Yu Gu, Ph.D.,

Academy of Distinguished Alumni Professor,
Department of Mechanical, Materials and Aerospace Engineering
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WVU Robotics – Interactive Robotics Lab – Blog – YouTube – LinkedIn – Google Scholar

Highlights

- An innovator of unique robot systems for solving practical and nonpractical problems.
- Research was published in 130 papers and featured in 170 media stories.
- Winner of five international robotic competitions, along with $855k prize from NASA.
- PI or co-PI of 23 externally funded projects with a total budget over $10M.
- A coordinator for the initiation of the WVU Robotics Program.
- Instructor for 10 (including 6 new) courses, with an average student evaluation of 4.6/5.0.
- Mentored 32 students to win 58 fellowships, scholarships, or recognitions.

Education

Ph.D. in Aerospace Engineering, WVU, Dec 2004. Advisor: Prof. Marcello R. Napolitano. Dissertation: "Design and Flight-Testing Actuator Failure Accommodation Controllers on WVU YF-22 Research UAVs."

M.S. in Control Engineering, School of Electronic Information and Electrical Engineering, Shanghai Jiao Tong University, Feb 1999. Advisor: Prof. Zhiming Wu.

B.S. in Automatic Controls, Shanghai University, Jun 1996.

Professional Experiences

Academy of Distinguished Alumni Professor, Professor, Associate Professor, Assistant Professor, Research Assistant Professor, Department of Mechanical, Materials and Aerospace Engineering (MMAE), WVU (2024 – present, 2023 – present, 2017-2023, 2012-2017, 2005 – 2012).

Adjunct Faculty, Lane Department of Computer Science and Electrical Engineering, WVU (2012 – present).

Consultant, Kutta Technologies, Phoenix AZ (2008).

Research Interests

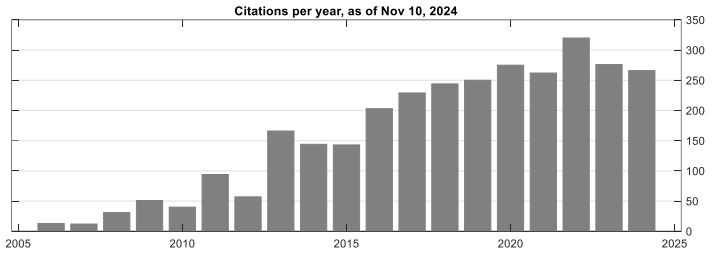
Long-term goal: improve robots' ability to function in increasingly complex environments and situations, leading to "*lifelike*" behaviors.

Applications: planetary exploration, precision pollination, improving safety.

Google Scholar Profile (as of Nov. 10, 2024, link)

Citations: 3,126

h-index: 33



Publication: Journal Articles

1. Jacobs, S., McAllister, R., Gillo, K., Cook, R., Wolf, T., Hassani, P., Ulbrich-Baker, J., Mapa, D., Adkins, N., McDonald, D., Chen, C., Gu, Y., "A Tale of Two Rovers: How Different Philosophies Foster Innovation in the 2023 University Rover Challenge," Accepted, Column Paper, IEEE Robotics & Automation Magazine, Oct 2024 (IF: 5.4).
2. Yerebakan, M. O., Gu, Y., Gross, J., Hu, B., "Evaluation of Biomechanical and Mental Workload During Human–Robot Collaborative Pollination Task," Human Factors, 00187208241254696, May 2024 (IF: 2.9).
3. Pooley, A., Gao, M., Sharma, A., Barnaby, S., Gu, Y., Gross, J., "Analysis of UAV Thermal Soaring Energy Management via Hawk-inspired Swarm Interaction," Biomimetics, 8(1), 124; Mar 2023 (IF: 3.7).
4. Kilic, C., Gu, Y., Gross, J., "Proprioceptive Slip Detection for Planetary Rovers in Perceptually Degraded Extraterrestrial Environments," Field Robotics. 2, 1754–1778. DOI: 0.55417/fr.2022054. Aug 2022.
5. Chen, Y., Yang, C., Gu, Y., Hu, B., "Influence of Mobile Robots on Human Safety Perception and System Productivity in Wholesale and Retail Trade Environments: A Pilot Study," IEEE Transactions on Human-Machine Systems, May 2022 (IF: 3.4).
6. Kilic, C., Martinez, B., Tatsch, C., Beard, J., Strader, J., Das, S., Ross, D., Gu, Y., Pereira, G., Gross, J., "NASA Space Robotics Challenge 2 Qualification Round: An Approach to Autonomous Lunar Rover Operations," IEEE Aerospace and Electronic Systems Magazine, Dec 2021 (IF: 1.6).
7. Yang, C., Strader, J., Gu, Y., "A Scalable Framework for Map Matching based Cooperative Localization," Sensors, Sep 2021 (IF: 3.6).
8. Hedrick, G., Gu, Y., "Terrain-Aware Traverse Planning for a Mars Sample Return Rover," Advanced Robotics, July 2021 (IF: 1.7).
9. Smith, T., Chen, Y., Hewitt, N., Hu, B., Gu, Y., "Socially Aware Robot Obstacle Avoidance Considering Human Intention and Preferences," Springer International Journal of Social Robotics, July 2021 (IF: 5.1).

10. Petrillo, M., Beard, J., Gu, Y., Gross, J., "Search Planning of a UAV/UGV Team with Localization Uncertainty in a Subterranean Environment," IEEE Aerospace and Electronic Systems Magazine, June 2021 (IF: 1.6).
11. Kilic, C., Ohi, N., Gu, Y., Gross, J., "Slip-Based Autonomous ZUPT through Gaussian Process to Improve Planetary Rover Proprioceptive Localization," IEEE Robotics and Automation Letters, Mar 2021 (IF: 3.7).
12. Hedrick, G., Ohi, N., Gu, Y., "Terrain-Aware Path Planning and Map Update for Mars Sample Return Mission," IEEE Robotics and Automation Letters, Jun 2020 (IF: 3.7).
13. Yang, C., Strader, J., Gu, Y., Canciani, A., Brink, K., "Cooperative UAV Navigation using Magnetic Anomaly Measurements and Limited Inter-Vehicle Ranging Information," AIAA Journal of Aerospace Information Systems, Jun 2020 (IF: 1.0).
14. Tian, P., Chao, H., Flanagan, P., Hagerott, S., Gu, Y., "Design and Evaluation of UAV Flow Angle Estimation Filters," IEEE Transactions on Aerospace and Electronic Systems, Vol.: 55, Issue: 1, Feb 2019 (IF: 4.6).
15. Gu, Y., Strader, J., Ohi, N., Harper, S., Lassak, K., Yang, C., Kogan, L., Hu, B., Gramlich, M., Kavi, R., Gross, J., "Robot Foraging: Autonomous Sample Return in a Large Outdoor Environment," IEEE Robotics and Automation Magazine, Vol.: 25, Issue: 3, Sep 2018 (IF: 4.3).
16. Gu, Y., Ohi, N., Lassak, K., Strader, J., Kogan, L., Hypes, A., Harper, S., Hu, B., Gramlich, M., Kavi, R., Watson, R., Cheng, M., Gross, J., "Cataglyphis: An Autonomous Sample Return Rover," Journal of Field Robotics, 35(2), 248-274, Mar 2018 (IF: 4.3).
17. Rhudy, M., Gu, Y., Gross, J., and Chao, H. "Onboard Wind Velocity Estimation Comparison for Unmanned Aircraft Systems," IEEE Transactions on Aerospace and Electronic Systems, Volume: 53, Issue: 1, Feb 2017 (IF: 2.7).
18. Chao, H, Gu, Y., Gross, J., Rhudy, M., and Napolitano, M., "Flight-Test Evaluation of Navigation Information in Wide-Field Optical Flow," AIAA Journal of Aerospace Information Systems, doi: 10.2514/1.I010482, Nov 2016 (IF: 1.4).
19. Mandal, T., and Gu, Y., "Analysis of Pilot-Induced-Oscillation and Pilot Vehicle System Stability Using UAS Flight Experiments," Aerospace, 2016, 3(4), 42; doi: 10.3390/aerospace3040042, Nov 2016.
20. Gross, J., Watson, R., D'Urso, S., and Gu, Y., "Flight-Test Evaluation of Kinematic Precise Point Positioning of Small UAVs," International Journal of Aerospace Engineering, Volume 2016, Article ID 1259893, 2016.
21. Rice, C., Gu, Y., Chao, H., Larrabee, T., Gururajan, S., Napolitano, M., Mandal T., and Rhudy M., "Autonomous Close Formation Flight Control with Fixed Wing and Quadrotor Test Beds," International Journal of Aerospace Engineering, Volume 2016, Article ID 9517654, 2016.
22. Gross, J., Gu, Y., and Rhudy, M., "Fixed-Wing UAV Attitude Estimation using Single Antenna GPS Signal Strength Measurements," Aerospace, 3(2), 14; doi:10.3390 /aerospace3020014, May 2016.
23. Gu, Y., Gross, J., Rhudy, M., and Lassak, K, "A Fault-Tolerant Multiple Sensor Fusion Approach Applied to UAV Attitude Estimation," International Journal of Aerospace Engineering, Vol. 2016, Article ID 6217428, 2016.

24. Rhudy, M., Fravolini, M.L., Gu, Y., Napolitano, M., Gururajan, S., and Chao H., "Aircraft Model Independent Airspeed Estimation without Pitot Tube Measurements," IEEE Transactions on Aerospace and Electronic Systems, 51(3):1980-95, Jul 2015.
25. Rhudy, M., Gu, Y., Chao, H., and Gross, J., "Unmanned Aerial Vehicle Navigation Using Wide-Field Optical Flow and Inertial Sensors," Journal of Robotics, Volume 2015, Article ID 251379, Oct 2015.
26. Gross, J., Gu, Y., and Rhudy, M., "Robust UAV Relative Navigation with DGPS, INS, and Peer-to-Peer Radio Ranging," IEEE Transactions on Automation Science and Engineering, Volume 12, Issue 3, Jan 2015.
27. Chao, H., Gu, Y., and Napolitano, M., "A Survey of Optical Flow Techniques for Robotics Navigation Applications," Journal of Intelligent & Robotic Systems, Volume 73, Issue 1-4, pp 361-372, 2014.
28. Rhudy, M., and Gu, Y., "Online Stochastic Convergence Analysis of the Kalman Filter," International Journal of Stochastic Analysis, vol. 2013, Article ID 240295, 9 pages, 2013. doi:10.1155/2013/240295.
29. Rhudy, M., Gu, Y., and Napolitano, M., "An Analytical Approach for Comparing Linearization Methods in EKF and UKF," International Journal of Advanced Robotic Systems, Vol. 10, No. 208, 2013.
30. Rhudy, M., Gu, Y., Gross, J., Gururajan, S., and Napolitano, M., "Sensitivity Analysis of Extended and Unscented Kalman Filters for Attitude Estimation," AIAA Journal of Aerospace Information Systems, Vol. 10, No. 3, pp. 131-143, Mar 2013.
31. Gross, J., Gu, Y., Rhudy, M., Gururajan, S., and Napolitano, M., "Flight Test Evaluation of Sensor Fusion Algorithms for Attitude Estimation," IEEE Transactions on Aerospace and Electronic Systems, vol.48, no.3, pp.2128-2139, Jul 2012.
32. Rhudy, M., Gu, Y., Gross, J., and Napolitano, M., "Evaluation of Matrix Square Root Operations for UKF within a UAV-Based GPS/INS Sensor Fusion Application," International Journal of Navigation and Observation, Article ID 416828, oi:10.1155/2011/416828, 2011.
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34. Mammarella, M., Campa, G., Napolitano, M., Fravolini, M., Perhinschi, M., and Gu, Y., "Machine Vision / GPS Integration Using EKF for the UAV Aerial Refueling Problem," IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews, Vol. 38, No. 6, pp.791-801, Nov 2008.
35. Campa, G., Gu, Y., Seanor, B., Napolitano, M., Pollini, L., and Fravolini, M., "Design and Flight Testing of Nonlinear Formation Control Laws," Control Engineering Practice, Vol. 15, No. 9, pp 1077-1092, Sep 2007.
36. Gu, Y., Seanor, B., Campa, G., Napolitano, M., Rowe, L., Gururajan, S., Perhinschi, M.G., and Wan, S., "Design and Flight Testing Evaluation Of Formation Control Laws," IEEE Transactions on Control Systems Technology, Vol.14, No. 6, pp. 1105-1112, Nov 2006.
37. Campa, G., Fravolini, M.L., Seanor, B., Napolitano, M., Del Gobbo, D., Gu, Y., and Gururajan, S., "On-Line Learning Neural Networks for Sensor Validation for the Flight

Control System of a B777 Research Aircraft Model," International Journal of Robust and Non-Linear Control, Vol. 12, pp. 987-1007, Sep 2002.

38. Gu, Y., Wu, Z.M., and Jiang, Z.P., "The Rebuilding Process of Hybrid RAID," Micro Computer Systems (in Chinese), Vol. 15, No. 2, pp. 44-46, Feb 1999.

Publication: Refereed Conference Proceedings

39. Beard, J., Butts, M., Gu, Y., "Feeling Optimistic? Ambiguity Attitudes for Online Decision Making," IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct 2024.
40. Smith, T., Rijal, M., Tatsch, C., Butts, M., Beard, J., Cook, T., Chu, A., Gross, J., Gu, Y., "Design of Stickbug: a Six-Armed Precision Pollination Robot," IEEE/RSJ IROS 2024, Oct 2024.
41. Smith, T., Smith, T., Szczecinski, N., Yakovenko, S., Gu, Y., "Cellular Plasticity Model for Bottom-up Robotic Design," Living Machines, Jul 2024.
42. Cottrill, H., Gu, Y., "Enhanced 3D Localization on Venus: A Map Matching and Particle Filtering Approach," 2024 AIAA SciTech, Jan 2024.
43. Smith, T., Butts, M., Adkins, N., Gu, Y., "Swarm of One: Bottom-up Emergence of Stable Robot Bodies from Identical Cells," IEEE/RSJ IROS 2023, Oct 2023.
44. Mera-Trujillo, M., Patel, S., Gu, Y., Doretto, G. "Self-supervised Interest Point Detection and Description for Fisheye and Perspective Images," IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) (pp. 6497-6506), Jun 2023.
45. Tatsch, C., Bredu, J., Covell, D., Tulu, I., Gu, Y., "Rhino: An Autonomous Robot for Mapping Underground Mine Environments," IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM). Jun 2023.
46. Jacobs, S, Gu, Y., "Autonomous Soaring Simulation and Glider System Development," 2023 International Conference on Unmanned Aircraft Systems (ICUAS). Jun 2023.
47. Rahman, IM, White, S., Crockett, K., Gu, Y., Dutra, DAA, Pereira G., "Imitating Swarm Behaviors by Learning Agent-Level Controllers," 2023 American Control Conference (ACC). May 2023.
48. Yerebakan, M. O., Chen, Y., Tatsch, C. A., Gu, Y., Hu, B., "Factors that Affect Acceptance of Agricultural Related Robotic or Wearable Technology by Agricultural Stakeholders: A Pilot Survey," 2022 IEEE 3rd International Conference on Human-Machine Systems (ICHMS) (pp. 1-6). IEEE. Nov 2022.
49. Smith, T., Gutierrez, E., Bredu, J., Gu, Y., Gross, J., "Cooperative Localization of Swarm Robots using Adaptive Boid's Rules," Proceedings of ION GNSS+, (pp. 2927-2940), Sep 2022.
50. Curtis, R., Dooty, E.N., Raisa, S.A., Gross, J., Gu, Y., "Human-Swarm Interaction Robotics as Context for Training Diverse Undergraduate Researchers," 2022 ASEE Annual Conference & Exposition, Aug 2022.
51. Chen, Y., Smith, T., Hewitt, N., Gu, Y., Hu, B., "Effects of Human Personal Space on the Robot Obstacle Avoidance Behavior: A Human-in-the-loop Assessment," In Proceedings of the Human Factors and Ergonomics Society Annual Meeting, Sep 2021.

52. Hedrick, G., Covell, D., Gu, Y., "In-Situ Terrain Analysis for Planetary Rovers," International Society for Terrain-Vehicle Systems (ISTVS) 20th International and 9th Americas Conference, 2021.
53. Chen, Y., Yang, C., Song, B., Gonzalez, N., Gu, Y., Hu, B., "Effects of Autonomous Mobile Robots on Human Mental Workload and System Productivity in Smart Warehouses: A Preliminary Study," Human Factors and Ergonomics Society's 2020 International Annual Meeting, Oct 2020.
54. Dhanaraj, N., Hewitt, N., Edmonds-Estes, C., Jarman, R., Seo, J., Gunner, H., Hatfield, A., Johnson, T., Yifru, L., Maffeo, J., Pereira, G., Gross, J., Gu, Y., "Advanced Platform for Interactive Swarm Robotics (APIS): A Human-Swarm Interaction Research Testbed," 2019 International Conference on Advanced Robotics (ICAR), Belo Horizonte, Brazil, Dec 2019.
55. Strader, J., Nguyen, J., Tatsch, C., Du, Y., Lassak, K., Buzzo, B., Watson, R., Cerbone, H., Ohi, N., Yang, C., Gu, Y., "Flower Interaction Subsystem for a Precision Pollination Robot," IROS 2019, Macau, China, Nov 2019.
56. Kilic, C., Gross, J., Ohi, N., Watson, R., Strader, J., Swiger, T., Harper, S., Gu, Y., "Improved Planetary Rover Inertial Navigation and Wheel Odometry Performance through Periodic Use of Zero-Type Constraints," IROS 2019, Macau, China, Nov 2019.
57. Gross, J., De Petrillo, M., Beard, J., Nichols, H.,Swiger, T.,Watson, R., Kirk, C., Kilic, C., Hikes, J., Upton, E., Ross, D., Russell, M., Gu, Y., Griffin, C., "Field Testing of a UAV-UGV Team for GNSS-Denied Navigation in Subterranean Environments," ION GNSS+ Conference, Miami, FL, Sep 2019.
58. Yang, C., Watson, R., Gross, J., Gu, Y., "Localization Algorithm Design and Evaluation for an Autonomous Pollination Robot," ION GNSS+ Conference, Miami, FL, Sep 2019.
59. Rhudy, M., Gross, J. Gu, Y., "Stochastic Wind Modeling and Estimation for Unmanned Aircraft Systems," AIAA Aviation 2019 Forum (p. 3111), Dallas, TX, Jun 2019.
60. Ohi, N., Lassak, K., Watson, R., Strader, J., Du, Y., Yang, C., Hedrick, G., Nguyen, J., Harper, S., Reynolds, D., Kilic, C., Hikes, J., Mills, S., Castle, C., Buzzo, B., Waterland, N., Gross, J., Park, Y., Li, X., Gu, Y., "Design of an Autonomous Precision Pollination Robot," IROS 2018, Madrid, Spain, Oct 2018.
61. Yang, C., Strader, J., Gu, Y., Hypes, A., Canciani, A., Brink, K., "Cooperative UAV Navigation using Inter-Vehicle Ranging and Magnetic Anomaly Measurements," 2018 AIAA SciTech Guidance, Navigation, and Control (GNC) Conference, Kissimmee, FL, Jan 2018.
62. Rhudy, M., Gross, J., Gu, Y., "Determination of Stochastic Wind Speed Model Parameters Using Allan Deviation Approach," AIAA Aviation Forum, Denver, CO., Jun 2017.
63. Tian, P., He, A., Chao, H., Zheng, Z., Gu, Y., "Wake Encounter Simulation and Flight Validation with UAV Close Formation Flight," AIAA SciTech GNC Conference, Dallas, TX, Jan 2017.
64. Strader, J., Harper, S., Gu, Y., "Aircraft Instrumentation and Computer Vision-Aided Flight Analysis of Local Air Flow," AIAA Aviation 2016, Washington DC, Jun 2016.
65. He, A., Tian, P., Zheng, Z., Chao, H., Gu, Y., "A Study on Wake Turbulence Encounter during UAV Formation Flight Using Coupled Aerodynamics/Flight Dynamics Simulation," AIAA Atmospheric and Space Environment Conference, Washington DC, Jun 2016.

66. Strader, J., Gu, Y., Gross, J., De Petrillo, M., Hardy, J., "Cooperative Relative Localization for Moving UAVs with Single Link Range Measurements," IEEE/ION PLANS, Savannah, Georgia, Apr 2016. *Best Paper Award*, Track B: Perception for Autonomous and Semi-Autonomous Systems.
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68. Mandal, T., Gu, Y., "Online Pilot Model Parameter Estimation Using Sub-Scale Aircraft Flight Data," Invited, AIAA SciTech, San Diego, CA, Jan 2016.
69. Lassak, K., Gu, Y., "Real-Time Extended Kalman Filter Stability Indicator," Invited, AIAA SciTech, San Diego, CA, Jan 2016.
70. Tian, P., Chao, H., Gu, Y., Hagerott, S., "UAV Flight Test Evaluation of Fusion Algorithms for Estimation of Angle of Attack and Sideslip Angle" AIAA SciTech, San Diego, CA, Jan 2016.
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75. Rhudy, M., Gu, Y., Chao, H., "Wind Field Velocity and Acceleration Estimation Using a Small UAV," AIAA Modeling and Simulation Technologies Conference (MST), Atlanta, GA, Jun 2014.
76. Larrabee, T., Chao, H., Rhudy, M., Gu, Y., and Napolitano, M., "Wind Field Estimation in UAV Formation Flight," American Control Conference (ACC), Portland, OR, Jun 2014.
77. Mandal, T., and Gu, Y., "Pilot-Vehicle System Modeling Using Sub-Scale Flight Experiments," Invited, AIAA GNC Conference, Washington DC, Jan 2014.
78. Rhudy, M., Gu, Y., and Napolitano, M.R., "Relaxation of Stability Requirements for Extended Kalman Filter Stability within GPS/INS Attitude Estimation," Invited, AIAA GNC Conference, Washington DC, Jan 2014.
79. Rhudy, M., Gu, Y., and Napolitano, M., "UAV Attitude, Heading, and Wind Estimation Using GPS/INS and an Air Data System," AIAA GNC Conference, Boston, MA, Aug 2013.
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82. Lassak, K., Rhudy, M., and Gu, Y., "On-Line Orientation Calibration of Inertial Measurement Unit Pairs using Unmanned Aerial Vehicle Flight Data," AIAA GNC Conference, Boston, MA, Aug 2013.
83. Mandal, T., Gu, Y., Chao, H., and Rhudy, M., "Flight Data Analysis of Pilot-Induced-Oscillations of a Remotely Piloted Aircraft," AIAA GNC Conference, Boston, MA, Aug 2013.
84. Larrabee, T., Chao, H., Mandal, T., Gururajan, S., Gu, Y., and Napolitano, M., "Design, Simulation, and Flight Test Validation of a UAV Ground Control Station for Aviation Safety Research and Pilot Modeling," AIAA GNC Conference, Boston, MA, Aug 2013.
85. Gu, Y., Gururajan, S., Seanor, B., Chao, H., and Napolitano, M., "Building Better Tools: Experimental UAV Research at West Virginia University," Invited, 2013 ACC, Washington, DC, Jun 2013.
86. Chao, H., Gu, Y., Gross, J., Guo, G., Fravolini, M.L., and Napolitano, M., "A Comparative Study of Optical Flow and Traditional Sensors in UAV Navigation," 2013 ACC, Washington, DC, Jun 2013.
87. Chao, H., Gu, Y., Napolitano, M., "A Survey of Optical Flow Techniques for UAV Navigation Applications," 2013 ICUAS, Atlanta, GA, May 2013.
88. Tancredi, D., Gu, Y., Chao, H., "Fault Tolerant Formation Flight Control Using Different Adaptation Techniques," Invited, 2013 ICUAS, Atlanta, GA, May 2013.
89. Rhudy, M., Gu, Y., and Napolitano, M., "Relaxation of Initial Error and Noise Bounds for Stability of GPS/INS Attitude Estimation," AIAA GNC Conference, Minneapolis, MN, Aug 2012.
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92. Vassiliadis, D., Gu, Y., and Pisano, D.J., "Ionospheric Rocket Payload Development: Project and Course," the ASEE Annual Conference, San Antonio, TX, Jun 2012.
93. Gururajan, S., McGrail, A., Gu, Y., Seanor, B., Napolitano, M., Prucz, J., and Phillips, K., "Identification of Aerodynamic Parameters for a Small UAV from Flight Data," the 52nd Israel Annual Conference on Aerospace Sciences, Technion-I.I.T, Haifa, Israel, Mar 2012.
94. Gururajan, S., Gu, Y., Seanor, B., Prucz, J., Napolitano, M., "Evolution of the Flight Testing Program at West Virginia University in Support of Flight Control Research," the 52nd Israel Annual Conference on Aerospace Sciences, Technion-I.I.T, Haifa, Israel, Mar 2012.
95. Rhudy, M., Gu, Y., Gross, J., and Napolitano, M., "Sensitivity Analysis of EKF and UKF in GPS/INS Sensor Fusion," 2011 AIAA GNC Conference, Portland, OR, Aug 2011.
96. Merceruio, Z., Phillips, K., Gu, Y., Gururajan, S., and Napolitano, M., "Aerodynamic and Thrust Force Modeling for a Propulsion Assisted Control Aircraft Test Bed," 2011 AIAA AFM Conference, Portland, OR, Aug 2011.
97. Gross, J., Gu, Y., Rhudy, M., Barchesky, F., and Napolitano, M., "On-line Modeling and Calibration of Low-Cost Navigation Sensors," 2011 AIAA MST Conference, Portland, OR, Aug 2011.

98. Barchesky, F., Gross, J., Gu, Y., Rhudy, M., Gururajan, S., and Napolitano, M., "Development of a GPS/INS Sensor Fusion Simulation Environment Using Flight Data," 2011 AIAA MST Conference, Portland, OR, Aug 2011.
99. Tancredi, D., Gu, Y., Phillips, K., Gururajan, S., and Napolitano, M., "Development of Adaptive Control Laws for Actuator Fault Accommodation," 2010 AIAA GNC Conference, Control ID#: 814102, Toronto, Ontario, Canada, Aug 2010.
100. Gross, J., Gu, Y., Gururajan, S., Seanor B., and Napolitano, M., "A Comparison of Extended Kalman Filter, Sigma-Point Kalman Filter, and Particle Filter in GPS/INS Sensor Fusion," 2010 AIAA GNC Conference, Control ID#: 810271, Toronto, Ontario, Canada, Aug 2010.
101. Gross, J., Gu, Y., and Napolitano, M., "A Systematic Approach for Extended Kalman Filter Tuning and Low-Cost Inertial Sensor Calibration within a GPS/INS Application," 2010 AIAA GNC Conference, Control ID#: 810796, Toronto, Ontario, Canada, Aug 2010.
102. Phillips, K., Gururajan, S., Campa, G., Seanor, B., Gu, Y., and Napolitano, M., "Nonlinear Aircraft Model Identification and Validation for a Fault-Tolerant Flight Control System," 2010 AIAA AFM Conference, Control ID#: 809261, Toronto, Ontario, Canada, Aug 2010.
103. Gross, J., Gu, Y., Seanor, B., Gururajan, S., and Napolitano, M., "Advanced Research Integrated Avionics (ARIA) System for Fault-Tolerant Flight Research," 2009 AIAA GNC Conference, AIAA-2009-5659, Chicago, Illinois, Aug 2009.
104. Phillips, K., Campa, G., Gururajan, S., Seanor, B., Napolitano, M., Gu, Y., and Fravolini, M., "Parameter Identification for Application Within a Fault-Tolerant Flight Control System," 2009 AIAA AFM Conference, AIAA-2009-5723, Chicago, Illinois, Aug 2009.
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108. Effland, J., Seanor, B., Gu, Y., and Napolitano, M., "Application of Machine Vision in Unmanned Aerial Systems for Autonomous Target Tracking," 2008 AIAA GNC Conference, AIAA 2008-7251, Honolulu, HI, Aug 2008.
109. Campa, G., Mammarella, M., Cukic, B., Gu, Y., Napolitano, M., and Fuller, E., "Calculation of Bounding Sets for Neural Network Based Adaptive Control Systems," 2008 AIAA GNC Conference, AIAA 2008-6778, Honolulu, HI, Aug 2008.
110. Mammarella, M., Campa, G., Fravolini, M.L., Gu, Y., Seanor, B., and Napolitano, M., "A Comparison of Optical Flow algorithms for Real Time Aircraft Guidance and Navigation," 2008 AIAA GNC Conference, AIAA 2008-7494, Honolulu, HI, Aug 2008.
111. Sagoo1, G.K., Gururajan, S., Napolitano, M., Perhinschi, M., Gu, Y., Seanor, B., and Campa, G., "Pilot-in-the-Loop Assessment of Neurally Augmented Dynamic Inversion Based Fault Tolerant Control Laws in a Motion-Based Flight Simulator," 2008 AIAA MST Conference, AIAA 2008-6843, Honolulu, HI, Aug 2008.

112. Perhinschi, M.G., Napolitano, M.R., Campa, G., Seanor, B., Gururajan. S., and Gu, Y., "Development of Fault-Tolerant Flight Control Laws for the WVU YF-22 Model Aircraft," Proceedings of the AIAA GNC Conference, AIAA 2007-6511, Hilton Head, SC, Aug 2007.
113. Gu, Y., Seanor, B., Campa, G., Napolitano, M., Rowe, L., and Gururajan, S., "Autonomous Formation Flight: Hardware Development," 14th Mediterranean Conference on Control and Automation, pp.1-6, Ancona, Italy, Jun 2006.
114. Seanor, B., Gu, Y., Napolitano, M., Campa, G., Gururajan, S., and Rowe, L., "3 Aircraft Formation Flight Experiment," 14th Mediterranean Conference on Control and Automation, Ancona, Italy, Jun 2006.
115. Perhinschi, M., Napolitano, M., Campa, G., Seanor, B., Gururajan, S., Gu, Y., "Design and Flight Testing of Intelligent Flight Control Laws for the WVU YF-22 Model Aircraft," AIAA GNC Conference, AIAA-2005-6445, San Francisco, California, Aug 2005.
116. Campa, G., Seanor, B., Gu, Y., and Napolitano, M., "NLDI Guidance Control Laws for Close Formation Flight," ACC, vol. 4, pp. 2972-2977, Portland, OR, Jun 2005.
117. Seanor, B., Campa, G., Gu, Y., Napolitano, M., Rowe, L., and Perhinschi, M., "Formation Flight Test Results for UAV Research Aircraft Models," AIAA 1st Intelligent Systems Technical Conference, AIAA 2004-6251, Chicago, IL, Sep 2004.
118. Wan, S., Campa, G., Napolitano, M., Seanor, B., and Gu, Y., "Design of Formation Control Laws for Research Aircraft Models," AIAA GNC Conference, AIAA 2003-5730, Austin, TX, Aug 2003.
119. Wan, S., Campa, G., Gu, Y., Seanor, B., Gururajan, S., and Napolitano, M., "Development of Formation Control Laws for the WVU YF-22 Aircraft Models," ACC, ACC03-AIAA0041, Denver, CO, Jun 2003.
120. Tang, H.M., Wang, F.Y, and Gu, Y. "A Sliding-Mode Variable-Structure Control Method on Automatic Ship Steering," Control Theory & Application (in Chinese), Vol.13, Sup.1, Oct 1996.

Publication: Book Chapters

121. Gu, Y., Gross, J., Barchesky, F., Chao, H., and Napolitano, M., "Avionic Design for a Sub-Scale Fault Tolerant Flight Control Test-Bed," Chapter 21, Recent Advances in Aircraft Technology, ISBN: 978-953-51-0150-5, pp. 499-522, 2012.
122. Gu, Y., Campa, G., Seanor, B., Gururajan, S., and Napolitano, M., "Autonomous Formation Flight – Design and Experiments," Chapter 12, Aerial Vehicles, ISBN 978-953-7619-41-1, pp. 233-256, Jan 2009.

Publication: Others

123. Smith, T., Butts, M., Adkins, N, "Loopy Movement: Preliminary Study on Collective Motion of a Multi-cellular Robot," IROS 2023 Demonstration, Oct 2023.
124. Hu, B., Yerebakan, M., Gu, Y., & Gross, J., "Ergonomics Assessment of a Human-Robot Collaborative Plant Pollination Task," In IISE Annual Conference and Expo. IISE, May 2023.

125. Jacobs, S., Butts, R.M., Gu, Y., Baheri, A., Pereira, G., "A Framework for Controlling Multi-Robot Systems Using Bayesian Optimization and Linear Combination of Vectors," arXiv:2203.12416, Mar 2022.
126. Mills, S. A., Gu, Y., Gross, J., Li, X., Park, Y. L., & Waterland, N. L. Evaluation of an Autonomous Robotic Pollinator. American Society for Horticultural Science Annual Conference. August 10-14, 2020.
127. Watson, R., Ohi, N., Harper, S., Kilic, C., Yang, C., Hikes, J., De Petrillo, M., Strader, J., Hedrick, G., Nichols, H., Upton, E., Kirk, C., Hendricks, K., Reynolds, D., Darr,, J., Bredu, J., Langnese, E. , Gu, Y., Gross, J. "A Rover and Drone Team for Subterranean Environments: System Design Overview," Robotics Science & Systems (RSS) Workshop on Challenges and Opportunities for Resilient Collective Intelligence in Subterranean Environments, Pittsburgh, PA, June 30, 2018.
128. AIAA Intelligent Systems Technical Committee (main contributors: Gu Y., Wan Y., Tschan., C., Yucel A., Nguyen N., Lacher A., Atkins E., Adolf F.M., Casbeer D., Cook S.), "Recommendations for Intelligent Systems Development in Aerospace," AIAA Opinion Paper, Dec 2017.
129. Gu Y., "Unmanned Aerial Vehicle as a Versatile Research Tool," Editorial, Journal of Aeronautics & Aerospace Engineering, vol.1, iss.4, doi:10.4172/2168-9792.1000e112, 2012.
130. Gu, Y., Campa, G., Innocenti, M., "Formation Flight Control," Editorial, International Journal of Aerospace Engineering, Volume 2011, Article ID 798981, doi:10.1155/2011/798981, 2011.

Presentations (Selected)

Northeastern University, the Roux Institute, Portland, ME, 2024.

University of Illinois Urbana-Champaign, AE Dept., Champaign, IL, 2024.

Virgina Tech, AOE Dept., Blacksburg, VA, 2024.

University of Massachusetts Amherst, Amherst, MA, 2024.

University of Colorado Boulder, ME Dept., Boulder, CO, 2023.

NASA Ames Research Center, Mountain View, CA, 2022.

Saint Francis University Engineering, Loretto, PA, 2021.

West Virginia State Univ., Keynote, CNSM Research Symposium, Institute, WV, 2021.

Saint Louis University, St. Louis, MO, 2021.

National Institute for Occupational Safety and Health (NIOSH), Morgantown, WV, 2019.

Rutgers University, MAE Dept., New Brunswick, NJ, 2019.

University of Virginia, MAE Dept., Charlottesville, VA, 2019.

NASA Marshall Space Flight Center, Huntsville, AL, 2018.

University of Alabama, ECE Dept., Tuscaloosa, AL, 2018.

NASA's IV&V Facility, Fairmont, WV, 2018.

University of Texas at Austin, CS Dept., Austin, TX, 2018.

Worcester Polytechnic Institute, Robotics Engineering, Worcester, MA, 2018.
NASA Jet Propulsion Laboratory GDGPS Group, Pasadena, CA, 2017.
NASA Johnson Space Center, Houston, TX, 2017.
University of Rochester, ECE Dept., Rochester, NY, 2017.
NASA Jet Propulsion Laboratory Robotics Section, Pasadena, CA, 2016.
Air Force Research Laboratory, Eglin, FL, 2016.
University of Kansas, AE Dept., Lawrence, KS, 2015.
NASA Jet Propulsion Laboratory Mars Program Formulation Office, Pasadena, CA, 2015.
USDA National Institute of Food and Agriculture, Washington, DC, 2014.
NASA Ames Research Center, Mountain View, CA, 2014.
Shanghai Jiao-Tong University, Shanghai, China, 2012.
University of California, Merced, CA, 2012.
NASA Dryden Flight Research Center, Edwards, CA, 2012.
NASA Langley Research Center, Hampton, VA, 2012.
University of Hawaii at Manoa, Honolulu, HI, 2011.
Nanyang Technological University, Singapore, 2010.
NASA Integrated Resilient Aircraft Control (IRAC) Workshop, Chicago, IL, 2009.
National Radio Astronomy Observatory (NRAO), Green Bank, WV, 2008.
Turner-Fairbank Highway Research Center, McLean, VA, 2007.

External Research Grants

Twenty-three projects with total budget of $10.5M ($5.1M as PI and $5.4M as co-PI/Co-I), not including $0.9M NASA Challenge Prizes, and $2.0M other grants (industry/equipment /internal/senior personnel).

Title:	EAGER: Towards Multicellular Robotic Organisms: Exploring Physical Form, Behavior, and Environmental Response	**Project Period:**	08/15/2024 –07/31/2026
Sponsor:	NSF FRR		
Role:	PI	**Budget:**	$224,544
Title:	P-003: OrBNaV - Orbiter-assisted Balloon Navigation for Venus Exploration	**Project Period:**	08/16/2023 –08/15/2024
Sponsor:	NASA EPSCoR R3		
Role:	Co-I	**Budget:**	$99,967
Title:	Design Guidelines for Assessment of Pillar Stability in Underground Room & Pillar Mines from Autonomous Robotic Inspections	**Project Period:**	12/01/2022 –11/30/2024
Sponsor:	Alpha Foundation		
Role:	Co-PI	**Budget:**	$569,149
Title:	Collaborative Research: NRI: Reducing Falling Risk in Robot-Assisted Retail Environments	**Project Period:**	08/01/2022 –07/31/2025
Sponsor:	NSF, National Robotics Initiative		
Role:	PI	**Budget:**	$382,796
Title:	Collaborative Research: NRI: StickBug – an Effective Co-Robot for Precision Pollination	**Project Period:**	11/01/2021 –10/30/2025
Sponsor:	USDA/NIFA, National Robotics Initiative (reviewed by NSF Panel)		
Role:	PI (*Proposal*)	**Budget:**	$750,361

Title:	Data Security Challenges for Multi-Agent Cooperative Robotic Systems	**Project Period:**	08/12/2021 –05/11/2023
Sponsor:	Kinnami Software Corporation (AF STTR)		
Role:	Co-PI	**Budget:**	$225,000
Title:	Cooperative Energy-aware Navigation of Hybrid Airships in the Atmosphere of Venus	**Project Period:**	06/01/2021 –05/31/2023
Sponsor:	NASA EPSCoR R3		
Role:	Co-I	**Budget:**	$99,999
Title:	Autonomous Robotics Early Warning System for Underground Stone Mining Safety	**Project Period:**	09/01/2019 –04/30/2023
Sponsor:	Alpha Foundation		
Role:	Co-PI	**Budget:**	$749,968
Title:	Micro-Probes Propelled and Powered by Planetary Atmospheric Electricity (MP4AE)	**Project Period:**	05/15/2019 –8/14/2020
Sponsor:	NASA Innovative Advanced Concepts (NIAC), **6%** acceptance rate		
Role:	PI, NIAC Fellow	**Budget:**	$124,997
Title:	REU Site: Undergraduate Robotics Research in Human-Swarm Interaction	**Project Period:**	03/01/2019 –02/28/2023
Sponsor:	NSF		
Role:	PI (*Proposal*)	**Budget:**	$303,310
Title:	Autonomous Navigation of Small UAV/UGV Teams in Underground Tunnels	**Project Period:**	02/15/2018 –8/14/2023
Sponsor:	DoD		
Role:	Co-PI	**Budget:**	$599,688
Title:	Center for Cognitive Computing (C3): A Multidisciplinary Research Center for Excellence	**Project Period:**	01/01/2018 –12/31/2023
Sponsor:	West Virginia Division of Science and Research		
Role:	Co-PI	**Budget:**	$1,295,866
Title:	Fast Traversing Autonomous Rover for Mars Sample Collection	**Project Period:**	09/16/2017 –09/15/2022
Sponsor:	NASA EPSCoR		
Role:	Science-PI	**Budget:**	$1,125,000
Title:	Precision Pollination Robot	**Project Period:**	11/15/2016 –02/14/2021
Sponsor:	USDA National Robotics Initiative (reviewed by NSF Panel)		
Role:	PI	**Budget:**	$1,065,010
Title:	Cooperative UAV Navigation using Inter-Vehicle Range and Bearing Measurements	**Project Period:**	01/01/2016 –12/31/2017
Sponsor:	Air Force Research Lab		
Role:	PI	**Budget:**	$104,302
Title:	Enabling Moving Target Hand-off in GPS-Denied Environments	**Project Period:**	05/15/2015 –02/14/2016
Sponsor:	Air Force STTR (Through STR)		
Role:	Co-PI	**Budget:**	$149,844
Title:	Cooperative Gust Sensing and Suppression for Aircraft Formation Flight – Phase II	**Project Period:**	03/16/2014 –09/15/2016
Sponsor:	NASA LEARN (Leading Edge Aeronautics Research for NASA)		
Role:	PI	**Budget:**	$350,000
Title:	Cooperative Gust Sensing and Suppression for Aircraft Formation Flight	**Project Period:**	01/01/2013 –12/31/2013
Sponsor:	NASA LEARN		
Role:	Co-I	**Budget:**	$200,000
Title:	Verification and Validation of Autonomous Flight in an Unstructured and GPS-Degraded Environment	**Project Period:**	01/01/2013 –12/31/2013
Sponsor:	NASA IV&V		
Role:	PI	**Budget:**	$44,500

Title:	Validation Tools for an Information Fusion based Integrated Flight Safety Monitor	**Project Period:**	10/01/2012 –03/30/2016
Sponsor:	NASA VSST (Vehicle Systems Safety Technologies)		
Role:	PI	**Budget:**	$500,000
Title:	Aviation Safety Research and Development	**Project Period:**	10/01/2010 –12/31/2012
Sponsor:	NASA Langley		
Role:	Co-I	**Budget:**	$1,500,000
Title:	Development of Remote Sensing Capabilities for Highway Applications – Phase II	**Project Period:**	12/01/2009 – 11/30/2010
Sponsor:	Mid-Atlantic Universities Transportation Center (MAUTC) WV Department of Transportation/WV Division of Highway (DOH)		
Role:	PI	**Budget:**	$88,716
Title:	Evaluation of Remote Sensing Aerial Systems in Existing Transportation Practices	**Project Period:**	12/22/2008 – 12/21/2009
Sponsor:	MAUTC, WV DOH		
Role:	PI	**Budget:**	$167,422

Other Grants

"West Virginia University Robotics Laboratories for Education, Research, and Outreach," $1,000,000, Co-PI, Congressionally Directed Spending (CDS) project, Sponsor: NASA, 2024-2025.

"REU Site: Undergraduate Robotics Research for Rural Appalachia," $454,179, Senior Personnel, NSF, 2024 – 2027.

"Decision-Making under Second-Order Uncertainties – A Robot Foraging Case Study," $15,000, PI, Sponsor: WVU Research Office Program to Stimulate Competitive Research (PSCoR), 2023 – 2024.

"Enhancing Hands-on Distance Learning in Rural K-12 Schools Using Telepresence Robots," $227,963, PI, CDS project, Sponsor: USDA DLT, 2022 – 2025.

"SmartAg WV," $131,000, Co-PI, Sponsor: WVU Provost Office. Part of a 7-person team that won the second place of 10 teams during the 2021 WVU Academic Innovation Summit. 2021 – 2022.

"Bottom-up Co-design for Soft Robotics," $30,000, PI, Sponsor: NASA WV Space Grant Consortium, 2021 – 2022.

"Sensor Fusion and Navigation Project," $5,000 + 10 copies of MATLAB license, PI, Sponsor: Mathworks, 2013 – 2015.

"Development of an Undergraduate Course in Mobile Robotics," $20,000, PI, Sponsors: NASA WV Space Grant Consortium, Statler College of Engineering and Mineral Resources, MAE Department, LCSEE Department, 2013 – 2014.

"Multiple Model Adaptive Motion Planner (M-MAP)," $14,979, PI, Sponsor: WVU Senate Grants, 2010 – 2011.

"OpeRA – Open Research Aircraft," $30,000, PI, Sponsor: NASA WV Space Grant Consortium, 2010 – 2011.

"Sensor Fusion and Calibration for UAV Navigation," $20,000, PI, Sponsor: NASA WV EPSCoR, 2010 – 2011.

"A Test Bed for Propulsion Assisted Flight Control," $30,000, PI, Sponsor: NASA WV Space Grant Consortium, 2009 – 2010.

"Data Analysis for Kutta's Personal Flight Data Recorder with Display" $5,000, PI, Sponsor: Kutta Technologies, 2008 – 2009.

"Development of a Small, Ultra Low Cost, and Flexible UAV Test-bed," $20,000, PI, Sponsor: NASA WV Space Grant Consortium, 2006 – 2007.

Teaching

Note: Student Evaluation of Instruction (SEI) numbers below are averages of all questions.

Capstone Design – Robotics Section, MAE 471/371/271, CpE 480, new course development, F2017 (class size: 26, SEI: 4.5/5.0), F2018 (class size: 24, SEI: 4.8/5.0), F2019 (class size: 42, SEI: 4.6/5.0), F2020 (class size: 36, SEI 4.7/5.0), F2021 (class size: 38, SEI 4.7/5.0), F2022 (class size: 54, SEI 4.7/5.0), F2023 (class size: 44, SEI 4.7/5.0) + many volunteers.

Mobile Robotics, MAE 412, CpE 412, new course development, F2013, (class size: 18, SEI: 4.7/5.0), F2014 (class size: 18, SEI: 4.7/5.0), S2017 (class size: 24, SEI: 4.6/5.0), F2018 (class size: 24, SEI: 4.8/5.0), F2019 (class size: 26, SEI: 4.7/5.0), F2020 (class size: 29, SEI 4.5/5.0), F2021 (class size: 33, SEI 4.4/5.0), F2022 (class size: 40, SEI 4.6/5.0), F2023 (class size: 40, SEI 4.1/5.0).

Engineering Systems Design – Robotics Section, MAE 472/371/271, CpE 481, new course development, S2018, (class size: 20, SEI: 4.7/5.0), S2019, (class size: 22, SEI: 4.8/5.0), S2020 (class size: 30, SEI: 4.8/5.0), S2021 (class size: 13, SEI: 4.6/5.0), S2022 (class size: 25, SEI: 4.8/5), S2023 (class size: 33, SEI: 4.7) + many volunteers.

Autonomous Robot Systems, MAE 593B, new course development, S2019, (class size: 14, SEI: 4.8/5.0).

Planetary Rover Design, MAE 493J/593K, CpE 493N/591F, new course development (with co-instructor Dr. Klinkhachorn), S2014 (class size: 24, SEI: 4.8/5.0), S2015 (class size: 28, SEI: 4.9/5.0), S2016 (class size: 20, SEI: 5.0/5.0).

Mechatronics (plus labs), MAE 211, instructor, S2013, (class size: 84, SEI: 3.7/5.0), F2015, (class size: 144, SEI: 3.8/5.0), F2016 (class size: 141, SEI: 4.2/5.0).

Advanced Mechatronics (with labs), MAE 411, co-instructor with Dr. Sergio Tamayo and Mr. Matthew Rhudy, Summer, 2011 (class size: 8).

Automatic Controls, MAE 460, instructor, Summer, 2010, (class size: 9, SEI: 4.8/5.0).

Sounding Rocket Payload Development (RockSat), PHYS 493S, co-instructor with Dr. Vassiliadis and Dr. Pisano, S2010 (class size: 10), F2009 (as a project).

Instrumentation Engineering, MAE 663, new course development, S2008, (class size: 18, SEI: 4.0/5.0).

Research Professor & Post-Doc

Dr. Ali Baheri, Research Assistant Professor, 2019 – 2021, employer: Rochester Institute of Technology.

Graduate Students

Committee Chair, Research Advisor:

Rashik Shrestha, Ph.D. student.
Robert Cook, M.S. student (thesis).
Nathaniel Pearson, Ph.D. student.
John Little, M.S. student (thesis).
Trevor Smith, Ph.D. student.
Madhav Rijal, Ph.D. student.
Christopher Tatsch, M.S. (thesis), 2020, Ph.D. candidate.
Ronald Butts, M.S. (thesis), 2024.
Mathew Collins, M.S. (thesis), 2024, employer: Form Energy.
Heath Cottrill, M.S. (thesis), 2024, employer: Leidos.
Jared Beard, M.S. (thesis), 2020, Ph.D., 2024, employer: Lunar Outpost.
Stephen Jacobs, M.S. student, 2023, employer: SpaceX.
Jonas Amoama Bredu, M.S. (thesis), 2022, employer: MC Dean.
Nicholas Ohi, Ph.D., 2022, employer: CACI/NASA JSC
Dylan Covell, M.S. (thesis), 2022, employer: Carnegie Robotics.
Chizhao Yang, Ph.D., 2021, employer: O-Net Communication.
Jared Strader, MS (thesis), 2016, Ph.D., 2021, employer: MIT.
Benjamin Buzzo, M.S. (thesis), 2021, employer: Oceaneering.
Gabrielle Hedrick, Ph.D., 2020, employer: MITRE.
Jennifer Nguyen, M.S. (thesis), 2020, employer: Open Robotics, Intrinsic.
Kyle Lassak, Ph.D., 2020, employer: Astrobotic.
Conner Castle, M.S. (thesis), 2019, employer: Honeybee Robotics, Gecko Robotics.
Scott Harper, MS (thesis), 2018, employer: 4D Tech Solutions.
Tanmay Mandal, Ph.D., 2016, employer: Airbus, Amazon, LTA Research.
Alexander Hypes, M.S. student, 2016, employer: Oculus, Facebook.
Yaohui Ding, MS, 2015, employer: University of Arizona.
Trevor Caplinger, MS (thesis), 2015, employer: NAVAIR.
Caleb Rice, MS, 2015, employer: NAVAIR.
Matthew Rhudy, Ph.D., 2013, employer: Penn State University, Reading.
Zach Merceruio, MS (thesis), 2011, employer: JHU Applied Physics Lab.

Committee Member, Research Co-Advisor:

Eric Swanson, M.S. student.
Daniele Tancredi, MS (thesis), 2011, employer: MathWorks, Inc.
Frank Barchesky, MS (thesis), 2011, employer: AAR Corp.
Jason Gross, Ph.D., 2011, employer: JPL, WVU.
Jason Jarrell, MS (thesis), 2007, employer: Northrop Grumman Corporation.

Committee Member:

Rogerio Rodrigues Lima (Ph.D., 2023); Bernardo Martinez Rocamora Jr. (Ph.D., 2023); Shounak Das (Ph.D., 2023); Marcela Mera Trujillo (Ph.D., 2023); Anna Puigvert I Juan (M.S., 2023); Eduardo Gutierrez Lopez (M.S., 2022); Jeremy Rathjen (M.S., 2022); Olawoye Uthman (M.S., 2022); Richard Licata (Ph.D., 2022); Kieren Samarakoon (M.S., 2022); Matteo De Petrillo (Ph.D., 2021); Cagri Kilic (Ph.D., 2021); Marwan Alkhweldi (Ph.D., 2021); Nicholas Sia (M.S., 2021), Derek Ross (M.S., 2021); Danylo Shapovalov (M.S., 2020); Stanislav Pidhorskyi (Ph.D., 2020); Matthew Boots (Ph.D., 2019); Ryan

Watson (Ph.D., 2019); Andrew Rhodes (Ph.D., 2019); Yixin Du (Ph.D., 2019); Jacob Hikes (M.S., 2018); Shane Haught (M.S., 2018); Shannen Daly (M.S., 2018); Sean Lantto (M.S., 2018); Victor Sivaneri (Ph.D., 2018); Nathan Tehrani (M.S., 2017); Lisa Kogan (M.S., 2017); Lylia Benhacine (M.S., 2017); Qian Mou (M.S., 2016); Ryan Watson (M.S., 2016); Jeremy Hardy (M.S., 2016); Wei Qi (Ph.D., 2016); Lei Jiang (Ph.D., 2015); Katie Rabidoux (Ph.D., 2015); Jennifer N. Wilburn, (Ph.D., 2013); Trenton Larrabee, (M.S., 2013); Brenton Wilburn, (M.S., 2010); Josh Effland, (M.S., 2007).

Visiting Students:

Paolo Roberto Di Gregorio (2016); Matteo De Petrillo (2015).

Undergraduate Researchers

WVU Students: Marc Gramlich, Jared Strader, Ryan Watson, Alexander Gray, Scott Harper, Jared Leggett, Nicholas Ohi, Lucas Behrens, Joey Licata, Anthony Donzella, Dylan Reynolds, Conner Castle, Matthew Gramlich, Jonas Amoama Bredu, Mo Buzzo, Jared Beard, Kiki Yaw Sarpong, Dylan Covell, Quinton Fleming, Kate Digon, Jada Williams, Christopher Brindle, Henry Cerbone (high school), Tucker Johnson, Henry Vos, Alexandra Collins, Lunet Yifru, Trevor Smith, Karan "Kermit" Sah, Giovanni Molin, Gabe Bobbitt, Ibrahim Rahman (high school), Stephen Jacobs, Spencer Regnier, Nathaniel Pearson, Ronald Butts, Tyler Cook, Tyler Wolf, Andy Chu, Andrew Sarver, Riley McAllister, Nathan Adkins, Shawn Li (high school), Izaak Whetsell, Dre' Hodges, Jalen Beeman, Kendra Gillo, Connor Mann, Patrick Weiss.

REU Students: Nathan Hewitt, Neel Dhanaraj, Julietta Maffeo, Aleks Hatfield, Rachel Jarman, Jeongwoo Seo, Casey Edmonds-Estes, Henry Gunner, Dillan Wilson, David Rubel, Di'Quan Ishmon, John Little, Shelby Hacker, Daniel Villarreal, Ibrahim Rahman, Sarah Alderman, Stanford White, Max Gao, Adam Pooley, Arushi Sharma, Sachi Barnaby, Katelyn Crockett, Camndon Reed, Matthew Williams.

Efforts on Promoting an Inclusive Environment

Nineteen years of experience as an educator in Appalachia working with students from social-economic disadvantaged backgrounds.

Working with education experts to deploy 20 telepresence robots to four high schools and five middle schools in WV for supporting STEM learning.

Advising robotics competition teams that promotes a diverse and inclusive culture, peer to peer learning, and student leadership.

Research and competition teams are involved in more than a dozen outreach activities each year to K-16 students and the public.

Directed an NSF REU site (2019 – 2023) with an Appalachia recruitment focus (39% of participants from Appalachia, 35% female students, 9% underrepresented minorities, 30% from primarily undergraduate institutions, and 17% first generation college students).

Mentored 70 undergraduate and high school students in research.

Attended 2018 Southern Regional Education Board (SREB) Institute on Teaching and Mentoring for learning and for recruitment of diverse faculty candidates.

Professional Societies

Senior Member, American Institute of Aeronautics and Astronautics (AIAA).

Member, Institute of Electrical and Electronics Engineers (IEEE)
Robotics and Automation; Aerospace and Electronic Systems; Control Systems.

Professional Services

Technical Editor, IEEE/ASME Transaction on Mechatronics, 2020 – 2024.

Associate Editor, 2025, 2024, 2023, 2022, 2021 International Conference on Robotics and Automation (ICRA).

Associate Editor, 2024, 2023, 2022, 2021, 2020, 2019 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM).

Associate Editor, 2023, 2019 International Conference on Advanced Robotics (ICAR).

Panel Reviewer, NASA, 2023.

Panel Reviewer, NSF, 2022 (1), 2021(1), 2020 (1), 2019 (2), 2018 (2), 2017 (2).

Panel Reviewer, USDA/NIFA, 2019, 2024.

Contributor, US Robotics Roadmap, 2020, 2024 Editions.

Member, AIAA Intelligent Systems Technical Committee (ISTC), 2016-2018.

Chair, AIAA ISTC Roadmap Sub-Committee, 2016-2018.

Moderator, Space Robotics Breakout Session, Intelligent Systems Workshop, 2017.

Moderator, Robotics Breakout Session, Intelligent Systems Workshop, 2016.

Advisory Board, Mechatronics Engineering Technology at California University of Pennsylvania, 2014.

Editorial Board, Journal of Aeronautics & Aerospace Engineering, 2012-2014.

Lead Guest Editor, Special Issue on Formation Flight Control, International Journal of Aerospace Engineering, August 01, 2011.

Session Co-Chair, Autonomous System Collision Avoidance, 2008 AIAA GNC Conference.

Reviewer – Proposal, American Association for the Advancement of Science (AAAS), Canada Foundation for Innovation, Center for Connected Multimodal Mobility (C^2M^2), Georgia National Science Foundation, Israeli Ministry of Science and Technology, Kentucky Science & Engineering Foundation, US National Science Foundation, NASA EPSCoR, New York Space Grant, USDA/NIFA, National Institute for Occupational Safety and Health (NIOSH), Research North Dakota, WVU Senate Grant, WVU PSCoR.

Reviewer – Journal, ACM Transactions on Cyber-Physical Systems, Aerospace Science and Technology, AIAA Journal of Guidance, Control, and Dynamics, Aircraft Engineering and Aerospace Technology, Automatica, Electronics, Control Engineering Practice, Engineering, Engineering Applications of Artificial Intelligence, Field Robotics, IEEE Robotics and Automation Letters, IEEE Robotics and Automation Magazine, IEEE Transactions on Aerospace and Electronic System, IEEE Transactions on Control

Systems Technology, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Robotics, IEEE Transactions of Vehicular Technology, IEEE Sensors Journal, IEICE Electronics Express, International Journal of Advanced Robotic Systems, International Journal of Aerospace Engineering, International Journal of Control, Journal of Aerospace Engineering, Journal of Control Science and Engineering, Journal of Real-Time Image Processing, Nature Food, Robotics, Robotics and Autonomous Systems, Sensors.

Reviewer – Conference, AIAA Guidance, Navigation and Control Conference, American Control Conference, International Conference on Advanced Intelligent Mechatronics, International Conference on Automation Science and Engineering, International Conference on Intelligent Robots and Systems (IROS), International Conference on Robotics and Automation (ICRA), International Conference on Unmanned Aircraft Systems, Israel Annual Conference on Aerospace Sciences, Mediterranean Conference on Control and Automation, Robotics: Science and Systems (RSS).

Leadership Roles in Building WVU Robotics Program

Gained visibility and reputation through winning NASA Challenges and robotics competitions.

Established WVU Robotics Achievement undergraduate Fellowship (with part of NASA Prize)

Proposed multiple robotics faculty positions and served on 11 faculty search committees.

Developed and offered five new robotics courses.

Proposed and co-developed a college-wide robotics seminar series.

Facilitated the development of a central website (*https://robotics.wvu.edu*), promotional videos, a recruitment eBook, a shared test facility, and a robot museum.

Directed an NSF-funded REU site on human-swarm interaction.

Advising the student robotics club and competition teams.

Awards and Honors

Research, Teaching, and Service:

MMAE Academy of Distinguished Alumni Professorship, 2024.

Researcher of the Year, 2021-2022, WVU Statler College of Engineering and Mineral Resources, 2022.

NASA Innovative Advanced Concepts (NIAC) Fellow, 2019.

Big XII Faculty Fellow 2018-2019, WVU, 2018.

Excellence in Research Senior Level, 2017-2018, WVU Statler College, 2018.

Recognition for Mountaineer Values, WVU's 150th Anniversary Celebration, 2018.

Best Paper Award, Track B: Perception for Autonomous and Semi-Autonomous Systems, IEEE/ION PLANS 2016.

Excellent Reviewer, AIAA Journal of Guidance, Control, and Dynamics, 2015 – 2016.

Outstanding Researcher, 2014-2015, WVU Statler College, 2015.

Robotic Competition:

2nd Place (among 102 teams from 15 countries), 2024 University Rover Challenge (URC), team faculty advisor, 2024.

1st Place (among 104 teams from 15 countries), 2023 University Rover Challenge (URC), team faculty advisor, 2023 (Design and Software).

6th Place, NASA Space Robotics Challenge Phase 2 Centennial Challenge ($45k prize), team member (team lead: Dr. Jason Gross), 2021.

Final Challenge (*$750,000 Prize*) Winner, team leader, NASA Centennial Challenge (Sample Return Robot Challenge), 2016.

Robotics Team Recognition by NASA & US Senators in the Capital, Washington, D.C., 2015.

Level-2 Challenge (*$100,000 Prize*) Winner, team leader, NASA Centennial Challenge,2015.

Level-1 Challenge Winner and Technology Achievement Award, team leader, NASA Centennial Challenge, 2014.

1st Place (Joe Kosmo) Award, NASA Robotic Mining Competition, team co-advisor (team advisor: Dr. Powsiri Klinkhachorn), 2014.

Student Achievements

NSF Graduate Research Fellowship: Nicholas Ohi (2016), Trevor Smith (2022).

Order of Augusta (WVU's most prestigious student honor): Nicholas Ohi (2016).

Ruby Distinguished Doctoral Fellowship (3-year): Jared Beard (2020).

Arlen G. and Louise Stone Swiger Fellowship (3-year): Jared Strader (2016).

Benjamin M. Statler Ph.D. Fellowship (3-year): Gabrielle Hedrick (2017), Madhav Rijal (2022).

Outstanding Merit Fellowship for Continuing Doctoral Students: Chizhao Yang (2018).

Staler College Ph.D. Recruitment Award: Madhav Rijal (2021), Nathaniel Pearson (2022).

WVU Undergraduate Research Symposium Winner, Science & Technology category: Trevor Smith (2021), Runner-Up, Physical Sciences and Engineering category: Camndon Reed and Matthew Williams (2024).

Best Presentation, Living Machines Conference 2024, Chicago, IL: Trevor Smith (2024).

WVU and West Virginia Student Employee of the Year: Scott Harper (2016).

NASA WV SGC Graduate Fellowship: Jason Gross, Matthew Rhudy, Zach Merceruio, Caleb Rice, Alexander Hypes, Scott Harper (twice), Jennifer Nguyen (twice), Jared Strader, Nicholas Ohi (three times), Conner Castle, Mo Buzzo, Jared Beard (twice), Ronald Butts, Nathaniel Pearson (twice), Stephen Jacobs, John Little, Heath Cottrill.

NASA WV SGC Undergraduate Fellowship: Marc Gramlich, Scott Harper, Jared Strader, Alexandra Augsberger, Colin Osborn, Cameron Wilson, Tucker Johnson, Chad Hite, Stephen Jacobs, Logan Gold.

WVU Summer Undergraduate Research Experiences (SURE): Conner Castle, Benjamin Buzzo, Spencer Regnier, Tyler Cook, Connor Mann, Patrick Weiss.

JPL Visiting Student Research Program (JVSRP): Scott Harper, Jared Strader, Gabrielle Hedrick, Nicholas Ohi, Jared Beard, Jennifer Nguyen.

Undergraduate First Author: Adam Pooley (Biomimetics), Trevor Smith (IJSR, ION GNSS+), Stephen Jacobs (ICUAS), Ibrahim Rahman (ACC), Neel Dhanaraj (ICAR).

Winners of several international robotics competitions.

Media Coverages (Selected)

Articles:

IEEE Spectrum Robotics Blog (22 times), "Video Friday, Aug, Jul (4), Jun (3), Apr 2024, Jul, Apr 2023, Jul (2), Jun 2022, Mar 2019, May, Apr 2018, Nov, Aug, Apr 2017, Feb 2016, Apr 2015."

ASME, "Six-Armed Robot Stickbug Works as a Precision Pollinator," Jul 2024.

The Conversation, "'Swarm of one' robot is a single machine made up of independent modules," Feb 2024.

Scientific American, "Robotic bees could support vertical farms today and astronauts tomorrow," July 2023.

Forbes, "How new innovations are helping prevent retail injuries," Dec 2022.

Safety+Health Magazine, "Researchers developing robots to detect slip and fall hazards in retail spaces," Nov 2022.

Fast Company, "When bees can't pollinate a flower, this agricultural robot steps in," Nov 2021. "This robot could help pollinate crops if we kill all the bees," May 2018.

NASA, "NASA invests in 18 potentially revolutionary space tech concepts," Apr 2019. "NASA reveals the unknown in 2016," Dec 2016. "NASA awards $750K in sample return robot challenge for autonomous technology," Sep 2016. "Strengthening our space technology future: snapshots of success," Jan 2016. "NASA, U.S. Senate welcome robot challenge winners to Washington," Sep 2015. "NASA awards $100,000 to winning team of robot challenge," Jun 2015.

National Geographic Italia, "The pollinator robot that replaces the bees," Sep 2018.

Wired, "This robotic pollinator is like a huge bee with wheels and an arm," May 2018.

Fruit Grower News, cover story, "Beeline to the future, could robots replace honeybees as pollinators?" May 2017.

Air & Space Smithsonian Magazine, "From a Massachusetts field to the plains of Mars," Nov 2016.

The Associated Press, ABC News, The Washington Post, The New York Times, USA Today, "West Virginia University students win robotics competition," Sep 2016.

GPS World, "Navigation progress for indoors and UAVs," Jul 2016.

Aviation Week, "The week in technology, July 13-17, 2015," Jul 2015.

The Associated Press, "WVU team gets $100,000 from NASA in robotics challenge," Jun 2015.

NASA's Technology Innovation e-zine, "A week in the park," Apr 2015.

Interviewed as a Subject Matter Expert:

Popular Mechanics, "How legged robots could revolutionize space exploration," Nov 2023.

CNN, “With bees in short supply, soap bubbles could assist with pollination, study finds,” Jun 2020.

Science, AAAS, “Drone-delivered soap bubbles could help pollinate flowers,” Jun 2020.

Television, Radio, and Online Video:

BBC Earth Lab, “Are robot bees the future?” Apr 2023.

NASA 360, “NASA competition winners develop AI for future rovers,” Nov 2019. “NASA Challenge winners develop robots for earth and rovers for space,” Aug 2019. “As bees die NASA-inspired robot could fill the pollination void,” Aug 2019. “Rover reloaded,” Sep 2015. “Rise of the rovers,” Sep 2014.

Planetary Radio, the Planetary Society, “Space innovations so incredible, they just might work,” Oct 2019.

J-WAVE, live radio interview about robotic pollination, Nov 2018.

Discovery Channel Canada, Daily Planet, on robotics Easter egg hunt, Apr 2017.

NASA, “What happened this year @ NASA,” Dec 2015, Dec 2016.

Time Warner Cable, “It ain't rocket science,” Oct 2015.

Good Morning Washington, live TV interview, Sep 2015.

Personal Interests

Planetary observation, astro and nature photography (*Gallery*), telescope making, blogging.