

Shivam Bajaj

Postdoctoral Research Associate, Purdue University

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RESEARCH TOPICS

Control Systems, Game Theory, Reinforcement Learning

ACADEMIC APPOINTMENTS

Postdoctoral Research Associate,
Purdue University, West Lafayette, IN

September 2023 – Present
Advisor: Dr. Vijay Gupta

EDUCATION

Ph.D., Electrical and Computer Engineering
Michigan State University, East Lansing

August 2019 – August 2023
Advisor: Dr. Shaunak D. Bopardikar

M.Sc., Electrical and Computer Engineering
Michigan State University, East Lansing

August 2017 – August 2019
Advisor: Dr. Shaunak D. Bopardikar

B. Tech., Electrical and Electronics Engineering
Indraprastha University, Delhi, India

August 2012 – August 2016

PUBLICATIONS

JOURNAL PUBLICATIONS (UNDER REVIEW)

- J1. **S. Bajaj**, Carolyn L. Beck, Vijay Gupta, "Online Model Order Reduction via (γ, δ) -similarity", in IEEE Transactions on Automatic Control, 2025, (Under Revision)
- J2. **S. Bajaj**, Prateek Jaiswal, Vijay Gupta, "Leveraging Offline Data from Similar Systems for Online Linear Quadratic Control", in IEEE Transactions on Automatic Control, 2025, (Under Review)

JOURNAL PUBLICATIONS (ACCEPTED)

- J3. **S. Bajaj**, B. Jha, S.D. Bopardikar, A.V. Moll, D. Casbeer, "Shortest Trajectory of a Dubins Vehicle with a Controllable Laser", in IEEE Transactions on Automatic Control, 2025, (Conditionally Accepted).
- J4. **S. Bajaj**, E. Torn, S.D. Bopardikar, "Competitive Perimeter Defense of Linear Environments", Theoretical Computer Science Journal, 2025, pp. 115262
- J5. **S. Bajaj**, Pranoy Das, Yevgeniy Vorobeychik, Vijay Gupta, "Rationality of Learning Algorithms in Repeated Normal-Form Games", IEEE Control Systems Letter, vol. 8, pp. 2409-2414, 2024
- J6. **S. Bajaj**, E. Torn and S. D. Bopardikar, "Randomized Competitive Perimeter Defense on a Line," in IEEE Control Systems Letters, vol. 8, pp. 1000-1005, 2024
- J7. **S. Bajaj**, S. D. Bopardikar, E. Torn, A. Von Moll, D. W. Casbeer, "Multivehicle Perimeter Defense in Conical Environments," in IEEE Transactions on Robotics, vol. 40, pp. 1439-1456, 2024
- J8. **S. Bajaj**, S.D. Bopardikar, A. Von Moll, E. Torn, D.W. Casbeer "Competitive perimeter defense with a turret and a mobile vehicle" in Frontiers in Control Engineering, vol. 4, 2023 4:1128597. Guest edited by J. Marden, P. Tsiotras, D. Shishika, M. Dorothy, D. Macharet.

CONFERENCE PUBLICATIONS (UNDER REVIEW)

- C1. V. Kanakeri, **S. Bajaj**, A. Verma, V. Gupta, A. Mitra "Harnessing Data from Clustered LQR Systems: Personalized and Collaborative Policy Optimization", 8th Annual Learning for Dynamics and Control (**L4DC**).

CONFERENCE PUBLICATIONS (ACCEPTED)

- C2. **S. Bajaj**, S. D. Bopardikar, A.V. Moll, E. Torn, D. W. Casbeer "Perimeter Defense Using a Turret with Finite Range and Service Times," 2023 American Control Conference, San Diego, CA, USA, June 2023, pp. 3350-3355.
- C3. **S. Bajaj**, S.D. Bopardikar "Optimal Pursuit of Surveilling Agents Near a High Value Target." In Decision and Game Theory for Security: 13th International Conference (**GameSec**), Pittsburgh, PA, USA, October 2022, Proceedings, pp. 168-187. Cham: Springer International Publishing, 2023.
- C4. **S. Bajaj**, E. Torn, S. D. Bopardikar, A.V. Moll, I. Weintraub, E. Garcia, D. W. Casbeer "Competitive Perimeter Defense of Conical Environments," IEEE 61st Conference on Decision and Control, Cancun, Mexico, December 2022, pp. 6586-6593
- C5. **S. Bajaj**, E. Torn, S. D. Bopardikar, "Competitive Perimeter Defense on a Line," 2021 American Control Conference, New Orleans, LA, USA, June 2021, pp. 3196-3201.
- C6. **S. Bajaj**, E. Garcia, S. D. Bopardikar, "Cooperative Evasion by Translating Targets with Variable Speeds," 2021 IEEE Conference on Control Technology and Applications, San Diego, CA, USA, August 2021, pp. 374-379.
- C7. **S. Bajaj**, S.D. Bopardikar, "Dynamic Boundary Guarding Against Radially Incoming Targets", 2019 IEEE 58th Conference on Decision and Control, Nice, France, December 2019, pp. 4804-4809.
- C8. A. Goel, V. Rajput, **S. Bajaj**, R. Mittal, A. Dube. "Solar hybrid electric vehicle—A green vehicle for future impulse." In 3rd International Conference on Computing for Sustainable Global Development, pp. 2794-2800. IEEE, 2016.

TALKS

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| 1. Rising Star Symposium on CPS Security, Resilience, & Privacy (Invited) | September 2025 |
| 2. University of Maryland at College Park (Organized by Kaiqing Zhang) | June 2025 |
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WORKSHOPS AND CONFERENCE PRESENTATIONS

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| 1. Poster, Annual Security Symposium, Purdue University at West Lafayette | April 2025 |
| 2. Poster, Midwest Workshop on Control and Game Theory | April 2025 |
| 3. Poster, Annual Security Symposium, Purdue University at West Lafayette | April 2024 |
| 4. Poster, Midwest Workshop on Control and Game Theory | April 2024 |
| 5. Poster, Midwest Workshop on Control and Game Theory | April 2023 |
| 6. Presentation, American Control Conference | June 2023 |
| 7. Presentation, Decision and Game Theory for Security | October 2022 |
| 8. Presentation, IEEE Conference on Decision and Control | December 2022 |
| 9. Presentation, American Control Conference | June 2021 |
| 10. Presentation, IEEE Conference on Control Technology and Applications | August 2021 |
| 11. Presentation, IEEE Conference on Decision and Control | December 2019 |
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AWARDS AND ACHIEVEMENTS

1. **Invited Workshop:** "New England Future Faculty Workshop" Northeastern University, Boston, MA August 2025
 2. **Best poster** award Michigan State University, East Lansing, MI May 2022
 3. **Certificate** in Mentoring, Leadership, and Teamwork Graduate School, Michigan State University, East Lansing, MI June 2022
 4. **Graduate** from the Leadership Academy Michigan State University, East Lansing, MI May 2020
 5. **First prize** in LEAR Open Innovation Challenge LEAR Corporation, Detroit, MI March 2018
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OUTREACH

1. **Journal Reviewer:** IEEE Transactions on Automatic Control (IEEE-TAC), Automatica, IEEE Control Systems Letters (IEEE-LCSS), IEEE Robotics and Automation Letters (IEEE RA-L), Open Journal of Control Systems (OJCSYS)
 2. **Conference Reviewer:** IEEE Conference on Decision and Control (CDC), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), American Control Conference (ACC), IEEE Conference on Control Technology and Applications (CCTA), IEEE International Conference on Automation Science and Engineering (CASE), International Conference on Robotics and Automation (ICRA), Learning for Decision and Control (L4DC).
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SERVICE / VOLUNTEERING

1. Poster Judge, Office of Interdisciplinary Graduate Programs Purdue University, West Lafayette, IN May 2025
 2. Poster Judge, University Undergraduate Research and Arts Forum Michigan State University, East Lansing, MI April 2023
 3. Student Member, ECE Graduate Studies Committee Michigan State University, East Lansing, MI Fall 2022-Fall 2023
 4. Presenter, Science Festival Michigan State University, East Lansing, MI April 2022
 5. Presenter, Science Festival Michigan State University, East Lansing, MI April 2021
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MENTORING EXPERIENCE

*Under supervision of Dr. Vijay Gupta, †Under supervision of Dr. Shaunk D. Bopardikar

PhD Students

1. Ujin Jeon*, Purdue University January 2025 - September 2025

Master's Students

1. Ulugbek Abdullaev*, Purdue University October 2024 – May 2025

Under-graduate Students

1. Soham Samir Seksaria*, Purdue University May 2025-Present
2. Fellipe Ramirez Franco*, Purdue University August 2024 - June 2025
3. Krishna Das Artis-Mickens†, Michigan State University May 2023 - August 2023
4. Jayden Devaull†, Michigan State University May 2022 - August 2022