CHAOQUN WANG

(86) · 13210587091 ◇ chaoqunwang@sdu.edu.cn
Room 104, Control Science and Engineering Building
Shandong University, Shandong Province, China

RESEARCH EXPERIENCE

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

- 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 Shandong University Qilu Young Scholars Program.

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

- **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*

PUBLICATIONS

Journals

[1] **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.

[2] 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.

[3] 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.

[4] 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.

[5] **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.

[6] **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.

[7] **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.

[8] **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.

[9] **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.

[10] **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.

[11] **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.

[12] **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.

[13] 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.

[14] 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.

[15] 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.

[16] 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.

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

[18] 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

[19] 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.

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

[5] Chaoqun Wang, Min Xia, et al. "Water quality monitoring using autonomous unmanned surface vehicle", No. 202010838034.3, First trial.

[6] 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 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

- 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)

GRANT ACTIVITIES & PARTICIPATION

- "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

- "A survey of scene graph and its application in robo t 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

STUDENT CO-SUPERVISION

- Mobile robot motion planning, Kuanqi Cai *2018-2019*
- Autonomous robot exploration, Xiaoyi Wei *2017-2018*
- Mobile robot motion planning, Olay Cheng *2016-2017*

REFERENCES

Professor Max Q.-H. Meng
Fellow of IEEE, Fellow of CAE
Department of Electronic Engineering, The Chinese University of Hong Kong
Room 406, Ho Sin Hang Engineering Building, The Chinese University of Hong Kong
Phone: +852-2609-8282, Fax: +852-2603-5558
Email: max.meng@cuhk.edu.hk

Professor Clarence de Silva
Fellow of IEEE, Fellow of ASME, Fellow of CAE
Department of Mechanical Engineering, University of British Columbia
Room 2071, CEME Building, University of British Columbia
Phone: +604-822-6291, Fax: +604-822-2403
Email: desilva@mech.ubc.ca

Professor Simon X. Yang
School of Engineering,University of Guelph
Room 2513, Richards Building, University of Guelph
Phone: +519-824-4120, Fax: +519-836-0227
Email: max.meng@cuhk.edu.hk