CHAOQUN WANG

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Shandong University, Shandong Province, China

RESEARCH EXPERIENCE

Professor   *2023-Now*
School of Control Science and Engineering, Shandong University

- Supported by National Overseas High-level Talent Program.

- Supported by Young Taishan Scholars Program of Shandong Province.

- Supported by Outstanding Young and Middle-aged Scholars Program of Shandong University.

Research Professor   *2021-2022*
School of Control Science and Engineering, Shandong University

- Supported by Qilu Young Scholars Program of Shandong University.

Postdoctoral Researcher   *2019-2020*
PI: Max Q.-H. Meng, Department of Electronic Engineering, The Chinese University of Hong Kong

- Supported by Research Talent Hub Program, Hong Kong Innovation & Technology Commission.

- Developed a world-first autonomous robotic trolley collection system for Hong Kong airport.

Research Engineer   *2016-2017*
PI: Clarence de Silva, Department of Mechanical Engineering, University of British Columbia

- Developed an unmanned surface vehicle for autonomous water quality monitoring.

- Implemented informative path planning algorithms on the developed robotic system.

EDUCATION

The Chinese University of Hong Kong   *2014-2019*
Ph.D., Electronic Engineering, Hong Kong Phd Fellowship Scheme, Hong Kong SAR
University of British Columbia   *2016-2017*
Visiting Research Student, Mechanical Engineering, Global Research Scholarship, CUHK
Shandong University   *2010-2014*
B.Eng., Automation Science and Engineering

SELECTED SCHOLARSHIPS AND AWARDS

- **The Capek Prize: Young Scientist Award**, CAMETA China,   *May. 2023*

- **Dr. Barbara Kwok Researcher Travel Grants**, *Top 2%*, CUHK   *Oct. 2019*

- **Professor Charles K. Kao Student Creativity Awards**, CUHK   *May 2019*

- **Hong Kong Phd Fellowship**, *Rank 1/300 worldwide*, Hong Kong SAR   *2014-2018*

- **JD Robot Challenge**, *Second Prize, Top 2/300*, JD Ltd   *Dec. 2018*

- **JD Robot Challenge**, *Golden Egg Prize*, JD Ltd, China   *Dec. 2018*

- **Talent Development Scholarship**, *Top 2%, Three times*, Hong Kong SAR   *2015-2017*

- **IROS Travel Grant**, IEEE Robotics and Automation Society   *Sept. 2017*

- **Reaching Out Award**, *Top 5%*, CUHK   *May 2016*

- **Challenge Cup**, *First Prize*, Hong Kong SAR   *July 2016*

- **National Encouragement Scholarship**, *Ministry of Education, PRC, China*   *Sept. 2013*

- **National Scholarship**, *Two times, the highest scholarship in PRC, China*   *2011,2012*

- **Leader of Excellent Automation Engineering Class**, Shandong Province   *Sept. 2013*

- **Mechanical Electronic Design Contest**, *First Prize*, Shandong Province   *Sept. 2012*

- **Energy-Saving Emission Reduction Contest**, *First Prize*, SDU   *Apr. 2012*

SELECTED PUBLICATIONS

Journals

[1] Liu, J., Xie, J., Huang, S., **Wang, C.***, Zhou F.*. (2023). Continual Learning for Robotic Grasping Detection with Knowledge Transferring, IEEE Transactions on Industrial Electronics,

[2] Fu, T., Bai, Y., Li, C., Li, F., **Wang, C.**, Song, R. (2023). Human-Robot Deformation Manipulation Skill Transfer: Sequential Fabric Unfolding Method for Robots. IEEE Robotics and Automation Letters.

[3] **Wang, C.**, Chen, X., Li, C., Song, R., Li, Y., & Meng, M. Q. H. (2022). Chase and track: Toward safe and smooth trajectory planning for robotic navigation in dynamic environments. IEEE Transactions on Industrial Electronics, 70(1), 604-613.

[4] Chen, X., Liu, J., Wu, J., **Wang, C.***, & Song, R*. (2022). LoPF: An Online LiDAR-Only Person-Following Framework. IEEE Transactions on Instrumentation and Measurement, 71, 1-13.

[5] Liu, J., Chen, X., **Wang, C.***, Zhang, G., & Song, R.* (2022). A person-following method based on monocular camera for quadruped robots. Biomimetic Intelligence and Robotics, 2(3), 100058.

[6] Cai K.#, **Wang, C.#**, Song S., et al., & Meng, M. Q. H. Risk-Aware Path Planning Under Uncertainty in Dynamic Environments[J]. Journal of Intelligent & Robotic Systems, 2021, 101(3): 1-15.

[7] **Wang, C.**, et al.& Meng, M. Q. H.,"Efficient Autonomous Exploration with Incrementally Built Topological Map in 3D Environments". IEEE Transactions on Instrumentation and Measurement. 2020, DOI:10.1109/TIM. 2020.3001816.

[8] **Wang, C.**, & Meng, M. Q. H.,"Stable Autonomous Wheelchair Robot Navigation in the Environments with Slope Way". IEEE Transactions on Vehicular Technology. 2020, DOI: 10.1109/TVT. 2020.3009979.

[9] **Wang, C.**, Mai,X. et al. & Meng, M. Q. H. "Coarse-to-Fine Visual Object Catching Strategy Applied in Autonomous Airport Baggage Trolley Collection". IEEE Sensors Journal. DOI: 10.1109/JSEN.2020.3022459.

[10] **Wang, C.**, Cheng,J., Chi,W.,Yan,T.,& Meng, M. Q. H., "Semantic-Aware Informative Path Planning for Efficient Object Search Using Mobile Robot". IEEE Transactions on System, Man, and Cybernetics: Systems. 2019, DOI: 10.1109/TSMC.2019.2946646.

[11] **Wang C.**, Chi W., Sun Y. & Meng, M. Q. H., "Autonomous Robotic Exploration by Incremental Road Map Construction". IEEE Transactions on Automation Science and Engineering, vol. 16, no. 4, pp. 1720-1731, Oct. 2019.

[12] **Wang C.**, Zhu, D., Li, T., Meng, M. Q. H., & De Silva, C. W.,"Efficient Autonomous Robotic Exploration with Semantic Road Map in Indoor Environments". IEEE Robotics and Automation Letters, 4(3), pp. 2989-2996.

[13] **Wang, C.**, Cheng, J., Wang, J., Li, X., & Meng, M. Q. H., "Efficient object search with belief road map using mobile robot". IEEE Robotics and Automation Letters, 3(4), 3081-3088.

[14] **Wang, C.**, Wang, J., Li, C., Ho, D., Cheng, J., et al., & Meng, M. Q. H.,"Safe and Robust Mobile Robot Navigation in Uneven Indoor Environments". Sensors, 19(13), 2993.

[15] Li Teng, **Wang, C.**, & Meng, M. Q. H., et al. Attention-Driven Active Sensing With Hybrid Neural Network for Environmental Field Mapping[J]. IEEE Transactions on Automation Science and Engineering, 2021.

[16] Cheng,J.,**Wang, C.**, et al., & Meng, M. Q. H., "Improving Dense Mapping for Mobile Robots in Dynamic Environment Based on Semantic Information". IEEE Sensors Journal, DOI: 10.1109/JSEN. 2020.3023696.

[17] Chi W, **Wang, C.**, Wang J, et al., & Meng, M. Q. H.,"Risk-DTRRT-Based Optimal Motion Planning Algorithm for Mobile Robots". IEEE Transactions on Automation Science and Engineering. 2018, 16(3): 1271-1288.

[18] Cheng, J., **Wang, C.**, et al., & Meng, M. Q. H., "Robust Visual Localization in Dynamic Environments Based on Sparse Motion Removal". IEEE Transactions on Automation Science and Engineering, 2019.17(2):658 - 669.

[19] Wang,Y., Cheng, H.,**Wang, C.**,& Meng, M. Q. H. Pose Invariant Inertial Odometry for Pedestrian Localization. IEEE Transactions on Instrumentation & Measurement

[20] Pan J. Mai X., **Wang, C.**, et al. & Meng, M. Q. H. "A Searching Space Constrained Partial to Full Registration Approach with Applications in Airport Trolley Deployment Robot". IEEE Sensors Journal.2020

[21] Chen,W., Zhu L.,**Wang, C.**, et al. & Meng, M. Q. H. "CEB-Map: Visual Localization Error Prediction for Safe Navigation". IEEE Sensors Journal. DOI: 10.1109/JSEN.2020.2999641.

[22] Wang, J, Wen, Z., Li, C, **Wang, C.**, & Meng, M. Q. H.,"Neural RRT*: Learning-based Optimal Path Planning". IEEE Transactions on Automation Science and Engineering, 2020. DOI:10.1109 /TASE.2020.2976560.

Conferences

[1] Chen X, Wang Y, **Wang, C.**, et al. Low-drift LiDAR-only Odometry and Mapping for UGVs in Environments with Non-level Roads[C]//2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2022: 13174-13180.

[2] **Wang, C.**, Li, T., Meng, M. Q. H., & De Silva, C., "Efficient Mobile Robot Exploration with Gaussian Markov Random Fields in 3D Environments." In 2018 IEEE International Conference on Robotics and Automation (ICRA), pp. 5015-5021. IEEE, 2018.

[3] **Wang, C.**, Meng L., She S., et al, Max Q.-H. Meng, & De Silva, C., "Autonomous mobile robot navigation in uneven and unstructured indoor environments." In 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 109-116. IEEE, 2017.

[4] **Wang, C.**, Meng, L., Li, T., De Silva, C. W., & Meng, M. Q. H., "Towards autonomous exploration with information potential field in 3D environments." In 2017 18th International Conference on Advanced Robotics (ICAR), pp. 340-345. IEEE, 2017.

[5] **Wang, C.**, & Meng, M. Q. H., "Variant step size RRT: An efficient path planner for UAV in complex environments." In 2016 IEEE International Conference on Real-time Computing and Robotics (RCAR), pp. 555-560. IEEE, 2016.

[6] **Wang, C.**, Liu, W., & Meng, M. Q. H., " Obstacle avoidance for quadrotor using improved method based on optical flow. " In 2015 IEEE International Conference on Information and Automation (ICIA), pp. 1674-1679. IEEE, 2015.

[7] **Wang, C.**, Liu, W., & Meng, M. Q. H., "A denoising and drift-control approach for UAV trajectory tracking." In 2014 IEEE International Conference on Robotics and Biomimetics (ROBIO 2014), pp. 1714-1718. IEEE, 2014.

[8] **Wang, C.**, & Meng, M. Q. H., "Experimental evaluation of the RT-WMP for typical multi-robot systems in real-life indoor environment." In 2013 IEEE International Conference on Robotics and Biomimetics (ROBIO 2013), pp. 2286-2290. IEEE, 2013.

[9] Lu, Y., **Wang, C.**, Meng, M. Q. H.,"Video-based Contactless Blood Pressure Estimation: A Review" IEEE International Conference on Real-time Computing and Robotics (RCAR). Accepted.

[10] Cai, K., **Wang, C.**, Li, C., Song, S., & Meng, M. Q. H.. "Adaptive Sampling for Human-aware Path Planning in Dynamic Environments." In 2019 IEEE International Conference on Robotics and Biomimetics (ROBIO). pp. 1987-1994. IEEE.

[11] Li, T., **Wang, C.**, Meng, M. Q. H., & de Silva, C. W.,"Coverage Sampling Planner for UAV-enabled Environmental Exploration and Field Mapping." In 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2019: 2509-2516.

[12] Cai, K., Chen W., **Wang, C.**, et al. & Meng, M. Q. H."Curiosity-based Robot Navigation under Uncertainty in Crowded Environments". In 2021 IEEE International Conference on Robotics and Automation (ICRA)

[13] Li T.,Ho,D.,Li,C., Zhu,D., **Wang, C.**, & Meng, M. Q. H.,"Houseexpo: A large-scale 2d indoor layout dataset for learning-based algorithms on mobile robots" In 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Accepted.

[14] Zhu, D., Li, T., Ho, D., **Wang, C.**, & Meng, M. Q. H., "Deep reinforcement learning supervised autonomous exploration in office environments." In 2018 IEEE International Conference on Robotics and Automation (ICRA), pp. 7548-7555. IEEE, 2018.

[15] Cheng, J., Sun, Y., Chi, W., **Wang, C.**, Cheng, H., & Meng, M. Q. H., "An accurate localization scheme for mobile robots using optical flow in dynamic environments." In 2018 IEEE International Conference on Robotics and Biomimetics (ROBIO), pp. 723-728. IEEE, 2018.

[16] Zhu, D., Du, Y., Lin, Y., Li, H., **Wang, C.**, Xu, X., & Meng, M. Q. H., "Hawkeye: Open source framework for field surveillance." In 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 6083-6090. IEEE, 2017.

PATENTS

[1] Aili Li, Chaoqun Wang, et al. "Trolley pose estimation: method and device", No.ZL202010127115.2, Issued.

[2] Aili Li, Chaoqun Wang, et al. "Trolley collection method", No. ZL201911274337.0, Issued.

[3] Aili Li, Chaoqun Wang, et al. "Trolley collection robot", No. ZL 201922258697.3, Issued.

[4] Chaoqun Wang, Xuewen Rong, et al. "A Robot Guide Dog System", No. ZL 2021 1 0988030.8, Issued

[5] Chaoqun Wang, Yinchuan Wang, et al. "Autonomous Exploration based on Deep Reinforcement Learning", First trial.

[6] Chaoqun Wang, Wei Song, et al. "Scene Graph driven Autonomous Exploration in Office-like environments", First trial.

[7] Chaoqun Wang, Min Xia, et al. "Water quality monitoring using autonomous unmanned surface vehicle", First trial.

[8] Max Q.-H. Meng, Chaoqun Wang, et al. "Autonomous trolley collection robot", No. 16/819973, First trial.

[9] Min Xia, Chaoqun Wang, et al. "Path planning method based on improved hybrid particle filter", No. 202010665446.1, First trial.

PROFESSIONAL ACTIVITIES

Associate Editor
- Frontiers in Robotics and AI
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Reviewer
- IEEE Transactions on Robotics
- IEEE Transactions on Systems, Man, and Cybernetics, Systems
- IEEE Transactions on Automation Science and Engineering
- IEEE Transactions on Cognitive and Developmental Systems
- IEEE/ASME Transactions on Mechatronics
- IEEE Transaction on Industrial Electronics
- IEEE Robotics and Automation Letters
- Journal of Intelligent and Robotic Systems
- Intelligent Service Robotics Journal
- International Journal of Advanced Robotic Systems
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robotics and Biomimetics (ROBIO)
- IEEE International Conference on Information and Automation (ICIA)

Session Chair
- The 42nd Chinese Control Conference (CCC 2023)
- IEEE International Conference on Information and Automation (ICIA)
- IEEE International Conference on Advanced Robotics (ICAR)

Program Committee
- IEEE International Conference on Robotics and Biomimetics (ROBIO)
- IEEE International Conference on Real-time Computing and Robotics (RCAR)
- The 16th International Conference on Computer Science and Education (ICCSE)
- International Conference on Biomimetic Intelligence and Robotics(ICBIR)

GRANT ACTIVITIES & PARTICIPATION

- "History-aware Autonomous Robotic Exploration", 1000,000, PI, funded by National Natural Science Foundation of China, 2023-2025.

- "Embodied Navigation", 750,000, PI, funded by Shandong Government, 2023-2025.

- "Research on Semantic-driven Autonomous Mobile Robot Exploration Methods Towards Dynamic Scenes", 300,000, PI, funded by National Natural Science Foundation of China, 2022-2024.

- "Research on autonomous mobile robot perception based on spatial-temporal Knowledge Graph", 150,000, PI, funded by National Natural Science Foundation of Shandong Province, 2022-2024.

- "An Intelligent Robotic System for Autonomous Airport Passenger Trolley Deployment", HK$ 6,757,124, PI: Max Q.-H. Meng, funded by Innovation and Technology Fund (Innovation and Technology Support Programme), 2018-2020. C. Wang constructed $\sim 80\%$ of the grant proposal and worked as team leader for developing the robot system.

- "Development of Scenario Intelligence for Service Robots with Application in Autonomous Untrained Elevator Operations", HK$ 632,421, PI: Max Q.-H. Meng, funded by Hong Kong Research Grants Council, 2018-2021. C. Wang constructed $\sim 50\%$ of the grant proposal and participated in this project as a research engineer.

INVITED TALK

- "Autonomous Exploration", Chinese Congress on Artificial Intelligence, Fuzhou, China *2023*

- "Autonomous and Embodied Navigation", Jianghuai Lab, Anhui, China *2023*

- "A survey of scene graph and its application in robot navigation", Zhejiang Lab *2022*

- "Autonomous navigation in dense environment with adaptive Model Predictive Control", Shandong University *2020*

- "Development of motion planning algorithms", Shenlan College *2019*

- "Autonomous robotic exploration based on topological road map", Young Scientist Forum in Artificial Intelligence and Smart Manufacturing, Northwestern Polytechnical University *2019*

- "Autonomous obstacle avoidance based on optifical flow", Young Scientist Forum in Artificial Intelligence, Tsinghua University *2018*

TEACHING EXPERIENCE

- Linear Algerba *2021-now*
  Lecturer, public course, Shandong University

- Mobile Robot Motion Planning *2019-2020*
  Senior Lecturer, public course, Shenlan College

- ELEG5757 Wearable Bioelectronics *2019-2020*
  Teaching Assistant, postgraduate course, CUHK

- ELEG5757 Wearable Bioelectronics *2018-2019*
  Teaching Assistant, postgraduate course, CUHK

- BMEG3420 Medical Robotics *2017-2018*
  Teaching Assistant, undergraduate course, CUHK

- BMEG4103 Biomedical Modeling *2015-2016*
  Teaching Assistant, undergraduate course, CUHK

- BMEG2000 Introduction to Biomedical Engineering *2014-2015*
  Teaching Assistant, undergraduate course, CUHK

REFERENCES

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Professor Clarence de Silva

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