

Associate Professor Yan Qiao

Macau University of Science and Technology
Faculty of Innovation Engineering



PhD. Supervisor

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Academic Qualification:

June, 2015: Ph. D. degree in Mechanical Engineering, Guangdong University of Technology, Guangzhou, China

June, 2009: B. S. degree in Industrial Engineering, Guangdong University of Technology, Guangzhou, China

Teaching Area

Intelligent Control Technology

Introduction to Algorithm Theory

Operations Research

Research Area

Semiconductor manufacturing systems, scheduling and control, discrete event systems, Petri nets

Working Experience

July 2022 – Present: Associate Professor at the Institute of Systems Engineering, Macau University of Science and Technology, Macao

Jan. 2018 – June 2022: Assistant Professor at the Institute of Systems Engineering, Macau University of Science and Technology, Macao

Jan. 2016 – Dec. 2017: Postdoctoral Fellow at the Institute of Systems Engineering, Macau University of Science and Technology, Macao

Sep. 2014 – Sep. 2015: Visiting student at the department of Electrical and Computer Engineering, New Jersey Institute of Technology, USA

Research Grants

“Modeling, Control and Scheduling of Cluster Tools with Complex Constraints,” National Natural Science Foundation of China under Grant 61803397, Jan. 2019 – Dec. 2021;

“Digital-twin driven scheduling and control of wafer fabrication systems,” Science and Technology development fund (FDCT), Macau SAR (file No. 0018/2021/A1), Sep. 2021 – Sep. 2024;

Representative publications (Complete publication refer to my webpage)

Y. Qiao, Y. J. Lu, J. Li, S. W. Zhang, N. Q. Wu, and B. Liu, “An efficient binary integer programming model for residency time-constrained cluster tools with chamber cleaning requirements,” *IEEE Transactions on Automation Science and Engineering*, vol. 19, no. 3, pp. 1757-1771, July 2022.

Y. Qiao, M. C. Zhou, N. Q. Wu, Z. W. Li, and Q. H. Zhu, “Closing-down optimization for single-arm cluster tools subject to wafer residency time constraints,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 51, no. 11, pp. 6792-6807, November 2021.

- Y. Qiao**, S. W. Zhang, N. Q. Wu, M. C. Zhou, Z. W. Li, and T. Qu, “Efficient approach to failure response of process module in dual-arm cluster tools with wafer residency time constraints,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 51, no. 3, pp. 1612-1629, March 2021.
- Y. Qiao**, S. W. Zhang, N. Q. Wu, X. Wang, Z. W. Li, M. C. Zhou, and T. Qu, “Data-driven approach to optimal control of ACC systems and layout design in large rooms with thermal comfort consideration by using PSO,” *Journal of Cleaner Production*, vol. 236, DOI: 10.1016/j.jclepro.2019.07.053, 2019.
- Y. Qiao**, N. Q. Wu, F. J. Yang, M. C. Zhou, Q. H. Zhu, and T. Qu, “Robust scheduling of time-constrained dual-arm cluster tools with wafer revisiting and activity time disturbance,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 49, no. 6, pp. 1228-1240, June 2019.
- Y. Qiao**, N. Q. Wu, F. J. Yang, M. C. Zhou, and Q. H. Zhu, “Wafer sojourn time fluctuation analysis of time-constrained dual-arm cluster tools with wafer revisiting and activity time variation,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 48, no. 4, pp. 622-636, April 2018.
- Y. Qiao**, M. C. Zhou, N. Q. Wu, and Q. H. Zhu, “Scheduling and control of startup process for single-arm cluster tools with residency time constraints,” *IEEE Transactions on Control Systems Technology*, vol. 25, no. 4, pp. 1243-1256, July 2017.
- Y. Qiao**, C. R. Pan, N. Q. Wu, and M. C. Zhou, “Response policies to process module failure in single-arm cluster tools subject to wafer residency time constraints,” *IEEE Transactions on Automation Science and Engineering*, vol. 12, no. 3, pp. 1125-1139, July 2015.
- Y. Qiao**, N. Q. Wu, and M. C. Zhou, “Schedulability and scheduling analysis of dual-arm cluster tools with wafer revisiting and residency time constraints based on a novel schedule,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 45, no. 3, pp. 472-484, March 2015.
- Y. Qiao**, N. Q. Wu, Q. H. Zhu, and L. P. Bai, “Cycle time analysis of dual-arm cluster tools for wafer fabrication processes with multiple wafer revisiting times,” *Computers & Operations Research*, vol. 53, pp. 252-260, January 2015.
- Y. Qiao**, N. Q. Wu, C. R. Pan, and M. C. Zhou, “How to respond to process module failure in residency time-constrained single-arm cluster tools,” *IEEE Transactions on Semiconductor Manufacturing*, vol. 27, no. 4, pp. 462-474, Nov. 2014.
- Y. Qiao**, N. Q. Wu, and M. C. Zhou, “Scheduling of dual-arm cluster tools with wafer revisiting and residency time constraints,” *IEEE Transactions on Industrial Informatics*, vol. 10, no. 1, pp. 286-300, Feb. 2014.
- Y. Qiao**, N. Q. Wu, and M. C. Zhou, “A Petri net-based novel scheduling approach and its cycle time analysis for dual-arm cluster tools with wafer revisiting,” *IEEE Transactions on Semiconductor Manufacturing*, vol. 26, no. 1, pp. 100-110, Feb. 2013.
- Y. Qiao**, N. Q. Wu, and M. C. Zhou, “Real-time scheduling of single-arm cluster tools subject to residency time constraints and bounded activity time variation,” *IEEE Transactions on Automation Science and Engineering*, vol. 9, no. 3, pp. 564-577, July 2012.
- Y. Qiao**, N. Q. Wu, and M. C. Zhou, “Petri net modeling and wafer sojourn time analysis of single-arm cluster tools with residency time constraints and activity time variation,” *IEEE Transactions on Semiconductor Manufacturing*, vol. 25, no. 3, pp. 432-446, August 2012.

Professional Certification and Awards

Senior Member of IEEE

Best Paper Award in Application, for the paper “A virtual wafer-based scheduling method for dual-arm cluster tools with chamber cleaning requirements,” by Y. Qiao, J. Li, Y. J. Lu, S. W. Zhang, N. Q. Wu, and B. Liu, IEEE International Conference on Networking, Sensing and Control, Xiamen, China, December 3-5, 2021;

The 2018 Science and Technology Award of Jiangxi Province of China-The Second Prize of Natural Science Award;

2018 BOC (Bank of China) Excellent Research Award

The 2018 Science and Technology Award of Macau-The Third Prize of Natural Science Award

Journal Editorship

Special Issue Guest Editor of IEEE Robotics and Automation Magazine, Machine Learning for Industry 4.0, 20

Personal Website

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