

Shen-Ning Tung

Curriculum Vitae

Department of Mathematics
National Tsing Hua University
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Research Interests

Primary: Mathematical Finance • Quantitative Finance • Data Science • Machine Learning

Secondary: Optimization and Control • Decentralized Finance • Number Theory

Academic Positions

2022–present **Assistant Professor**
Department of Mathematics, National Tsing Hua University

2019–2022 **Postdoctoral Fellow**
Department of Mathematics, University of British Columbia
Advisor: Rachel Ollivier and Sujatha Ramdurai

Education

2015–2019 **Ph.D. in Mathematics**, Universität Duisburg-Essen
Advisor: Vytautas Paškūnas
Thesis: *On the automorphy of 2-dimensional potentially semi-stable deformation rings of $G_{\mathbb{Q}_p}$*

2013–2015 **M.Sc. in Mathematics**, University of British Columbia
Advisor: Sujatha Ramdurai
Thesis: *Fontaine rings and p -adic L -functions*

2008–2012 **B.S. in Mathematics**, National Taiwan University

Grants and Funding

2025–2028 **NSTC Research Fellowship** – NTD 2,208,000
Mathematical Foundation of Automated Market Makers

2022–2025 **NSTC Research Fellowship** – NTD 2,116,000
Patching and the Completed Homology of Locally Symmetric Spaces

Publications

Peer-Reviewed Articles

1. W.-R. Chen, A. C. Silva, and **S.-N. Tung** (2024). Stylized facts in Web3. *Frontiers of Mathematical Finance*, 3(4), 572–609. [doi:10.3934/fmf.2024021](https://doi.org/10.3934/fmf.2024021)
2. J. Najnudel, K. Yamazaki, J.-Y. Yen, and **S.-N. Tung** (2024). An arbitrage-driven price dynamics of Automated Market Makers in the presence of fees. *Frontiers of Mathematical Finance*, 3(4), 560–571. [doi:10.3934/fmf.2024018](https://doi.org/10.3934/fmf.2024018)
3. **S.-N. Tung** (2021). On the automorphy of 2-dimensional potentially semi-stable deformation rings of $G_{\mathbb{Q}_p}$. *Algebra & Number Theory*, 15(9), 2173–2194. [doi:10.2140/ant.2021.15.2173](https://doi.org/10.2140/ant.2021.15.2173)
4. **S.-N. Tung** (2021). On the modularity of 2-adic potentially semi-stable deformation rings. *Mathe-*

matische Zeitschrift, 298, 107–159. doi:10.1007/s00209-020-02588-4

5. V. Paškūnas and **S.-N. Tung** (2021). Finiteness properties of the category of mod p representations of $GL_2(\mathbb{Q}_p)$. *Forum of Mathematics, Sigma*, 9, e78. doi:10.1017/fms.2021.72

Preprints

1. T.-H. Wang and **S.-N. Tung**. A mathematical framework for modelling CLMM dynamics in continuous time. *arXiv:2412.18580* [arXiv]
2. J. Risk, **S.-N. Tung**, and T.-H. Wang. Dynamics of Liquidity Surfaces in Uniswap v3. *arXiv:2509.05013* [arXiv]
3. C. Y. Lee, **S.-N. Tung**, and T.-H. Wang. Growth rate of liquidity provider's wealth in G3Ms. *arXiv:2403.18177* [arXiv]

Teaching Experience

National Tsing Hua University (2022–present)

- MATH 597: Mathematical Foundations of Data Science (Winter 2024)
- MATH 571: Financial Mathematics II (Spring 2024)
- MATH 570: Financial Mathematics I (Winter 2023)
- MATH 104: Calculus II (Spring 2023)
- MATH 103: Calculus I (Winter 2022)

University of British Columbia (2019–2022)

- MATH 317: Vector Calculus (Spring 2022)
- MATH 220: Mathematical Proof (Winter 2020, 2021)
- MATH 253: Multivariable Calculus (Summer 2020)
- MATH 105: Integral Calculus with Applications to Commerce and Social Sciences (Spring 2020)
- MATH 104: Differential Calculus with Applications to Commerce and Social Sciences (Winter 2019)

Student Supervision

2025–2026	Hai-Ching Shih (Undergraduate Research Program)
2023–2024	De-Jin Huang, Chen-Chung Yang (Undergraduate Research Program)
2022–2024	Wei-Ru Chen (M.Sc., co-supervised with Yuki Chino)

Service and Professional Activities

2024	Mentor, Undergraduate Summer Research Program National Center for Theoretical Sciences
2023–2025	Course Committee Member Department of Mathematics, National Tsing Hua University
2022	Organizing Committee Member, Annual Meeting Taiwanese Mathematical Society

Research Visits

<i>Feb–Apr 2025</i>	University of Calgary, Canada (Host: Jinniao Qiu)
<i>Aug 2024</i>	University of British Columbia, Canada (Host: Sujatha Ramdorai)
<i>Dec 2020–Feb 2021</i>	Academia Sinica, Taiwan (Host: Ming-Lun Hsieh)
<i>May–Jun 2020</i>	Academia Sinica, Taiwan (Host: Ming-Lun Hsieh)
<i>Jul 2019</i>	Academia Sinica, Taiwan (Host: Ming-Lun Hsieh)
<i>Jul 2019</i>	Morningside Center of Mathematics, China (Host: Yongquan Hu)
<i>May 2018</i>	University of Cambridge, UK (Host: Jack Thorne)

Selected Invited Talks

<i>Mar 2025</i>	Mathematics Colloquium, National Sun Yat-sen University
<i>Feb 2025</i>	Mathematical Finance Seminar, University of Calgary
<i>May 2024</i>	TWSIAM Annual Meeting, National Chung Hsing University
<i>Feb 2020</i>	Number Theory Seminar, University of Toronto
<i>Jul 2019</i>	Number Theory Seminar, Academia Sinica
<i>Jul 2019</i>	Number Theory Seminar, Morningside Center of Mathematics
<i>Jul 2018</i>	Number Theory Seminar, University of Bonn
<i>May 2018</i>	Number Theory Seminar, University of Cambridge
<i>Mar 2018</i>	Number Theory Seminar, University of British Columbia

References

Professor Tai-Ho Wang

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Professor Ju-Yi Yen (*for teaching*)

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Professor Jinniao Qiu

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Dr. A. Christian Silva

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