Dawen Wu

Research Fellow
Nanyang Technology University

Homepage: https://wuwudawen.github.io/
Email: dawen.wu@ntu.edu.sg
Scopus Author ID: 57681447400

Employment

- **Nanyang Technological University** — Singapore
  NTU AI4X Fellowship Awardee | *4-year funding & SGD 250,000 research grant* — *March 2026 - March 2030*

- **CNRS@CREATE** — Singapore
  Research Fellow — *Jan 2024 - March 2026*
  Advisor: Ludovic Chamoin (Physics) & Pierre Senellart (CS)

- **National University of Singapore** — Singapore
  School of Computing — *Jan 2024 - Apr 2026*
  Research Fellow
  Advisor: Stéphane Bressan (CS)

Education

- **Université Paris-Saclay** — Paris, France
  Ph.D. in Applied Mathematics — *Nov 2020 - Nov 2023*
  Advisor: Abdel Lisser (Math)

- **Peking University** — Beijing, China
  M.S. in Computer Science — *Sep 2017-Jul 2020*
  Advisor: Zhong Chen (CS).

- **Civil Aviation University of China** — Tianjin, China
  B.S. in Engineering — *Sep 2013-Jul 2017*

Research Interest

My research focuses on developing deep learning-based algorithms to tackle a broad range of mathematical and physical problems, and applying them to solve real-world operations research and engineering problems. These specialized approaches are carefully designed to take advantage of the problem structures, enabling superior accuracy and efficiency compared to general-purpose methods. Specifically, key areas of my research include Physics-informed neural networks, Transport map, Model order reduction, and Chance constrained programming.

PUBLICATIONS AND UNDERGOING PAPERS(Google Scholar)

1. **Dawen Wu**, Ludovic, Chamoin, Stéphane Bressan. Neural Triangular Map for Density Estimation and Sampling with Application to Bayesian Inference. Journal of Computational Physics, 2025.
2. **Dawen Wu**, Ludovic Chamoin, Abdel Lisser. Solving large-scale variational inequalities with dynamically adjusting initial condition in physics-informed neural networks. Computer Methods in Applied Mechanics and Engineering, 2024.
3. **Dawen Wu**, Ludovic Chamoin. Data-Driven Residual Correction of POD-Based Reduced Order Models via Conditional VAEs. Computer Methods in Applied Mechanics and Engineering, 2025.
4. **Dawen Wu**, Abdel Lisser. Neuro-PINN: A hybrid framework for efficient nonlinear projection equation solutions. International Journal for Numerical Methods in Engineering, 2024.
5. **Dawen Wu**, Abdel Lisser. Error Bound Analysis of Physics-Informed Neural Networks for Solving Nonlinear Projection Equations. Journal of Optimization Theory and Applications, 2025.
6. **Dawen Wu**, Ludovic Chamoin. Approximations of the Cumulative Distribution Function using Transport Maps Learning. Chaos, 2025.
7. **Dawen Wu**, Ludovic Chamoin. A Two-Stage Framework Combining Derivative-Free MCMC Sampling and Transport Maps for Black-Box Bayesian Inverse Problems. ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering, 2025.
8. **Dawen Wu**, Abdel Lisser. Parallel solution of nonlinear projection equations in a multitask learning framework. IEEE Transactions on Neural Networks and Learning Systems, 2024.

9. **Dawen Wu**, Abdel Lisser. Predicting Nash Equilibria in Bimatrix Games Using a Robust Bichannel Convolutional Neural Network. IEEE Transactions on Artificial Intelligence, 2023.

10. Zi-Yu Khoo, **Dawen Wu***, Jonathan Sze Choong Low, Stéphane Bressan. Separable Hamiltonian neural networks. Physical Review E, 2024. (*Corresponding author)

11. Zi-Yu Khoo, **Dawen Wu***, Jonathan Sze Choong Low, Stéphane Bressan. Periodic Hamiltonian Neural Networks. IEEE Transactions on Artificial Intelligence, 2024. (*Corresponding author)

12. **Dawen Wu**, Abdel Lisser. Using CNN for solving two-player zero-sum games . Expert Systems with Applications, 2022.

13. **Dawen Wu**, Abdel Lisser. A dynamical neural network approach for solving stochastic two-player zero-sum games. Neural Networks, 2022.

14. **Dawen Wu**, Abdel Lisser. MG-CNN: A deep CNN to predict saddle points of matrix games. Neural Networks, 2022.

15. **Dawen Wu**, Abdel Lisser. Enhancing neurodynamic approach with physics-informed neural networks for solving non-smooth convex optimization problems. Neural Networks, 2023.

16. **Dawen Wu**, Abdel Lisser. A deep learning approach for solving linear programming problems. Neurocomputing, 2023.

17. **Dawen Wu**, Abdel Lisser. CCGnet: A deep learning approach to predict Nash equilibrium of chance-constrained games. Information Sciences, 2023.

18. **Dawen Wu**, Abdel Lisser. Improved saddle point prediction in stochastic two-player zero-sum games with a deep learning approach. Engineering Applications of Artificial Intelligence, 2023.

19. **Dawen Wu**, Abdel Lisser. Solving Constrained Pseudoconvex Optimization Problems with deep learning-based neurodynamic optimization. Mathematics and Computers in Simulation, 2024.

20. Félix Chavelli, Zi-Yu Khoo, **Dawen Wu**, Jonathan Sze Choong Low, Stéphane Bressan. Physics-informed Discovery of State Variables in Second-Order and Hamiltonian Systems. NeurIPS 2024 Workshop: Machine Learning and the Physical Sciences .

21. **Dawen Wu**, Ludovic, Chamoin, Abdel Lisser. Reformulating Chance-Constrained Optimization as Neural Network Learning. European Journal of Operational Research. (Major revision)

22. **Dawen Wu**, Ludovic Chamoin, Stéphane Bressan. Approximations of the Inverse Cumulative Distribution Function using Transport Maps and Physics-informed Neural Networks. Inverse Problem. (Reject & Resubmit)

23. **Dawen Wu**, Amine Ammar, Francisco Chinestan. Overcoming Vanishing Gradients in Inverse Source Localization via Physically-Relaxed PINNs. Computer Methods in Applied Mechanics and Engineering. (Submitted)

Professional Service

- **Reviewer**: Journal of Computational Physics, 4OR, EURO Journal on Computational Optimization, Annals of Operation Research, IEEE Transactions on Neural Networks and Learning Systems, European Journal of Control, Journal of Global Optimization, Machine Learning, Engineering Applications of Artificial Intelligence, Expert Systems With Applications, IEEE Transactions on Cybernetics, Neural Networks, Nonlinear Dynamics, Computer Physics Communications Engineering Applications of Computational Fluid Mechanics,

Presentations

- ICSP: 17th International Conference on Stochastic Programming — Jul. 29, 2025
  Title: Reformulating Nonlinear Projection Equations as Neural Network Learning. [Slide] — (Paris, France)

- Xi'an Jiaotong University — Jun. 30, 2025
  Title: Reformulating Nonlinear Projection Equations as Neural Network Learning. [Slide] — (Xi'an, China)

- AI4X — Jul. 8, 2025
  Title: Approximation of the Inverse CDF using Transport Map. [Poster] — (Singapore)
  (Third prize.)

- ACIIDS: 17th Asian Conference on Intelligent Information and Database Systems — Apr. 23, 2025
  Title: Physics-informed Discovery of State Variables in Hamiltonian Systems. [Slide] — (Kitakyushu, Japan)
- National University of Singapore — Feb. 7, 2024
  Title: Transport Map. [Slide] — (Singapore)
- Laboratoire des Signaux et Systèmes (L2S) PhD Students' Day — Sept. 15, 2022
  Title: Optimization-Informed Neural Networks. [Slide] — (Gif-sur-Yvette, France)
- ECSO–CMS–2022 Conference — Jul. 1, 2022
  Title: A Neurodynamic Approach for Solving Stochastic Two-Player Zero-Sum Games. [Slide] — (Venice, Italy)
- CSC–POLYTECH Seminar — May 23, 2022
  Title: Using CNN for Solving Two-Player Zero-Sum Games. [Slide] — (Paris, France)
- Laboratoire des Signaux et Systèmes (L2S) PhD Students' Day — Sept. 23, 2021
  Title: Using CNN for Solving Two-Player Zero-Sum Games. [Poster] — (Gif-sur-Yvette, France)

Skills

Languages Cantonese (Native), Mandarin (Native), English (Fluent).
Programming Python, Julia
Packages PyTorch, JAX
Tools LaTeX, Inkscape

Referees

- **Prof. Abdel Lisser** (Ph.D. Advisor)
  Affiliation: Université Paris-Saclay, CentraleSupélec, France
  Website: https://l2s.centralesupelec.fr/en/u/lisser-abdel/
  Email: abdel.lisser@l2s.centralesupelec.fr
- **Prof. Ludovic Chamoin** (Postdoctoral Advisor)
  Affiliation: Université Paris-Saclay, ENS Paris-Saclay, France
  Website: https://lmps.ens-paris-saclay.fr/en/directory-people/ludovic-chamoin
  Email: ludovic.chamoin@ens-paris-saclay.fr
- **Prof. Amine Ammar** (Postdoctoral Advisor)
  Affiliation: ENSAM, France
  Website: https://scholar.google.com.sg/citations?user=0p0aYhMAAAAJ&hl=en
  Email: amine.ammar@ensam.eu
- **Prof. Francisco (Paco) Chinesta** (Postdoctoral Advisor)
  Affiliation: ENSAM , France
  Website: https://scholar.google.com.sg/citations?user=bUC7RZcAAAAJ&hl=en
  Email: francisco.chinesta@ensam.eu
- **Prof. Ariel Neufeld** (Postdoctoral Advisor)
  Affiliation: Nanyang Technological University, Singapore
  Website: https://ariel.neufeld@ntu.edu.sg/
  Email: ariel.neufeld@ntu.edu.sg