRM–ISM postdoctoral fellowship, Montreal, Canada
May 2013	Phi Beta Kappa, Columbia University Chapter, New York, USA
2011–2012	OxBridge Scholarship, Columbia University, New York, USA

Teaching Experience

Spring 2023	Functional Analysis
Fall 2022	Analysis (graduate)
Spring 2022	Functional Analysis, ODE, and Honours Linear Algebra II
Fall 2021	Analysis (graduate) and Honours Linear Algebra I
Spring 2021	Honours Linear Algebra II and PDE
Fall 2020	Honours Linear Algebra I
Spring 2020	Lecturer for Complex analysis (graduate) and ODE
Fall 2019	Lecturer for Calculus III
Spring 2018	Lecturer for Riemannian geometry (graduate) and ODE
Fall 2018	Lecturer for Calculus I
Trinity 2017	Tutor for Hyperbolic PDE (graduate); Prelims Analysis III, Prelims Probability; Part A Probability, and Part A Integration
Hilary 2017	Tutor for Part A Integration
Michaelmas 2016	Tutor for Prelims Analysis I, Prelim Probability; Part A Probability Part A Integral transforms, and Introduction to PDE (graduate)
Trinity 2016	Tutor for Part A Calculus of variations, Part A Probability, Prelims Analysis; Tutor for Hyperbolic PDEs (graduate)
Hilary 2016	Tutor for Prelims Multivariate calculus
Trinity 2015	Tutor for Part C Functional analysis and Hyperbolic PDE (graduate)
Hilary 2015	Tutor for Prelims Fourier analysis and PDE, Prelims Multivariate calculus, and Part A Differential equations
Michaelmas 2014	TA for Part C Functional analysis; tutor for Part A Probability
Hilary 2014	TA for Part B Hilbert spaces
Michaelmas 2013	TA for Part B Banach spaces and Martingale through measure theory

Professional Service

- Referee for Analysis (Berlin), Journal of Physics A, Quarterly Journal of Mechanics and Applied Mathematics, Discrete Dynamics in Nature and Society, Advances in Mathematics, Journal of Functional Analysis, SIAM Journal of Mathematical Analysis, Mathematical Problems in Engineering, Acta Mathematica Scientia, Journal of Function Spaces, Symmetry, Chinese Annals of Mathematics Series B, Journal of London Mathematical Society (quick opinion), Mathematical Problems in Engineering, Mathematics, Advances in Nonlinear Studies (J. Spruck special issue).
- Reviewer for zbMATH and MathSciNet.

- PhD advanced examination committee for Asghir Varfell (Rice University).
- PhD defence committee for Huihuang Zhou (Shanghai Jiao Tong University).
- MSc defence committee for Ruoyu Zhang (Shanghai Jiao Tong University).
- Supervision for PhD students: Jianing Yang (since 2023).
- Supervision for undergraduate capstone projects: Qianyu Zhu (NYU-Shanghai; now Ph.D. student at MIT), Zitong Tian (Shanghai Jiao Tong University; now Ph.D. student at Tsing-Hua Univ.), Shunxi Wang (Shanghai Jiao Tong University).
- Supervision for master projects: Chaorui Wang, Tianyu Wu, Tong Zhao (UCL).

Other Professional and Outreach Experiences

2022–	Ph.D. qualification exam and entrance exam committee, SJTU
2021 Summer	DURF projects (undergrad research), NYUSH
2019–2020	Chair of colloquium committee, Maths Dept., Rice University
2017–18	Mentor for Rice geometry lab (undergraduate research)
2017–18	Committee for current mathematics seminar (graduate seminar), Rice University
2016	Interview panel for undergraduate admissions, Oriel College, University of Oxford

Research Areas

Analysis and partial differential equations; differential geometry; applied mathematics.

Personal Data

DOB: 19 September 1991; Citizen of China; Married to Xiaoqian Louise Lin; 1 son, Zhilin Edward Li.

References

Gui-Qiang Chen (*D. Phil.* supervisor, Oxford)	Gui-Qiang.Chen@maths.ox.ac.uk
Constantine Dafermos (Brown)	Constantine_Dafermos@Brown.edu
Robert Hardt (postdoctoal mentor, Rice)	hardt@math.rice.edu
Zhongmin Qian (research and teaching, Oxford)	Zhongmin.Qian@maths.ox.ac.uk
Marshall Slemrod (Wisconsin-Madison)	slemrod@math.wisc.edu
Ya-Guang Wang (Shanghai Jiao Tong University)	ygwang@sjtu.edu.cn