## Taiyang Xu

Fudan University	homonogo, toironguu github io
200 Handan Rd 200433, Shanghai, Ch	ina Email: tyxu19 (YOU KNOW) fudan (DOT) edu (DOT) cn
Current Position	Fudan University, Shanghai, China07/2024 - nowDepartment of Mathematics07/2024 - now
	Postdoctoral Fellow (Mentor: Prof. Lun Zhang)
Education	Fudan University, Shanghai, China09/2019 - 06/2024Ph.D. in Mathematics, supervisor Prof. Engui FanThesis title: "On the long-time asymptotics of the local and nonlocal mKdV equation under the nonzero background"
	China University of Mining and Technology, Xuzhou, China09/2015 - 06/2019B.Sc. in Mathematics, Distinguished HonorThesis title "Inverse scattering theory and integrability on several kinds of nonlinear evolution equations"
Research Interests	Integrable PDEs, Random matrices theory, Determinantal point processes, Orthogonal poly- nomials, Asymptotic analysis, Riemann-Hilbert (RH) problems, Special functions, Painlevé equations.
Research Articles	<ul> <li>Preprints</li> <li>1. Painlevé transcendents in the defocusing mKdV equation with non-zero boundary conditions (with Engui Fan and Zhaoyu Wang) arXiv:2306.07073.</li> </ul>
	<ul> <li>Publications in refereed journals</li> <li>1. Soliton resolution and asymptotic stability of <i>N</i>-soliton solutions for the defocusing mKdV equation with finite density type initial data (with Engui Fan and Zechuan Zhang) <i>Physica D: Nonlinear Phenomena</i>, 472 (2025), 134526.</li> </ul>
	<ol> <li>Transient asymptotics of the modified Camassa-Holm equation (with Yiling Yang and Lun Zhang) Journal of the London Mathematical Society, 110 (2024), e12967.</li> </ol>
	3. On the Cauchy problem of defocusing mKdV equation with finite density initial data: long- time asymptotics in soliton-less regions (with Engui Fan and Zechuan Zhang) <i>Journal of Differential Equations</i> , 372 (2023), 55-122.
	<ol> <li>Large-time asymptotics to the focusing nonlocal modified Kortweg-de Vries equation with step-like boundary conditions (with Engui Fan) <i>Studies in Applied Mathematics</i>, 150 (2023), 1217-1273.</li> </ol>
	<ol> <li>Riemann-Hilbert approach for multisoliton solutions of generalized coupled fourth-order nonlinear Schrödinger equations (with Weiqi Peng and Shoufu Tian) <i>Mathematical Methods in the Applied Sciences</i>, 43 (2020), 865-880.</li> </ol>
Grants	<ul> <li>Shanghai Post-doctoral Excellence Program 2024 – 2026</li> <li>Certificate No. 2024100</li> <li><i>"Riemann-Hilbert Method for Several Asymptotic Problems related to Universality from Integrable Systems and Random Matrix Theory"</i></li> <li>Role: Host</li> </ul>
	<ul> <li>China Postdoctoral Science Foundation 2024 – 2026 Certificate No. 2024M760480</li> <li><i>"Semiclassical Asymptotics and Universality for Nonlinear Integrable Shallow Water Wave Systems"</i> Role: Host</li> </ul>

Teaching Activities	@ Fudan (2019 – 2026) – Spring 2024: TA of Methods of Asymptotic Analysis (MATH630117)
	= Spring, 2024. TA of Colonbus & (MATH120021.02)
	= rai, 2021. TA of Calculus A (MATH120021.02). Spring, 2020: TA of Calculus B (MATH120004.01) (Opling)
	= Spring, 2020. TA of Calculus B (MATH120004.01) (Online).
	- Fail, 2019: 1A of Calculus B (MATH120003.01).
Scholarships &	2019 – 2024 (Doctorate)
Awards	– Graduation with Honors (Shanghai Outstanding Graduate), 2024.
	<ul> <li>Scholarship provided by Huatai Securities Technology, 2023.</li> </ul>
	<ul> <li>Scholarship provided by Pacific Insurance Company, 2022.</li> </ul>
	- Outstanding Doctoral Candidate Scholarship provided by Fudan University, 2021.
	<ul> <li>Doctoral Scholarship of the Year provided by Fudan University, 2019 – 2023.</li> </ul>
	<b>2015 – 2019 (Undergraduate)</b> – Outstanding Undergraduates in China University of Mining and Technology, 2019.
Seminars	<ul> <li>@ Fudan Integrable Systems and Random Matrix Theory Seminar (2019 – 2026)</li> <li>"Fredholm determinants from Schrödinger type equations, and deformation of Tracy-Widom distribution", Oct, 2024.</li> </ul>
	– "Biorthogonal measures, polymer partition functions, and random matrices", April, 2024.
	- "Painlevé type asymptotics for the Camassa-Holm equation", Oct, 2022.
	- "A Riemann-Hilbert approach to Fredholm determinants of Hankel composition operators: scalar-valued kernels", Sept - Oct, 2022.
	- "Primitive potentials and bounded solutions of the KdV equation", Sept. 2022.
	- "Soliton V. The gas: Fredholm determinants, analysis and the rapid oscillations behind the kinetic equation", May - June, 2022.
	<ul> <li>"Airy kernel determinant solutions to the KdV equation and integro-differential Painlevé equa- tions", Mar, 2022.</li> </ul>
	- "The defocusing nonlinear Schrödinger equation with step-like oscillatory initial data", Oct, 2022.
	- "Momenta spacing distributions in anharmonic and the higher order finite temperature Airy kernel", Oct, 2022.
	<ul> <li>"Long-Time behavior of the non-focusing nonlinear Schrödinger equation – a case study", April, 2022.</li> </ul>
	- "On the origins of Riemann-Hilbert problems in mathematics", Mar, 2022.
Co-organized Activities	<ul> <li>- (with Lun Zhang) Mini-workshop on Asymptotic Analysis, Fudan University, Shanghai, China, 5th-6th &amp; 9th June, 2025.</li> </ul>
Conferences	<ul> <li>Universality, Nonlinearity, and Integrability, In honor of Percy Deift, Seoul, Korea, 12-16 May, 2025.</li> </ul>
	<ul> <li>The 2nd Workshop on Integrable Systems and Random Matrix Theory, Dongguan, China, 5- 17 Jan, 2025. (Invited Talk: "Transient asymptotics of the modified Camassa-Holm equation")</li> </ul>
	- Random Matrices and Related Topics, Jeju island, Korea, 6-10 May, 2024.
	- The 15th Hemudu Forum on Integrable Systems, Ningbo, China, 24–26 Nov, 2023. (Con- tributed Talk: "Integrable PDEs with nonzero boundary conditions: large-time asymptotics")
	<ul> <li>Foundations of Computational Mathematics 2023 (FoCM2023), Paris, France, 12–21 June, 2023.</li> </ul>
	– The 13rd Hemudu Forum on Integrable Systems, Ningbo, China, 15 - 17 Oct, 2021.

Academic Visits	- 31/03/2025 - 11/04/2025, Chongqing University, China. (Host: Yiling Yang)
Summer School	- Random Matrix Summer School, University of Michigan, Ann Arbor, USA, 17-28 June, 2024.
Status	China – citizen
Languages	<ul><li>Chinese (native)</li><li>English</li></ul>
Computer Skills	ŁłłĘX, Mathematica, Matlab, HTML, C++, Javascript