

## CURRICULUM VITAE

### Kaiyan Yu

State University of New York at Binghamton  
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Web: <https://www.binghamton.edu/labs/acsr/>

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#### EDUCATION

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| <b>Ph.D.</b> | <i>Mechanical and Aerospace Engineering, Rutgers University</i>      | <i>October 2017</i> |
| <b>B.S.</b>  | <i>Intelligent Science and Technology, Nankai University (China)</i> | <i>July 2010</i>    |

#### RESEARCH INTERESTS

- Dynamic systems and controls
  - ▷ dynamic systems modeling and control
  - ▷ mechatronic systems and control
  - ▷ nonlinear, robust, and adaptive control system design
- Autonomous robotic systems
  - ▷ autonomous vehicles/robots
  - ▷ motion planning, navigation and control
  - ▷ human/robot interactions
- Automation science and engineering
  - ▷ automation for micro-/nano-systems
  - ▷ nano/micro particles control and manipulation
  - ▷ intelligent autonomous system

#### HONORS / AWARDS

- My class, ME 428, has been selected as one of the 25 Coolest Classes You Can Take at Binghamton, *Binghamton University Blog*, 2024
- Services for Students with Disabilities Student Recognition Recipient, *Binghamton University*, 2023
- My class, ME 428, has been selected as one of the 34 Cool Classes at Binghamton University, *Binghamton University Blog*, 2022
- Best Student Paper Award, 2022 *IEEE International Conference on Automation Science and Engineering*
- NSF Doctoral Consortium Award, 2016 *IEEE Conference on Automation Science and Engineering*
- Best Student Paper Award Finalist <sup>1</sup>, 2014 *IEEE/ASME International Conf. on Advanced Intelligent Mechatronics*
- “Hundred Reserve Young Teachers” program, Nankai University, 2010
- Graduate with Highest Honor, Nankai University, 2010
- Best Undergraduate Thesis, Nankai University, 2010
- National Scholarship/Fellowship, Nankai University, 2008-2009
- Wumart Science Masters Scholarship/Fellowship, Nankai University, 2007-2008
- First Prize of Excellent Undergraduate Scholarship/Fellowship, Nankai University, 2006-2007

#### TEACHING EXPERIENCE

- **Instructor**  
*Department of Mechanical Engineering, Binghamton University*

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<sup>1</sup>Due to visa application issue, I did not attend and participate the best paper competition at 2014 AIM in France.

- ▷ **ME 528:** Modern Robotics, New Graduate Course    *Fall 2018, Fall 2019, Fall 2020, Spring 2022, Spring 2023, Spring 2024, Spring 2025*
- ▷ **ME 424:** Control System in Mechanical Engineering, Undergrad Core Course    *Spring 2019, Spring 2020, Spring 2021, Fall 2021, Fall 2022, Fall 2023, Fall 2024*
- ▷ **ME 428:** Robotics, Undergrad Tech Elective    *Spring 2018, Spring 2020, Spring 2021, Spring 2022, Spring 2023, Spring 2024, Spring 2025*

*Department of Mechanical and Aerospace Engineering, Rutgers University*

- ▷ **MAE 221:** Engineering Mechanics: Statics, Undergrad Core    *Summer 2016*

- **Teaching assistant/lab instructor**

*Department of Mechanical and Aerospace Engineering, Rutgers University*

- ▷ **Byrne Freshmen Seminar:** Robotics: The past, the present, the future    *Spring 2016, Spring 2017*
- ▷ **MAE 361:** Introduction to Mechatronics    *Spring 2012, Spring 2013, Spring 2014*

*Institute of Robotics and Automatic Information System, Nankai University*

*Spring 2011*

- ▷ An Introduction to Robotics

- **Lecturer**

*ChuangYuan Information Technology Club, Nankai University*

*2008–2009*

- ▷ C++ Programming Language
- ▷ Computer Graphic Design

## RESEARCH EXPERIENCE

- **Associate professor (with tenure)**    *January 2025 – present*  
**Assistant professor**    *January 2018 – December 2024*  
*Department of Mechanical Engineering, Binghamton University*
- **Research associate**    *December 2017*  
*Department of Mechanical and Aerospace Engineering, Rutgers University*
- **Graduate research assistant**    *September 2011 – September 2017*  
*Department of Mechanical and Aerospace Engineering, Rutgers University*
- **Undergraduate and graduate research assistant**    *July 2008 – July 2011*  
*Institute of Robotics and Automatic Information System, Nankai University*
- **Cross-disciplinary Scholars in Science and Technology (CSST)**    *July 2009–September 2009*  
*Computer Science Department, University of California, Los Angeles*

## PUBLICATIONS <sup>2</sup>

- **Book chapters**
  - B1. **K. Yu** (2022). Electrophoresis-based manipulation of micro- and nanoparticles in fluid suspensions, In *Field-Driven Micro and Nanorobots for Biology and Medicine*, Y. Sun, X. Wang, and J. Yu (Ed.), Springer Nature, Switzerland, pp 133-164.
- **Refereed journal papers that have appeared or been accepted**
  - J20. S. Fang and **K. Yu**<sup>†</sup> (2024). Fine-Tuning Hybrid Physics-Informed Neural Networks for Vehicle Dynamics Model Estimation. *arXiv preprint arXiv:2409.19647*.
  - J19. J. Song, J. Wu, and **K. Yu**<sup>†</sup> (2024). Learning-based auto-focus and 3D pose identification of moving micro- and nanowires in fluid suspensions. *IEEE Trans. on Automation Science and Engineering*, vol. 21, no. 3, pp. 2321-2334.
  - J18. V. Veeraraghavan, K. Hunte, J. Yi<sup>†</sup>, and **K. Yu**<sup>†</sup> (2024). Complete and near-optimal robotic crack coverage and filling in civil infrastructure. *IEEE Trans. on Robotics*, vol. 40, pp. 2850-2867.

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<sup>2</sup>Underlined authors are graduate students or undergraduate students under my supervision. The name with a “†” symbol indicates the corresponding author.

- J17. A. Arab, K. Yu, J. Yu, and J. Yi<sup>†</sup> (2023). Motion planning and control of autonomous aggressive vehicle maneuvers. *IEEE Trans. on Automation Science and Engineering*, vol. 21, no. 2, pp. 1488-1500.
- J16. J. Wu and K. Yu<sup>†</sup> (2023). Adaptive tube model predictive control for manipulating micro- and nanoparticles in fluid suspensions under global external fields. *IEEE Trans. on Automation Science and Engineering*, vol. 20, no. 3, pp. 1838-1850.
- J15. X. Li, J. Wu, J. Song and K. Yu<sup>†</sup> (2022). Informed sampling-based motion planning for manipulating multiple micro agents using global external electric fields. *IEEE Trans. on Automation Science and Engineering*, vol. 19, no. 3, pp. 1422-1433.
- J14. Y. Zhang, J. Xu, P. Zhang, W. Li, K. Yu and P. Huang<sup>†</sup> (2022). Monocular visual-inertial sensing of unknown rotating objects: observability analyses and case study for metric 3D reconstructing of space debris. *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 2423-2430.
- J13. J. Wu, X. Li, and K. Yu<sup>†</sup> (2020). Electrophoresis-based adaptive manipulation of nanowires in fluid suspension. *IEEE Trans. on Mechatronics*, vol. 25, no. 2, pp 638-649.
- J12. H. Xiang, M. Trkov, K. Yu and J. Yi<sup>†</sup> (2019). A stick-slip interactions model of soft-solid frictional contacts. *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 141, no. 4, pp 041015-041015-10.
- J11. K. Yu<sup>†</sup>, J. Yi, and J. Shan (2018). Real-time motion planning of multiple nanowires in fluid suspension under electric-field actuation. *International Journal of Intelligent Robotics and Applications*, vol. 2, no. 4, pp 383-399.
- J10. K. Yu, J. Yi<sup>†</sup>, and J. Shan (2018). Automated characterization and assembly of individual nanowires for device fabrication. *Lab on a Chip*, vol. 18, no. 10, pp 1494-1503.
- J9. K. Yu, J. Yi<sup>†</sup>, and J. Shan (2018). Simultaneous multiple-nanowire motion control, planning and manipulation under electric-fields in fluid suspension. *IEEE Trans. on Automation Science and Engineering*, vol. 15, no. 1, pp 80-91.
- J8. X. Lu, K. Yu, Y. Zhang, J. Yi<sup>†</sup>, J. Liu, and Q. Zhao (2017). Whole-body pose estimation in physical rider-bicycle interactions with a monocular camera and wearable gyroscopes. *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 139, no. 7, pp 071005-071005-11.
- J7. K. Yu, J. Yi<sup>†</sup>, and J. Shan (2015). Motion planning and control of nanowires under electric fields in fluid suspension. *IEEE Trans. on Automation Science and Engineering*, vol. 12, no. 1, pp 37-49.
- J6. X. Lu, J. Liu<sup>†</sup>, K. Yu, Y. Li, and L. Sun (2014). Pose measurements using quaternion and Kalman filter. *High Technology Letters*, vol. 20, no. 2, pp 131-139.
- J5. X. Lu, J. Liu<sup>†</sup>, K. Yu, Y. Li, and L. Sun (2013). Uncalibrated visual servoing design for the competitive networked robots. *High Technology Letters*, vol. 19, no. 4, pp 413-421.
- J4. K. Yu<sup>†</sup>, J. Liu, X. Lu, H. Li, Y. Li, and L. Sun (2011). Design and implementation of simulation system for the competitive robot system. *Robot*, vol. 33, no. 6, pp 649-657 (in Chinese).
- J3. X. Lu<sup>†</sup>, J. Liu, K. Yu, H. Li, Y. Li, and L. Sun (2011). Rapid detection of moving target in the competitive networked robots. *Robot*, vol. 33, no. 6, pp 658-665,672 (in Chinese).
- J2. J. Yu<sup>†</sup>, K. Yu, X. Shi, and R. Peng (2009). Simultaneous determination of lead and zinc in copper concentrate by BP-artificial neural network spectrophotometry. *Metallurgical Analysis*, vol. 29, no. 3, pp 52-55.
- J1. W. Chou<sup>†</sup>, X. Lu, K. Yu, X. Liu, and S. Chen (2009). Indoor autonomous service robot system. *Automation & Instrumentation*, vol. 24, no. 9, pp 46-49 (in Chinese).
- **Refereed journal papers that are under review**

JS3. S. Fang, C. Wu, and K. Yu<sup>†</sup> (2025). DRCC-LPVMPC: A Data-Driven Approach with Model Uncertainty in Autonomous Driving with Obstacle Avoidance. Submitted to *IEEE Trans. on Intelligent Transportation Systems*, under review.

JS2. S. Fang and K. Yu<sup>†</sup> (2025). Fine-Tuning Hybrid Physics-Informed Neural Networks for Vehicle Dynamics Model Estimation. Submitted to *IEEE Trans. on Vehicular Technology*, under review.

JS1. X. Li, S. Fang, and K. Yu<sup>†</sup> (2025). Time-optimal motion planning for autonomous vehicle: a beam theory-based path smoothing and trajectory optimization. Submitted to *IEEE Trans. on Automation Science and Engineering*, under review.
  - **Refereed conference papers that have appeared or been accepted**

C25. S. Fang and K. Yu (2024). Fine-tuning hybrid physics-informed neural networks for vehicle dynamics model estimation. In *Proceedings of 2024 Modeling, Estimation, and Control Conference*, Chicago, IL, pp 810-815.

- C24. A. Arab , Y. Mousavi, **K. Yu**, and I. B. Kucukdemiral (2024). Safety prioritization by iterative feedback linearization control for collaborative robots. In *Proceedings of 2024 IEEE Conference on Control Technology and Applications*, Newcastle upon Tyne, United Kingdom, pp 811-816.
- C23. J. Wu and **K. Yu** (2023). Ensemble control for manipulating multiple nanowires in fluid suspension using external electrical fields. In *Proceedings of 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Seattle, WA, pp 105-110.
- C22. J. Song, J. Wu, and **K. Yu** (2022). 3D pose identification of moving micro- and nanowires in fluid suspensions under bright-field microscopy. In *Proceedings of 2022 IEEE International Conference on Automation Science and Engineering*, Mexico City, Mexico, pp 987-992. **(Best Student Paper Award.)**
- C21. J. Wu and **K. Yu** (2021). Adaptive tube model predictive control of micro- and nanoparticles in fluid suspensions using global external fields. In *Proceedings of 2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Delft, Netherlands, pp 526-531.
- C20. J. Song and **K. Yu** (2021). 3D pose identification of micro- and nanowires in fluid suspensions. In *Proceedings of 2021 IEEE International Conference on Automation Science and Engineering*, Lyon, France, pp 2092-2097.
- C19. A. Joseph, J. Wu, **K. Yu**, L. Jiang, N. Cady, and B. Si (2021). Function-on-function regression for trajectory prediction of small-scale particles towards next-generation neuromorphic computing. In *Proceedings of 2021 IEEE International Conference on Automation Science and Engineering*, Lyon, France, pp 1997-2002.
- C18. X. Li and **K. Yu** (2020). Informed sampling-based motion planning for manipulating multiple micro agents using global external fields. In *Proceedings of 2020 IEEE International Conference on Automation Science and Engineering*, Hong Kong, China, pp 889-894.
- C17. J. Wu and **K. Yu** (2020). Electrophoresis-based adaptive tube model predictive control of micro- and nanoparticles motion in fluid suspension. In *Proceedings of 2020 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Boston, MA, pp 2068-2073.
- C16. J. Wu and **K. Yu** (2020). Adaptive tube model predictive control for manipulating multiple nanowires with coupled actuation in fluid suspension. In *Proceedings of 2020 IFAC World Congress*, Berlin, Germany, pp 8734-8739.
- C15. J. Wu and **K. Yu** (2019). Adaptive control of nanowires motion using electric fields in fluid suspension. In *Proceedings of 2019 ASME Dynamic Systems and Control Conference*, Park City, UT, Paper # DSCC2019-9051.
- C14. **K. Yu**, C. Guo, and J. Yi (2019). Complete and near-optimal path planning for simultaneous sensor-based inspection and footprint coverage in robotic crack filling. In *Proceedings of 2019 IEEE International Conference on Robotics and Automation*, Montreal, Canada, pp 8812-8818.
- C13. **K. Yu**, J. Yi, and J. Shan (2018). Automated electric-field-based nanowire characterization, manipulation, and assembly. In *Proceedings of 2018 IEEE International Conference on Automation Science and Engineering*, Munich, Germany, pp 1612-1617.
- C12. C. Guo, **K. Yu**, and J. Yi (2017). Optimal motion planning and control of a crack filling robot for civil infrastructure automation. In *Proceedings of 2017 IEEE International Conference on Automation Science and Engineering*, Xi'an, China, pp 1463-1468.
- C11. **K. Yu**, J. Yi and J. Shan (2016). Time optimal simultaneously motion planning and manipulation of multiple nanowires under electric-fields in fluid suspension. In *Proceedings of 2016 IEEE International Conference on Automation Science and Engineering*, Dallas, TX, pp 954-959.
- C10. A. Arab, **K. Yu**, J. Yi, and D. Song (2016). Motion planning for aggressive autonomous vehicle maneuvers. In *Proceedings of 2016 IEEE International Conference on Automation Science and Engineering*, Dallas, TX, pp 221-226.
- C9. A. Arab, **K. Yu**, J. Yi, and Y. Liu (2016). Motion control of autonomous aggressive vehicle maneuvers. In *Proceedings of 2016 IEEE International Conference on Advanced Intelligent Mechatronics*, Banff, Canada, pp 1663-1668.
- C8. **K. Yu**, J. Yi, and J. Shan (2015). Motion planning and manipulation of multiple nanowires simultaneously under electric-fields in fluid suspension. In *Proceedings of 2015 IEEE International Conference on Automation Science and Engineering*, Gothenburg, Sweden, pp 489-494.
- C7. **K. Yu**, J. Yi and J. Shan (2014). Motion control and manipulation of nanowires under electric-fields in fluid suspension. In *Proceedings of IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Besançon, France, pp 366-371. **(Best Student Paper Award finalist.)**
- C6. X. Lu, **K. Yu**, Y. Zhang, J. Yi, and J. Liu (2014). Whole-body pose estimation in physical rider-bicycle interactions with a monocular camera and a set of wearable gyroscopes. In *Proceedings of IEEE/RSJ International*

*Conference on Intelligent Robots and Systems*, Chicago, IL, pp 4124-4129.

- C5. **K. Yu**, X. Lu, J. Yi, and J. Shan (2013). Electrophoresis-based motion planning and control of nanowires in suspended fluids. In *Proceedings of 2013 IEEE International Conference on Automation Science and Engineering*, Madison, WI, pp 831-836.
- C4. X. Lu, Y. Zhang, **K. Yu**, J. Yi, and J. Liu (2013). Body-segment orientation estimation in rider-bicycle interactions with an un-calibrated monocular camera and wearable gyroscopes. In *Proceedings of 2013 ASME Dynamic Systems and Control Conference*, Palo Alto, CA, DSCC2013-3839.
- C3. Y. Li, X. Lu, **K. Yu**, and J. Liu (2011). Pursuit-evasion strategies of competitive networked robots based on differential games. In *Proceedings of the 30<sup>th</sup> Chinese Control Conference*, Yantai, China, pp 3947-3952 (in Chinese).
- C2. X. Lu, J. Liu, **K. Yu**, H. Li, Y. Li, and L. Sun (2011). High precision and rapid pose measurement for the competitive networked robots. *Chinese Automation Congress*, Beijing, China.
- C1. H. Li, J. Liu, Y. Li, X. Lu, **K. Yu**, and L. Sun (2010). Trajectory planning for visual servoing with some constraints. In *Proceedings of the 29<sup>th</sup> Chinese Control Conference*, Beijing, China, pp 3636-3642.

- **Refereed conference papers that are under review**

- CS1. T. Zheng, J. Yi, and **K. Yu** (2025). Optimal Planning for Multi-Robot Simultaneous Area and Line Coverage Using Hierarchical Cyclic Merging Regulation. Submitted to *Robotics: Science and Systems*, Los Angeles, CA, under review.

- **Conference workshop contribution (poster/extend abstract reviewed)**

- NC4. **K. Yu** (2018). Motion control, planning and manipulation of multiple nanowires under electric-fields in fluid suspension for automated characterization and nanoassembly. In *Poster Session at 30th annual Electronics Packaging Symposium*, Binghamton, NY.
- NC3. **K. Yu**, J. Yi, and J. Shan (2018). Motion control, planning and manipulation of multiple nanowires under electric-fields in fluid suspension for automated characterization and nanoassembly. In *Workshop on 30 Years of Small-Scale Robotics: from Nano-, to Millimeter-Sized Robotic Systems and Applications at 2018 IEEE International Conference on Robotics and Automation*, Brisbane, Australia.
- NC2. L. Wang, K. Yang, A. Dusane, M. Cotton, J. Xie, Y. Wang, X. Gong, S. Zhang, C. Yang, E. Kim, **K. Yu**, J. Yi, and A. D. Mazzeo (2017). A jellyfish-based aquatic locomotor with tunable gaits. In *Workshop on Material Robotics at 2017 Robotics Science and Systems*, Boston, MA.
- NC1. **K. Yu** (2017). Motion control, planning and manipulation of nanowires under electric-fields in fluid suspension. In *Women in Robotics Workshop at 2017 Robotics Science and Systems*, Boston, MA.

- **Theses**

- T2. **K. Yu** (2017). Motion control, planning and manipulation of nanowires under electric-fields in fluid suspension. Ph.D. dissertation, Department of Mechanical and Aerospace Engineering, Rutgers University. Committee members: Dr. Jingang Yi (chair), Dr. Jerry Shan, Dr. Qingze Zou, Dr. Kostas Bekris, Dr. Yicheng Lu.
- T1. **K. Yu** (2010). Design and implementation of multi-robot vision simulation system. B.S. thesis, Department of Information Technical Science, Nankai University, China. (**Best Undergraduate Thesis Award.**)

## RESEARCH GRANTS

- **Funded projects**

- G6. "CAREER: Simultaneous and Independent Control of Multiple Agents under a Common Electric Field", *National Science Foundation*, CMMI-2146056, 3/1/2022-2/28/2027, PI: **K. Yu**. Amount: \$596,608.00 (REU Supplemental Awards: NSF/CMMI-2146056: \$8,000).
- G5. "Ray-FL-FDA: Ray-empowered Federated Learning of Functional Data Analysis" ("Ray-based Distributed Computing in Multi-Task Functional Data Analysis for Neuromorphic Computing and Other Applications"), *SUNY-IBM AI Research Alliance*, SUNY-IBM, 6/1/2024-12/1/2025, PI: **K. Yu**, IBM Technical Leader: Carlos Costa. Direct amount: \$100,000.00. Total amount including cost share: \$157,000.00.
- G4. "Ray-F2R-FL: Ray-based Functional Regression with Federated Learning", *SUNY-IBM AI Research Alliance*, SUNY-IBM, 10/15/2021-12/31/2023, PI: B. Si (SSIE), co-PI: **K. Yu**, IBM Technical Leader: Carlos Costa. Direct amount: \$200,000.00 (Total amount including cost share: \$314,000.00). Prorated direct amount: \$50,000.00 (K. Yu).

- G3. “Hybrid Memristive Neural Network for Neuromorphic Computing with Automated Manipulation of Nanowires”, *SUNY Research Seed Grant Program, SUNY*, 10/15/2020-12/31/2023, PI: **K. Yu**, co-PI: B. Si (SSIE), N. Cady (University at Albany). Amount: \$22,500.00.
- G2. “Automated Integration with Micro/Nanowire-Based Fine-Pitch Interconnects for 3D Packaging”, *Integrated Electronics Engineering Center, Binghamton University*, 8/1/2020-8/30/2021, PI: **K. Yu**. Amount: \$40,000.00.
- G1. “Universal Instruments/United Technologies Aerospace (UIC/UTAS) vibration project”, *Integrated Electronics Engineering Center, Binghamton University*, 8/18/2020-9/3/2020, PI: **K. Yu**. Amount: \$9,839.00.

## PROFESSIONAL ACTIVITIES

- Member of the Institute of Electrical and Electronic Engineers (IEEE), 2013–present
- Member of the American Society of Mechanical Engineers (ASME), 2013–present
- Associate Vice President of the *IEEE Robotics and Automation Society (RAS) Media Services Board* (2019-present).
- Associate Editor
  - *IEEE Trans. on Automation Science and Engineering* (2022–present)
  - *IEEE Robotics and Automation Letters* (2021–present)
  - *IFAC Mechatronics* (2021–present)
  - *Frontiers in Robotics and AI* (2022–present)
  - *IEEE International Conference on Robotics and Automation (ICRA)*, Conference Editorial Board (2020, 2021)
  - *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Conference Editorial Board (2019)
  - *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Conference Editorial Board (2018, 2019, 2020)
  - *American Control Conference (ACC)*, Conference Editorial Board (2023, 2025)
  - *Modeling, Estimation and Control Conference (MECC)*, Conference Editorial Board (2022, 2023, 2024, 2025)
- Organizing/Operating Committee Member
  - E-Media Co-Chair of the 2028 *IEEE International Conference on Robotics and Automation (ICRA)*, Guadalajara, Jalisco, México.
  - Student Chair of the 2027 *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Boulder, CO.
  - E-Media Co-Chair of the 2024 *IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan.
  - Exhibit and Special Session Chair of the 2023 *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Seattle, IL.
  - Advisory committee member of the 2022 *International Conference on Sustainability and Emerging Trends in Civil and Mechanical Engineering*, Virtual.
  - Stop COVID-Spread Countermeasure (SC2) Committee of the 2022 *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Kyoto, Japan.
- Program Committee Member
  - *American Control Conference (ACC)* 2023, San Diego, CA.
  - *Watson GROWS Poster/Demo Competition*, 1st Annual Watson Graduate Research Outcomes Workshop Series, 2025, Binghamton, NY.
- Workshop Organizer
  - Organizer and talk presenter of the workshop on “Progress Toward Automated Micro-Bio-Nano Factories Through Robotic Manipulation” at the 2019 *IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada.
- Chair/co-Chair/Organizer of sessions in conferences
  - “Micro and Nano Systems” (co-Chair) in 2023 *IEEE/ASME International Conference on Advanced Intelligent Mechatronics*

- “Automation at Micro-Nano Scales 1” (co-Chair) in 2022 *IEEE International Conference on Automation Science and Engineering*
- “Computer Vision in Automation 2” (Chair) in 2022 *IEEE International Conference on Automation Science and Engineering*
- Reviewer for
 

**Journals:** *IEEE/ASME Trans. on Mechatronics* (2015-2020, 2022-2025), *IEEE Trans. on Robotics* (2016-2017), *IEEE Trans. on Automation Science and Engineering* (2013-2014, 2017-2025), *IEEE Trans. on Control Systems Technology* (2016-2017), *IEEE Robotics and Automation Letters* (2017, 2018-2020, 2022, 2024), *IFAC Mechatronics* (2022), *Control Engineering Practice* (2014-2016, 2018-2020), *ASME Journal of Dynamic Systems, Measurement and Control* (2014-2018), *International Journal of Intelligent Robotics and Applications* (2016, 2019), *Micromachines* (2017, 2019-2021), *Robotica* (2018), *IEEE Access* (2018), *Automation in Construction* (2019-2022), *Robotics* (2019), *Robotics and Autonomous Systems* (2019), *Measurement and Control* (2019), *Precision Engineering* (2019), *Mechatronics* (2020, 2022, 2023), *Applied Sciences* (2020).

**Conferences:** *IEEE International Conference on Robotics and Automation (ICRA)* (2013, 2017-2019), *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (2013, 2015, 2017-2018, 2020), *American Control Conference (ACC)* (2014, 2017-2019), *IFAC World Congress* (2020), *IEEE International Conference on Automation Science and Engineering (CASE)* (2014, 2016-2020, 2024), *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)* (2014-2015, 2019, 2023), *IEEE International Conference on Intelligent Transportation Systems (ITSC)* (2014, 2016), *Modeling, Estimation and Control Conference (MECC)* (2022, 2023), *ASME Dynamic Systems and Control Conference (DSCC)* (2013, 2016-2017), *IEEE Vehicular Technology Conference (VTC)* (2016), *International Symposium on Applied Abstraction and Integrated Design (AAID)* (2017).

**Proposals:** *US National Science Foundation (NSF): National Robotics Initiative (NRI)* (2021).
- Panelist for
 

**Proposals:** *US National Science Foundation (NSF): CMMI* (2020), *ENG* (2019, 2024).

## INVITED SEMINARS/TALKS

- *Learning-Based Approaches for 3D Manipulation of Micro- and Nano-Objects*, at *Advances in Interactive Robotics and Manufacturing*, Annual Robotics and Advanced Manufacturing Workshop, SUNY Polytechnic Institute, Utica, NY, November 23, 2024.
- *MITRE: Autonomous Systems & Robotics Session*, Binghamton University, Binghamton, NY, April 2023
- Keynote lecture at the *International Conference on Advances in Mechanical Engineering & Material Science*, VIT-AP University, Amaravati, Andhra Pradesh, India, April 2023
- *Rutgers University*, Department of Mechanical and Aerospace Engineering, Piscataway, NJ, April 2023
- *Newest Advances in Systems and Control from Recent DCSD CAREER Awardees* at *Modeling, Estimation and Control Conference (MECC)*, Jersey City, NJ, October 2022
- *Peak at Watson Smart Health Research*, Binghamton, NY, July 2022
- *BU-VIT joint webinar series on autonomous systems*, Binghamton, NY, November 2021
- *IEEC packaging research consortium*, Binghamton, NY, October 2021
- *University at Buffalo*, Department of Mechanical and Aerospace Engineering, Buffalo, NY, December 2020
- *Rensselaer Polytechnic Institute (RPI)*, Department of Electrical Engineering, and Computer, and Systems Engineering, Troy, NY, May 2019
- *University of Waterloo*, Department of Mechanical and Mechatronics Engineering, Waterloo, ON, Canada, March 2017
- *Louisiana State University*, Department of Mechanical and Industrial Engineering, Baton Rouge, LA, March 2017
- *City College of New York*, Department of Mechanical Engineering, New York, NY, March 2017
- *Binghamton University*, Department of Mechanical Engineering, Vestal, NY, March 2017
- *McGill University*, Department of Mechanical Engineering, Montreal, QC, Canada, February 2017
- *California State University at Northridge*, Department of Mechanical Engineering, Northridge, CA, February 2017

- *Fort Lewis College*, Department of Physics and Engineering, Durango, CO, February 2017
- *Rowan University*, Department of Mechanical Engineering, Glassboro, NJ, January 2017
- *New Jersey Institute of Technology*, Department of Mechanical and Industrial Engineering, Newark, NJ, December 2016
- *Louisiana Tech University*, Department of Mechanical Engineering, Ruston, LA, December 2016
- *Boise State University*, Department of Mechanical and Biomedical Engineering, Boise, ID, November 2016

### STUDENT SUPERVISION AND MENTORING <sup>3</sup>

- **Current graduate students**

Xilin Li (Ph.D. student, *Mechanical Engineering, Binghamton University*, 2017 Fall-)  
 Vishnu Veeraraghavan (Ph.D. student, *Mechanical Engineering, Binghamton University*, 2018 Fall-)  
 Shiming Fang (Ph.D. student, *Mechanical Engineering, Binghamton University*, 2019 Fall-)

- **Graduate students alumni/alumna**

- Juan Wu\*, Ph.D.,  
*Thesis: Motion Control of Multiple Micro-and Nano-Particles in Fluid Suspension with a Coupled External Electric Field*, Mechanical Engineering, Binghamton University, December 2022.  
*Award: Academic Excellence in Mechanical Engineering Research Award*  
 First job after graduation: Solution Engineer, Siemens Healthineers, NY
- Jiaxu Song, M.S., *Mechanical Engineering, Binghamton University*, Fall 2024.  
 First job after graduation: Junior Engineer, MornstAir Inc, AZ

- **Senior design faculty advisor**

***Binghamton University***

- “Smart Micro-Particle Manipulation Chamber” (K. McManus\*, D. Mertl\*, H. Babu\*, N. Cesped), 2024/2025
- “Micro Aquarium” (Q. O’Brien, S. Pappalardo\*, J. Pareti, S. Savidge), 2023/2024
- “Autonomous RC Race Car with Artificial Intelligence” (L. Roels, A. Ryan\*, V. Obando, B. Shiya, C. Grillo), 2023/2024, co-advise with Prof. J. Zhao.
- “Design and Prototype of Robotic Manipulator” (M. Madsen, B. Thompson\*, C. R. Anderson\*, A. Ricci, G. Nowell\*), 2022/2023
- “Robotic Arm Manipulator” (B. Iven, J. Jandik, K. Roach, E. Erb\*), 2021/2022
- “RACECAR Upgrade for Autonomous Driving with Aggressive Maneuvers” (W. Linderman, C. Dai, T. Gao), 2020/2021
- “Electrospinning Drum Collector” (M. Lindley, H. Yu), 2020/2021, co-advise with Prof. P. Zhang.
- “RACECAR Upgrade for Autonomous Driving with Aggressive Maneuvers” (J. Xing, M. Islam, Y. Tian), 2019/2020
- “Reconnaissance Robot” (C. Gale, A. Paul, D. Adamczuk, J. McCoy, J. Squitieri), 2018/2019, co-advise with Prof. R. McGrann. (**First Place winner of the 2019 MacDonald Family Prize in Senior Design**)
- “Crack-Filling Robot” (M. Jackson\*, D. Rozhkov, L. S. Bishop\*, J. Brown, M. Wally, A. K. Reddy), 2018/2019
- “RACECAR System Upgrade” (J. C. Escobar, J. Long, R. Grunder, W. Luo), 2018/2019
- “CubeSat Deorbiting Mechanism” (J. Chinkel, E. Comas\*, S. D’Attore, C. Long\*, N. Swerbilov, A. Virga), 2018/2019

- **Undergraduate research assistant/intern mentoring**

***Summer Training Experience in Engineering Research (STEER):*** B. Sevalia (Summer 2019, Physics/ Mechanical Engineer, Xavier University of Louisiana)

***Strategic Partnership for Industrial Resurgence (SPIR):*** V. Veeraraghavan (Spring 2019, Mechanical Engineering), R. B. Ezhilavanco (Fall 2024 - Spring 2025, Information Systems)

***Scalable Asymmetric Lifecycle Engagement Microelectronics Workforce Development Program (SCALE):*** H. Li (Spring 2024, Computer Science), R. Rahman (Fall 2024, Computer Science)

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<sup>3</sup>Underlined students with a “\*” symbol are female students under my supervision.



**Binghamton University Projects for New Undergraduate Researchers (BUPNUR):** J. Bonfiglio (Spring 2024, Computer Engineering, Mathematical Sciences) and D. Ramirez (Spring 2024, Mathematical Sciences)

**Undergraduate Student Engaging:** I. Barron (2025 Spring - Present, Mechanical Engineering)  
M. Liu (2025 Winter - Present, Mechanical Engineering)  
N. M. Fonseca\* (2023 Spring - 2023 Fall, 2025 Spring - Present, Mechanical Engineering)  
A. Prabhu\* (2024 Summer - Present, Biomedical Engineering)  
J. Jun (2024 Summer - Present, Mechanical Engineering)  
Z. Sim (2024 Summer - Present, Mechatronic Engineering at Universiti Teknologi Malaysia)  
J. Lim (2024 Fall - Present, Mechanical Engineering)  
J. Harrison (2023 Fall - Present, Mechanical Engineering)  
T. Zierer (2023 Fall - 2024 Spring, Mechanical Engineering)  
J. Pforte (2023 Fall - 2024 Spring, Mechanical Engineering)  
J. Kuster\* (2023 Fall - 2024 Spring, Biomedical Engineering)  
N. Viju\* (2023 Fall - 2024 Spring, Biomedical Engineering)  
C. Anderson\* (2020 Fall-2021 Spring, Mechanical Engineering/Electrical & Computer Engineering)  
T. Gao (2020 Spring - 2020 Summer, Mechanical Engineering)  
J. Xing (2020 Summer - 2020 Fall, Mechanical Engineering)  
Y. Tian (2019 Fall - 2020 Spring, Mechanical Engineering)  
L. Yang (2019 Spring - 2020 Spring, Electrical and Computer Engineering)

**4+1/Master Student Engaging:** Kyle Olstein (4+1 master, Mechanical Engineering, Binghamton University, 2020 Summer-2021 Spring)  
Arron Danehy (4+1 master, Mechanical Engineering, Binghamton University, 2020 Summer)  
Abhishek Ravindra Waghole (Master, Mechanical Engineering, Binghamton University, 2019 Fall)

- **Independent study and ME project mentoring**

- “Novel Design of Mechanical Elements for Robotics”, J. Lim (Fall 2024)
- “Nanomanipulation Using External Electric Fields”, S. Pappalardo\* (Spring 2024)
- “Modeling and Control of an Autonomous Driving Car in a Car Simulation Environment”, B. Thompson\* (Spring 2023)
- “Simultaneous Localization and Mapping of Autonomous Vehicle”, D. Demetros (Spring 2021)
- “Autonomous Surface Crack Detection and Filling Robot”, M. Castellanos (Spring 2021)
- “3D Manipulation of Micro/Nano Particles in Fluid Suspension”, J. Song (Spring 2021)
- “Task and Motion Planning for Agile Autonomous Vehicles”, S. Fang (Spring 2021)
- “Close-Loop Control of a 3D Printer”, A. R. Waghole (Fall 2019)

- **Dissertation committee**

**Ph.D. students:** M. Daeichin, Mechanical Engineering  
M. Pallay, Mechanical Engineering  
S. M. Mousavi, Mechanical Engineering  
E. Mahmoudi, Mechanical Engineering  
C. Cai, Mechanical Engineering  
J. H. Ha, Mechanical Engineering  
Y. Lai, Mechanical Engineering  
J. Yang, Mechanical Engineering  
J. Walsh, Mechanical Engineering  
J. Pourghader, Mechanical Engineering  
M. Karimi, Mechanical Engineering  
A. Momani, Mechanical Engineering  
V. Kudalka, Computer Science  
D. DeFazio, Computer Science  
Sivaranjani A,  
Electrical and Electronics Engineering, Anna University, India

Advisor: Dr. S. Towfighian  
Advisor: Dr. S. Towfighian  
Advisor: Dr. S. Towfighian  
Advisor: Dr. S. Towfighian  
Advisor: Dr. S. B. Park  
Advisor: Dr. S. B. Park  
Advisor: Dr. S. B. Park  
Advisor: Dr. S. B. Park  
Advisor: Dr. R. Miles  
Advisor: Dr. R. Miles  
Advisor: Dr. R. Miles  
Advisor: Dr. F. Cardullo  
Advisor: Dr. S. Zhang  
Advisor: Dr. S. Zhang  
  
Advisor: Dr. B. Vinod

**M.S. students:** D. Nelson, Mechanical Engineering  
P. Yin, Mechanical Engineering

Advisor: Dr. S. Towfighian  
Advisor: Dr. S. B. Park

J. H. Ha, <i>Mechanical Engineering</i>	Advisor: Dr. S. B. Park
F. Xue, <i>Biomedical Engineering</i>	Advisor: Dr. Y. Wan
Y. Lai, <i>Mechanical Engineering</i>	Advisor: Dr. S. B. Park
Y. Tian, <i>Mechanical Engineering</i>	Advisor: Dr. S. Towfighian
M. A. Razzaq, <i>Mechanical Engineering</i>	Advisor: Dr. M. Younis
H. Albatayneh, <i>Mechanical Engineering</i>	Advisor: Dr. M. Younis
M. Matahen, <i>Mechanical Engineering</i>	Advisor: Dr. M. Younis
R. Kiwan, <i>Mechanical Engineering</i>	Advisor: Dr. M. Younis
K. Hunte, <i>Mechanical and Aerospace Engineering, Rutgers University</i>	Advisor: Dr. J. Yi

## UNIVERSITY / DEPARTMENTAL SERVICES

- *Thomas J. Watson School of Engineering and Applied Science, Binghamton University*
  - Diversity Equity and Inclusion Committee (2024-2025)
  - Watson Commencement Committee (2022-2024)
  - Instructional Software & Labs Committee (2018-2020)
    - Conducted a comprehensive assessment of projected needs for the teaching laboratories in the Mechanical Engineering department for the period 2019-2024.
    - Compiled and analyzed data on equipment and space requirements, ensuring alignment with the department's instructional objectives.
    - Evaluated and summarized the current inventories and status of all eight teaching laboratories across the department.
    - Provided recommendations and justifications for necessary upgrades or additions to the teaching laboratories, considering emerging technologies and pedagogical advancements.
- *Department of Mechanical Engineering, Binghamton University*
  - Faculty Search Committee (2021-2025)
  - Graduate Studies Committee (2020-2024)
  - Undergraduate Studies Committee (2018-2020)
  - Seminar Committee (2018-2019, 2023-2024)
  - Junior/Sophomore Advising (2018-present)

## OUTREACH

- “Micro-Nano Adventures: Unveiling the Art of Micro-Nano-Manipulation and Control”. Community Day, National Engineers Week (February 22, 2025)
- Micro/Nano Robotics Experience and Robot Competition for Girls, Girl Scout STEM Day (February 8, 2025)
- Host for Bing-Robotics Seminar Series (Fall 2024)
- Panelist for Women in STEMM, Binghamton Scientista (November 8th, 2024)
- Robotics Lab tours with BOCES New Visions Program (October 15, 2024)
- Guest Lecture for the *EDD 112 Intro to Engineering Analysis*, Engineering Design Division, Binghamton University (April 15, 2024)
- Panelist for Women in STEM, the Society of Hispanic Professional Engineers (SHPE) (March 25, 2024)
- Faculty Advisor for the Binghamton University Projects for New Undergraduate Researchers (BUPNUR) (Spring 2024)
- “Nanofish Frenzy: Dive into the Exciting World of Nanomanipulation”. High School Track, Community Day, National Engineers Week (February 24, 2024)
- Faculty Advisor for the Scalable Asymmetric Lifecycle Engagement Microelectronics Workforce Development Program (SCALE) (Spring 2024, Fall 2024)
- “Autonomous Racing Cars and the Thrill of Safe Drifting”, Mini Lectures to High School Seniors during the Bi-Annual “Bearcat for a Day” Event. (Oct 28, 2023)
- Guest Lecture for the *ISE 479 Industrial Automation & Control*, Department of Systems Science and Industrial Engineering, Binghamton University (October 17, 2023)

- Panelist for “Careers in Academia”, Modeling, Estimation and Control Conference (October 5, 2022)
- Judge for BattleBots Competition, Watson Combat Robotics League (Spring 2022, Fall 2022, Spring 2023, Fall 2024)
- Lecturer for Introduction to Autonomous Intelligent Robots, Lyceum Program (Winter 2021)
- Lab tours with Broome County Promise Zone Camp (August 8, 2019)
- Faculty Advisor for the Summer Training Experience in Engineering Research (STEER) (Summer 2019)
- Faculty Advisor for the Strategic Partnership for Industrial Resurgence (SPIR) Project (Spring 2019, Fall 2024 - Spring 2025)
- Instructor at the First Annual Junior Robotics Challenge for K-6 students (March 30, 2019)
- Panelist for Women in STEM, National Engineers Week (February 18, 2019)

## PRESS/MEDIA COVERAGE

- *Binghamton University Blog*, September 17, 2024. “25 of the Coolest Classes You Can Take at Binghamton”.
- “Binghamton University Professor is Helping to Build the Next Generation of Autonomous Robotics”. June 26, 2023.
- “Binghamton University Campus Tour: Thomas J. Watson College of Engineering and Applied Science”. December 1, 2023.
- *Warson Review*, Summer 2022. “Machines that think”.
- *BingUNews*, June 24, 2022. “Researchers at Watson College creating machines that think - Faculty members shaping the future of autonomous systems”.
- *Binghamton University Blog*, November 11, 2022. “34 Cool Classes at Binghamton University”.
- NSF CAREER Award:
  - *BingUNews*, March 30, 2022. “Assistant professor’s nanobot research wins NSF CAREER Award”.
  - *Binghamton University Magazine*, Fall 2022.
- “Reconnaissance Robot” Senior Design Project:
  - *WICZ*, May 10, 2019. “Binghamton University Students Design Robot for Tioga County Sheriff’s Dept.”.
  - *BingUNews*, May 13, 2019. “Watson seniors design reconnaissance robot for police work”.
  - *NewsChannel 34*, May 17, 2019. “BU Students make reconnaissance robot for law enforcement”(video available).