



沈恆華博士

數智科技學系 | 助理教授

個人簡介

沈恆華，博士、碩士生導師。現任澳門中西創新學院數智科技學系助理教授，兼任圖書館行政中心主任、教師發展中心主任。他於加拿大達爾豪斯大學(Dalhousie University, Halifax)獲得機械工程博士學位。曾于香港理工大學、康考迪亞大學(Concordia University, Montreal)從事博士後研究。研究興趣包括控制理論、機器人技術、人工智能、人機交互及多智能體系統等。曾在《IEEE/ASME Transactions on Mechatronics》、《IEEE Transactions on Industrial Electronics》、**American Control Conference**、**IFAC World Congress** 等頂尖期刊/會議發表多篇論文。擔任 IEEE IES-Young Professionals 委員、澳門高校圖書館聯盟委員等社會服務職責。

工作經歷

- 助理教授，中西創新學院，2025 年-至今
- 教師發展中心主任，中西創新學院，2025 年-至今
- 圖書館行政中心主任，中西創新學院，2025 年-至今
- 博士後研究員，香港理工大學，2024 年

- 博士後研究員，康考迪亞大學（加拿大），2021 年-2023 年
- 研究助理，達爾豪斯大學（加拿大），2020

教育背景

- 工程博士（機械工程），達爾豪斯大學（加拿大），2020
- 工學碩士（機械電子工程），福州大學（中國），2015
- 工學學士（機械設計製造及其自動化），福州大學（中國），2012

研究興趣

控制理論、機器人技術、人工智能、人機交互及多智能體系統

任教課程

- 科技倫理,
- 視覺設計
- 人工智能導論
- 數字科技前沿
- 數字科技導論
- 人工智能應用

相關榮譽

- Horizon 博士後獎學金，康考迪亞大學（加拿大），2021–2023
- 新斯科舍省研究生獎學金（省級），加拿大，2016–2020

- 院長獎學金，達爾豪斯大學（加拿大），2016–2020
- 工程卓越獎，達爾豪斯大學（加拿大），2017
- Bruce and Dorothy Rosetti 工程研究獎學金，達爾豪斯大學（加拿大），2017
- 最佳報告獎，IEEE ICPS 2021
- 杰出論文獎，IEEE/ACM ICSE 2025

社會服務

- 秘書，IEEE 加拿大大西洋分會青年專業委員會，2017-2018
- 委員，IEEE 工業電子學會青年專業委員會，2026
- 委員，澳門高校圖書館聯盟，2025-至今

研究成果

審稿中論文

- 1.W. Zhang, Q. Zhang, M. Xu, M. You, H. Shen, Z. He, K. Jin, D.F. Wong, T. Fang, "Agri-CPJ: A training-free explainable framework for agricultural pest diagnosis using caption-prompt-judge and LLM-as-a-judge", Expert Systems with Applications, Under Review (Paper ID: ESWA-D-26-15157), 2026.
- 2.H.H. Shen*, Z.H. Tan, "Safe Switching for AI Customer Service via Lyapunov-Certified Residual Emotion Dynamics", The IFAC World Congress, Under Review (Paper ID: 2384), 2026.
- 3.H.H. Shen*, Z.H. Tan, Y.J. Pan, "Lyapunov-Based Stability and Region-of-Attraction Analysis of a Multistable Neural Mass Model", The 2026 International Symposium on Industrial Electronics (ISIE), Under Review (Paper ID: 000186), June 2025.
- 4.H.H. Shen*, Z.H. Tan, "TA-GAN: A LiDAR-Based Trajectory Prediction Framework for Dynamic Obstacles in Indoor Robot Navigation", Robotics and Autonomous Systems, Under Review (Paper ID: ROBOT-D-26-00591), 2026.
- 5.H.H. Shen, W.F. Xie, "Path Planning for Robot Manipulator Using Adaptive Reinforcement Learning", Neurocomputing, Under Review (Paper ID: NEUCOM-D-23-07231), 2025.

期刊論文發表

- 1.Z.H. Tan, H.H. Shen*, Y.Y. Wu, "RoboNavGuard: Lightweight Deformable Obstacle Segmentation and 3D Visual Grounding for Indoor Robot Navigation", Machine Vision and Applications, Accepted, 2026. (JCR Q2)
- 2.Z.H. Tan, H.H. Shen, "Lyapunov-based emotion-aware switching in hybrid human artificial intelligence customer service systems*", Information Sciences, Accepted, 2026. (JCR Q1 ,TOP 期刊)
- 3.R. Chen*, J. Xie, Y. Liu, H. Chen, S. Tang, J. Cheng, H.H. Shen, Z. Tan, "A novel complex network framework: Multi-span transition network with Riemann similarity measure", Engineering Applications of Artificial Intelligence, Accepted, 2025. (JCR Q1 , TOP 期刊)
- 4.H.H. Shen, Wen-Fang Xie*, Ningyu Zhu, "Degeneracy-Aware Full-Pose Path Planning Strategy for Robot Manipulator", IEEE Transactions on Systems, Man and Cybernetics: Systems, Vol. 54, No. 8, pp. 4955-4965, 2024. (JCR Q1 , TOP 期刊 , IF: 8.6)
- 5.N.Y. Zhu, W.F. Xie*, H.H. Shen, "Trajectory planning of cooperative robotic system for automated fiber placement in a leader-follower formation", The International Journal of Advanced Manufacturing Technology, Vol. 130, No. 1-2, pp. 575-588, 2024. (JCR Q1 , IF: 2.9)
- 6.H.H. Shen, Wen-Fang Xie*, Jianyu Tang, Tao Zhou, "Adaptive Manipulability-Based Path Planning Strategy for Industrial Robot Manipulators", IEEE/ASME Transactions on Mechatronics, Vol. 28, No. 3, pp. 1742-1753, 2023. (JCR Q1 , TOP 期刊 , IF: 6.1)
- 7.H.H. Shen, Y.J. Pan, "Nonlinear State Estimation and Online Neighbor Selection for Multi-Manipulator Systems*", IEEE/ASME Transactions on Mechatronics, Vol. 27, No. 6, pp. 4373-4383, 2022. (JCR Q1 , TOP 期刊 , IF: 6.1)
- 8.L. Wan, Y.J. Pan*, H.H. Shen, "Improving Synchronization Performance of Multiple Euler-Lagrange Systems using Non-Singular Terminal Sliding Mode Control with Fuzzy Logic", IEEE/ASME Transactions on Mechatronics, Vol. 27, No. 4, pp. 2312-2321, 2022. (JCRQ1 , TOP 期刊 , IF: 6.1)
- 9.H.H. Shen, Y.J. Pan, "Tracking Synchronization Improvement of Networked Manipulators Using Novel Adaptive Non-Singular Terminal Sliding Mode Control*", IEEE Transactions on

Industrial Electronics, Vol. 68, No. 5, pp. 4279-4287, 2021. (JCR Q1 , TOP 期刊 , IF: 7.5)

10.U. Ahmad, Y.J. Pan*, H.H. Shen, "Robust Control Design for Teleoperation of Multiple Mobile Manipulators under Time Delays", International Journal of Robust and Nonlinear Control, Vol. 30,

No. 16, pp. 6454-6472, 2020. (JCR Q1 , IF: 3.2)

11.H.H. Shen, Y.J. Pan*, U. Ahmad, B.W. He, "Pose Synchronization of Multiple Networked Manipulators using Non-singular Terminal Sliding Mode Control", IEEE/ASME Transactions on Systems, Man and Cybernetics: Systems, Vol. 51, No. 12, pp. 7497-7509, 2020. (JCR Q1 ,TOP 期刊 , IF: 8.6)

12.H.H. Shen, Y.J. Pan, "Improving Tracking Performance of Nonlinear Uncertain Bilateral Teleoperation Systems with Time-Varying Delays and Disturbances*", IEEE/ASME Transactions

on Mechatronics, Vol. 25, No. 3, pp. 1171-1181, 2020. (JCR Q1 , TOP 期刊 , IF: 6.1)

13.Y.Q. Liu, S.Y. Huang, B. He*, L.G. Yao, A. Lv, H.H. Shen, M.W. Chen, W.Y. Hong, "Preliminary Application of 3D Printing Technology in the Surgical Treatment of Falx Meningioma", Chinese General Practice, Vol. 19, No. 24, pp. 2953-2956, 2016. (JCR Q3 , IF: 3.44)

14.H.H. Shen, B. He*, J. Zhang, S. Chen, "Obtaining four-dimensional vibration information for vibrating surfaces with a Kinect sensor", Measurement, Vol. 65, pp. 149-165, 2015. (JCR Q1 , IF: 5.2)

15.L. Huang, C. Chen, H.H. Shen, B. He, "Adaptive registration algorithm of color images based on SURF*", Measurement, Vol. 66, pp. 118-124, 2015. (JCR Q1 , IF: 5.2)

16.S.S. Dong, B. He*, C. Lin, Q. Zhao, H.H. Shen, "Calibration method for a structured light measurement system with two different focal length cameras", Measurement, Vol. 73, pp. 462-472, 2015. (JCR Q1 , IF: 5.2)

17.X. Zhou*, H.H. Shen, B. He, "Birth Intensity Estimation Method for Multi-target Video Tracking", Journal of Computer Aided Design & Computer Graphics, Vol. 26, No. 12, pp.

2223-2231, 2014. (JCR Q4 , IF: 0.89)

會議論文發表

1.S.Y. Zhang, H.Y. Song, Q.X. Wang*, H.H. Shen, Y. Pei, "A Test Oracle for Reinforcement Learning Software Based on Lyapunov Stability Control Theory", in *Proceedings of the IEEE/ACM 47th International Conference on Software Engineering (ICSE 2025)*, April 27-May

3, 2025, Ottawa, Canada, pp. 502-513. (軟件工程領域頂級會議 ,Distinguished Paper Award)

2.N.Y. Zhu, W.F. Xie*, H.H. Shen, "A Leader-Follower Trajectory Planning Approach for Cooperative Robotic System in Automated Fiber Placement", in Proceedings of 2023 IEEE International Conference on Mechatronics and Automation (IEEE ICMA 2023), IEEE, 2023.

3.N.Y. Zhu, W.F. Xie*, H.H. Shen, "Adaptive Sliding Mode Control with RBF Neural Network-Based Tuning Method for Parallel Robot", in Proceedings of the 48th Annual Conference of the IEEE Industrial Electronics Society (IECON 2022), IEEE, 2022.

4.R. Adderson, Y.J. Pan*, H.H. Shen, "Application of Sliding Mode Control for the Formation of Heterogeneous Multi-Agent Systems", in Proceedings of the 5th IEEE Conference on Control Technology and Applications (CCTA), August 9-11, 2021, San Diego, USA, pp. 777-782. (控

制領域頂級會議)

5.H.H. Shen, Y.J. Pan*, L. Wan, "Teleoperated Single-Master-Multiple-Slave System for Cooperative Manipulations in Task Space", in *Proceedings of the IEEE International Conference on Industrial Cyber-Physical Systems (ICPS 2021)*, May 2021, Victoria, BC, Canada, pp. 864-869. (Best Presentation Award)

6.H.H. Shen, Y.J. Pan*, G. Bauer, "Online Noise-Estimation-based Neighbor Selection for Multi-Manipulator Systems", in *Proceedings of the 21st IFAC World Congress (IFAC-WC)*, July 2020, Berlin, Germany, Vol. 53, No. 2, pp. 9802-9807. (控制領域頂級會議)

7.G. Bauer, Y.J. Pan, H.H. Shen, "Adaptive Impedance Control in Bilateral Telerehabilitation with Robotic Exoskeletons", in Proceedings of the 2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC 2020), October 2020, Toronto, Canada, pp. 719-725.

8.H.H. Shen, Y.J. Pan, "Adaptive Robust Control of Networked Multi-Manipulators with Time-Varying Delays*", in Proceedings of the 2019 IEEE American Control Conference (ACC),

July 2019, Philadelphia, USA, pp. 3670-3675. (控制領域頂級會議)

9.H.H. Shen, Y.J. Pan*, U. Ahmad, S. Liu, M. Wu, Y. He, "Tracking Performance Evaluations on the Robust Teleoperative Control of Multiple Manipulators", in *Proceedings of the 28th IEEE International Symposium on Industrial Electronics (IEEE-ISIE 2019)*, June 2019, Vancouver, Canada, pp. 1268-1273.

10.H.H. Shen, Y.J. Pan*, G. Bauer, "Manipulability-based Load Application and Kinematic Decoupling in Cooperative Manipulations", in *Proceedings of the 28th IEEE International Symposium on Industrial Electronics (IEEE-ISIE 2019)*, June 2019, Vancouver, Canada, pp. 1168-1173.

11.U. Ahmad, Y.J. Pan*, H.H. Shen, S. Liu, "Cooperative Control of Mobile Manipulators Transporting an Object based on an Adaptive Backstepping Approach", in Proceedings of the 14th IEEE International Conference on Control and Automation (ICCA), June 2018, Anchorage, Alaska, USA, pp. 198-203.

12.H.H. Shen, Y.J. Pan*, B. He, "Teleoperation of Multiple Cooperative Slave Manipulators Using Graph-based Non-singular Terminal Sliding-Mode Control", in Proceedings of the IEEE International Conference on Robotics and Biomimetics (ROBIO), December 2017, Macau, China,

pp. 1430-1435. (機器人領域頂級會議)

13.H.H. Shen, A.T. Lei, B. He, "Fusing Salient Region Features and Depth Data for Real-time Multi-target Searching and Humanoid Navigation*", in *Proceedings of the 1st IEEE International Conference on Real-time Computing and Robotics (RCAR 2015)*, June 2015, Changsha, China.

主持或參加的科研項目

澳珠琴跨境低空無人駕駛飛行器可行方案及政策法規研究，澳門基金會，2026–2027，主持。

澳門非標準住宅門牌自主識別與定位系統研究，澳門教育協會，2026–2027，主持

基於神經引導與多態融合的自進化共情交互系統研究，澳門教育協會，2026–2027，共同主持

專利申報

實時獲取四維振動信息的測量方法 (CN103971409B, 2014)

一種基於 RGB-D 傳感器的足部三維測量與重建方法 (CN103971409B, 2017)

一種多 RGB-D 傳感器的足部三維信息測量方法 (CN104126989B, 2016)