

Chun Wun (Sam) CHENG

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Research Interest

My research lies at the intersection of machine learning, scientific computing, and computational physics. I am particularly interested in developing scalable and robust algorithms for solving partial differential equations (PDEs) and leveraging these methods to address challenging problems across science and engineering. In addition, my research extends to computer vision and medical imaging, including medical image segmentation, vision-language models, and generative models.

Education

University of Cambridge Oct 2023 - present
PhD in Mathematics of Information, SNSF Scholar: 4 year full PhD scholarship (220000 GBP)

Phd Program: Department of Applied Mathematics and Theoretical Physics

Supervisors: [Professor Carola-Bibiane Schönlieb](#) and [Professor Angelica I Aviles-Rivero](#)

City University of Hong Kong Sept 2019 - June 2023

Bachelor of Science in Computing Mathematics

Bachelor's degree program

First Class honours, 3 times Dean's List and first BSc Computing Mathematics graduate admitted with 4-year full scholarship for PhD study at the University of Cambridge since 1994, [Link](#)

My promotion video from CityU. [Youtube](#)

Research Experience/Work experience

Yau Mathematical Sciences Center - Tsinghua University 10/2024 - 01/2025, 06/2025 - 10/2025, 06/2026 - 10/2026

Visiting Student, Full-Time

Beijing, China

- Fully covered by Covered by SNSF and C2D3 Funding from University of Cambridge
- Supervisor: [Professor Angelica I Aviles-Rivero](#)

BBC - Computer Vision Team

Jan 2024 - Mar 2024

Research Intern, Full-Time

London, UK

- Developed the Watermarked Vector Quantized Generative Adversarial Network (W-VQGAN), an innovative framework for embedding and detecting watermarks in GAN-generated images, ensuring digital media authenticity and integrity.
- Supervisor: Dr. Juil Sock, Dr. Marc Górriz Blanch and Dr. Woody Bayliss (BBC)

City University of Hong Kong - Department of Mathematics

Jul 2023 - Sep 2023

Research Assistant, Full-Time

Hong Kong, China

- Fin-tech Research about mathematical finance and prompt engineering.
- Supervisors: [Professor Raymond H. Chan](#) (Lingnan University)

University of Cambridge - DAMTP

May 2022 - Aug 2022

Full-Time Summer Research Intern

Cambridge, UK

- Continues U-Net : Faster, Greater and Noiseless, Accepted by TMLR
- Supported by CityU with **25000 HKD**
- Supervisors: [Professor Raymond H. Chan](#) (CityU), [Professor Carola-Bibiane Schönlieb](#) (Cambridge) and [Dr. Angelica I. Aviles-Rivero](#) (Cambridge)

Teaching Experience

Tsinghua University - Yau Mathematical Sciences Center

Feb 2024 - June 2026

(Remote)Teaching Assistant for [Machine Learning Theory](#) (PhD course) (5 times)

Beijing, China

- Machine Learning theory is the core course for PhD student in Yau Mathematical Sciences Center.

City University of Hong Kong - Department of Mathematics

Sep 2021 - May 2022

Tutor of MA1300 and MA1301

Hong Kong, China

- Provided additional tutorial for math students in essential Calculus and Linear Algebra course

City University of Hong Kong - Department of Mathematics
Tutor of Math help centre

Sep 2021 - May 2022
Hong Kong, China

- Provided consultation on mathematics courses: Linear Algebra, Calculus and ODE, etc.

City University of Hong Kong - Department of Physics
PALSI leader

Feb 2021 - May 2021
Hong Kong, China

- Provided tutorial in Phy1201

Awards and Honors

Scholarship:

1. Swiss National Science Foundation 4 year full PhD Scholarship: **220000 GBP** SNSF: Oct 2024
2. HKSAR Government Scholarship Fund - Talent Development Scholarship: **10000 HKD** CityU: July 2023
3. Chi-Li Pao Foundation Scholarships for Academic Outstanding Students: **25000 HKD** CityU: Jun 2023
4. Jingchen Monika Hu Scholarships for Postgraduate Studies: **20000 HKD** CityU: Mar 2023
5. Hong Kong Hua-Yan Buddhist Association Scholarships: **10000 HKD** CityU: Feb 2023
6. HKSAR Government Scholarship Fund - Reaching Out Award: **10000 HKD** CityU: Sep 2022

Award :

1. [Top Quartile listings for pairs : Best-in-University Prizes](#) SMMC: Dec 2023
Rank top 25 % among 825 students from the world, best results in CityU and awarded **2100 HKD**
2. [Finalist at City Innovation and Technology Grand Challenge](#) HKSTP: Oct 2021
Age Friendly Virtual Assistant for Social Connectivity: **Finalist (Top 120 teams among 740 teams)** and awarded **30000 HKD** support for joining this project from College of Science
3. **Volleyball:** Former team member of 'Wah Ching', always ranked top 8 or 16 among all Hong Kong volleyball teams. Finalist in Hong Kong Volleyball team election (final 30 people). Always ranked top 4 and a few times champion in the Hong Kong Inter-School Volleyball Competition (Among all Hong Kong secondary schools) and Jing Ying Tournament.

Publication

Summary: 23 Papers in total: 5 accepted Journals, 6 accepted Conference and 12 under review
Journal Papers

- J5** [Training-Free Dual Hyperbolic Adapters for Better Cross-Modal Reasoning](#)
Yi Zhang, Chun-Wun Cheng, Junyi He, Ke Yu, Yushun Tang, Carola-Bibiane Schönlieb, Zhihai He, Angelica I Aviles-Rivero)
IEEE Transactions on Multimedia (IEEE TMM 2025)
- J4** [Mamba neural operator: Who wins? transformers vs. state-space models for pdes](#)
Chun-Wun Cheng*, Jiahao Huang*, Yi Zhang, Guang Yang, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (* indicates equal contributions)
Journal of Computational Physics (JCP 2025)
- J3** [Where Do We Stand with Implicit Neural Representations? A Technical and Performance Survey](#)
Amer Essakine*, Yanqi Cheng*, **Chun-Wun Cheng**, Lipei Zhang, Zhongying Deng, Lei Zhu, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (* indicates equal contributions)
Transactions on Machine Learning Research (TMLR 02/2025)
- J2** [The Missing U for Efficient Diffusion Models](#)
Sergio Calvo Ordoñez, **Chun-Wun Cheng**, Jiahao Huang, Lipei Zhang, Guang Yang, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero
Transactions on Machine Learning Research (TMLR 04/2024)

- J1** [Continuous U-Net: Faster, Greater and Noiseless.](#)
Cheng, Chun-Wun*, Christina Runkel*, Lihao Liu*, Raymond H. Chan, Carola-Bibiane Schönlieb, and Angelica I. Aviles-Rivero. (* indicates equal contributions)
Transactions on Machine Learning Research (TMLR 04/2024)

Conference Papers

- C6** [MAP-Diff: Multi-Anchor Guided Diffusion for Progressive 3D Whole-Body Low-Dose PET Denoising](#)
 Peiyuan Jing, **Chun-Wun Cheng**, Liutao Yang, Zhenxuan Zhang, Thiago V Lima, Klaus Strobel, Antoine Leimgruber, Angelica Aviles-Rivero, Guang Yang, Javier A Montoya-Zegarra
MICCAI 2026, Oral Presentation (around top 2% over 4601 submissions)
- C5** [ProSMA-UNet: Decoder Conditioning for Proximal-Sparse Skip Feature Selection](#)
Chun-Wun Cheng, Yanqi Cheng, Peiyuan Jing, Guang Yang, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero
MICCAI 2026 Early Accept Top 9% over 4601 papers
Oral Presentation (around top 2%)
- C4** [3D Wavelet-Based Structural Priors for Controlled Diffusion in Whole-Body Low-Dose PET Denoising](#)
 Peiyuan Jing, Yue Yang, **Chun-Wun Cheng**, Zhenxuan Zhang, Liutao Yang, Thiago V Lima, Klaus Strobel, Antoine Leimgruber, Angelica Aviles-Rivero, Guang Yang, Javier Montoya
ICPR 2026
- C3** [Training-Free Test-Time Adaptation with Brownian Distance Covariance in Vision-Language Models](#)
 Yi Zhang, Chun-Wun Cheng, Angelica I Aviles-Rivero, Zhihai He, Liang-Jie Zhang
ICASSP2026
- C2** [Implicit U-KAN2.0: Dynamic, Efficient and Interpretable Medical Image Segmentation](#)
Chun-Wun Cheng*, Yining Zhao*, Yanqi Cheng, Javier Montoya, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (* indicates equal contributions)
MICCAI 2025
- C1** [Cross-Modal Few-Shot Learning with Second-Order Neural Ordinary Differential Equations](#)
 Yi Zhang*, **Chun-Wun Cheng***, Junyi He, Zhihai He, Carola-Bibiane Schönlieb, Yuyan Chen, Angelica I Aviles-Rivero (* indicates equal contributions)
AAAI 2025 Oral, Accepted Oral Rate: 4.6 % (600/12,857)

Under Review

- U12** Yao Zhu, Xuan Ding, Chunxiao Li, Xiu Yan, **Chun-Wun Cheng**, Angelica I Aviles-Rivero, Rui Sun, Chuanlong Xie
[CholQuant: Cholesky-Conditioned Fractional Whitening for LLM Quantization](#)
- U11** Yudong Hu, Yao Zhu, **Chun-Wun Cheng**, Angelica I Aviles-Rivero, Rui Sun
[Mitigating Quantization-Parameterization Mismatch in LLM Post-Training Quantization](#)
- U10** **Chun-Wun Cheng**, Raymond H. Chan, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero
[Hybrid Geometry-aware Neural Operator](#) (Under Review)
- U9** **Chun-Wun Cheng**, Sifan Wang, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (2026).
[CATO: Charted Attention for Neural PDE Operators](#) (Under Review)
- U8** Chun-Wun Cheng, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (2026).
[SpectraKAN: Conditioning Spectral Operators](#) (Under Review)
- U7** Qiang Chen*, Chun-Wun Cheng*, Xiu Su, Hongyan Xu, Xi Lin, Shan You, Angelica I Aviles-Rivero, Yi Chen (* indicates equal contributions) (2025).
[LEGATO: Good Identity Unlearning Is Continuous](#) (Under Review)
- U6** Haonan Dong, Chun-Wun Cheng, Angelica I. Aviles-Rivero (2025).
[Product Interaction: An Algebraic Formalism for Deep Learning Architectures](#) (Under Review)
- U5** Huibo Xu, Chun-Wun Cheng, Likang Wu, Xianquan Wang, Haoning Dang, Angelica I Aviles-Rivero, Qi Liu(2025).
[NeuTSFlow: Modeling Continuous Functions Behind Time Series Forecasting](#) (Under Review)
- U4** Yanqi Cheng, Chun-Wun Cheng, Jim Denholm, Thiago Lima, Javier A Montoya-Zegarra, Richard Goodwin, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (2025).
[DNA-Prior: Unsupervised Denoise Anything via Dual-Domain Prior](#) (Under Review)

- U3 Chun-Wun Cheng**, Bin Dong, Carola-Bibiane Schönlieb, Angelica I Aviles-Rivero (2025). [PDE Solvers Should Be Local: Fast, Stable Rollouts with Learned Local Stencils](#) arXiv preprint (Under Review)
- U2 Yi Zhang, Chun-Wun Cheng**, Ke Yu, Zhihai He, Carola-Bibiane Schönlieb and Angelica I. Aviles-Rivero (2024). [NODE-Adapter: Neural Ordinary Differential Equations for Better Vision-Language Reasoning](#) arXiv preprint (Under Review)
- U1 Aviles-Rivero, A. I., Cheng, C. W.**, Deng, Z., Kourtzi, Z, Schönlieb, C. B. (2024). [Bilevel Hypergraph Networks for Multi-Modal Alzheimer's Diagnosis](#) arXiv preprint arXiv:2403.12719 (Under Review)

Invited Talk/Presentation/Poster

1. Mamba Neural Operator: Who Wins? Transformers vs. State-Space Models for PDEs SIAM CSE 2025, Fort Worth, Texas. Mar. 2025
2. Mamba Neural Operator: Who Wins? Transformers vs. State-Space Models for PDEs CityU, Hong Kong. Oct 15, 2024
3. SIAM Conference on Imaging Science (IS24) Georgia, U.S. May 28 - 31, 2024
Second Order Neural Odes for Inverse Imaging Problems (Symposium Talk)
4. 10th International Congress on Industrial and Applied Mathematics(ICIAM) Tykyo, Japan. Aug 2023
Second Order Neural Odes for Inverse Imaging Problems (Symposium Talk)
5. SIAM Conference on Optimization 2023, Seattle Washington, USA. May 2023
Second Order Neural Odes for Inverse Imaging Problems. (Symposium Talk)
Supported by CityU with **10800 HKD**
6. CityU Employers' Luncheon 2023 Hong Kong, China. Mar 2023
Continuous U-Net for Medical Image Analysis: Faster, Greater and Noiseless

Professional Activities

- 1: Conference Reviews: IEEE International Workshop on Machine Learning for Signal Processing (MLSP) 2024, AAAI2026, Neurips 2026, ICLR 2025/2026
- 2: Volunteer in Conference: Geometric Deep Learning Workshop (University of Cambridge, 10-12 June 2024), MIUA2022 Cambridge (University of Cambridge, 27 - 29 July 2022)
- 3: **[Co-Organiser]** MICCAI 2024, 2025, 2026 Tutorial - GraphMIA (Oct 2024)
- 4: **[Co-Organiser]** AI4Science Beijing Meetup 2025, 2026 – Learned Partial Differential Equations - Tsinghua University (2025), 28 June 2025, 13 June 2026
- 5: **[Co-Organiser]** DLMed25 Winter School 2025 – Medical Imaging in the Deep Learning Era - Online Winter School, 5–6 December 2025
- 6: **[Co-Organiser]** SIAM Optimization 2026 Data, Models, and Gradients: Learning to Optimise — and Beyond, University of Edinburgh, UK, 02-July to 05-July 2026

Supervision

1. Bincheng Hu, DL for PDE , Undergraduate from Shanghai Normal University 06/2026 - 08/2028
2. Nan Huang, DL for PDE Discovery, Undergraduate from City University of Hong Kong 06/2026 - 08/2028
3. Mengqi (Mona) Shi, Working on DL for PDEs, Undergraduate from Tsinghua University 06/2024 - 08/2024
4. Haoran Li, KAN: Kolmogorov-Arnold Networks, Undergraduate from Tsinghua University 06/2024 - 08/2024
5. Sergio Calvo-Ordóñez, Diffusion Model, Now Phd in University of Oxford 09/2023 - 12/2023
6. Rui Gou, Time Series for Earth Observation, PhD in Beijing Normal Univeristy 11/2023 - 03/2024

Technical skills

Programming Languages/Tools Matlab, Julia, Java, , Python, Pytorch, L^AT_EX

Language proficiencies

English Full professional proficiency
Chinese-Cantonese Native or bilingual proficiency
Chinese-Mandarin Full professional proficiency