Gaurav Dixit

https://gdixit.com – (425)-647-3679 – dixitg@oregonstate.edu

Research Profile

AI and robotics researcher specializing in multi-objective and multiagent decision-making, adaptive coordination under uncertainty, and human-centered autonomy, with applications in multi-robot systems, assistive robotics, healthcare, and long-duration autonomous systems.

Education

08.09.2023 **Doctor of Philosophy (Ph.D.) in Robotics**
Oregon State University, Corvallis, OR, USA
Thesis: *Learning to coordinate in sparse asymmetric multiagent systems*
Advisor: Prof. Kagan Tumer

03.09.2021 **Master of Science (M.S.) in Computer Science**
Oregon State University, Corvallis, OR, USA
Advisor: Prof. Kagan Tumer

01.05.2016 **Honors Bachelor of Engineering (B.Eng.), *magna cum laude***
University of Pune, Pune, India
Pune Institute of Computer Technology

Work Experience

2023–present **Research Associate**
AI-CARING Institute & Collaborative Robotics and Intelligent Systems Institute (CoRIS), Corvallis, OR

- Develop methods for multi-objective and multiagent decision-making that enable autonomous systems to reason across competing and evolving priorities in support of human-centered autonomy.
- Lead work within the NSF AI-CARING Institute on formalizing human-centered decision-making from a multi-objective perspective, including collaborations on beneficence and trust in autonomous systems.
- Mentor graduate students; contribute to graduate teaching in Multiagent Systems and Learning-Based Control.
- Contributor to multi-institution research and white papers with NSF and AFOSR.

2018–2023 **Graduate Research Assistant**
Oregon State University, Corvallis, OR
- Developed multiagent learning methods that address reward sparsity, credit assignment, and the emergence of coordinated behavior in environments with partially aligned or dynamic objectives.
- Designed diversity-search methods for improving zero-shot generalization to changes in task dynamics, agent policies and team composition.

2022–2023 **Artist Researcher (with Antti Ilvessuo)**
ADG Collective
- Explore computational and evolutionary techniques for generating aleatoric temporal art, particularly music, studying how stochastic structure and variation processes shape creative outcomes.
- Develop multimodal visualization tools to interpret transformations induced by generative models.

2019–2019	**AI Research Engineer**
	RedLynx Oy, Helsinki, Finland

- Investigated approaches combining tree-based planning with reinforcement learning for decision-making in normal form games.
- Advanced quality-diversity techniques for learning latent behavior representations to support automated policy exploration and diversity-driven search.

2016–2018	**Physics & AI Programmer**
	Ubisoft Entertainment SA, Pune, India

- Implemented policy-gradient and evolutionary optimization methods to develop an end-to-end pipeline for automated game testing.
- Designed and developed a web-based rigid-body physics engine in TypeScript/Node.js to support online simulation and interactive tools.

2015–2016	**Software Development Research Intern**
	BMC Software, Pune, India

- Developed a real-time event analysis tool for root-cause diagnosis and event-association mining using an optimized variant of the Rete algorithm for network automation.

2014–2016	**Undergraduate Research Assistant**
	Pune Institute of Computer Technology

- Developed methods to improve named-entity recognition for Hindi and regional dialects through data collection, feature engineering, and statistical modeling.

Research Output

Research expertise:
Multi-objective and multiagent decision-making; adaptive coordination under uncertainty; human-centered autonomy.
Peer-reviewed venues include: AAMAS, GECCO, ECAI, VIS, IJCCI.
Full list of publications: `https://scholar.google.com/citations?user=1sh3qCAAAAAJ`

List of Peer-Reviewed Publications

1. **Dixit, G.**, & Tumer, K. (2026). *Pareto-Guided Exploration for Multi-Objective Multiagent Learning.* To appear in AAMAS 2026.

2. Thakar, R.*, **Dixit, G.**, Iyer, S.*, & Tumer, K. (2025). *Multiagent Credit Assignment for Multi-Objective Coordination.* Proceedings of GECCO 2025, 663–672. `https://dl.acm.org/doi/10.1145/3712256.3726445`

3. Gonzalez, E., **Dixit, G.**, & Tumer, K. (2025). *Dynamic Influence for Coevolutionary Agents.* Proceedings of GECCO 2025, 368–376. `https://dl.acm.org/doi/10.1145/3712256.3726455`

4. Iyer, S.*, Aydeniz, A. A., **Dixit, G.**, & Tumer, K. (2025). *Multiagent Quality-Diversity for Effective Adaptation.* In ECAI 2025 (pp. 3323–3330). IOS Press. `https://ebooks.iospress.nl/doi/10.3233/FAIA251201`

5. Festa, A.*, **Dixit, G.**, & Tumer, K. (2024). *Influence-Focused Asymmetric Island Model.* Proceedings of AAMAS 2024, 2261–2263. `https://www.ifaamas.org/Proceedings/aamas2024/pdfs/p2261.pdf`

6. **Dixit, G.** & Tumer, K. (2024). *Informed Diversity Search for Learning in Asymmetric Multiagent Systems.* Proceedings of GECCO 2024, 313–321. `https://dl.acm.org/doi/10.1145/3638529.3654206`

7. Festa, A.*, **Dixit, G.**, & Tumer, K. (2024). *Reinforcing Inter-Class Dependencies in the Asymmetric Island Model.* Proceedings of GECCO 2024, 740–748. `https://dl.acm.org/doi/10.1145/3638529.3654213`

8. **Dixit, G.** & Tumer, K. (2024). *Objective-Informed Diversity for Multi-Objective Multiagent Coordination.* In ECAI 2024 (pp. 3660–3667). IOS Press. `https://ebooks.iospress.nl/doi/10.3233/FAIA240923`

9. **Dixit, G.** & Tumer, K. (2023). *Learning inter-agent synergies in asymmetric multiagent systems.* Proceedings of AAMAS 2023, 1569–1577. `https://dl.acm.org/doi/epdf/10.5555/3545946.3598812`

10. **Dixit, G.** & Tumer, K. (2023). *Learning synergies for multi-objective optimization in asymmetric multiagent systems.* Proceedings of GECCO 2023, 447–455. `https://dl.acm.org/doi/10.1145/3583131.3590524`

11. Nickelson, A., Zerbel, N., **Dixit, G.**, & Tumer, K. (2023). *Shaping the Behavior Space with Counterfactual Agents in Multi-Objective Map-Elites.* IJCCI 2023, 41–52. `https://www.scitepress.org/Papers/2023/121648/121648.pdf`

12. **Dixit, G.** & Tumer, K. (2022). *Balancing teams with quality-diversity for heterogeneous multiagent coordination.* Proceedings of the Genetic and Evolutionary Computation Conference Companion, 236–239. `https://dl.acm.org/doi/10.1145/3520304.3529062`

13. **Dixit, G.** & Tumer, K. (2022). *Behavior Exploration and Team Balancing for Heterogeneous Multiagent Coordination.* Proceedings of AAMAS 2022. `https://par.nsf.gov/servlets/purl/10359619`

14. **Dixit, G.**, Gonzalez, E., & Tumer, K. (2022). *Diversifying behaviors for learning in asymmetric multiagent systems.* Proceedings of the Genetic and Evolutionary Computation Conference, 350–358. `https://dl.acm.org/doi/10.1145/3512290.3528860`

15. **Dixit, G.**, Koll, C.*, & Tumer, K. (2021). *Heterogeneous agent coordination via adaptive quality diversity and specialization.* Proceedings of the Genetic and Evolutionary Computation Conference Companion, 95–96. `https://dl.acm.org/doi/10.1145/3449726.3459564`

16. Olson, M. L., Nguyen, T.-V., **Dixit, G.**, Ratzlaff, N., Wong, W.-K., & Kahng, M. (2021). *Contrastive identification of covariate shift in image data.* 2021 IEEE Visualization Conference (VIS), 36–40. IEEE. `https://arxiv.org/pdf/2108.08000`

17. **Dixit, G.**, Zerbel, N., & Tumer, K. (2020). *Gaussian processes as multiagent reward models.* AAMAS Conference Proceedings. `https://www.ifaamas.org/Proceedings/aamas2020/pdfs/p330.pdf`

18. **Dixit, G.**, Zerbel, N., & Tumer, K. (2019). *Dirichlet-multinomial counterfactual rewards for heterogeneous multiagent systems.* International Symposium on Multi-Robot and Multi-Agent Systems (MRS), 209–215. IEEE. `https://gdixit.com/assets/pdf/MRS19_DMCS.pdf`

* Denotes supervised undergraduate or graduate student.

Student supervision:
Co-supervised graduate and undergraduate students in multiagent learning, reinforcement learning, and adaptive autonomy.

Teaching Experience

Graduate teaching and tutorial leadership:
Contributed to graduate teaching and course development (2023–2025):

- Multiagent Systems (coordination, decision-making, learning)
- Learning-Based Control (control, reinforcement learning, embodied AI)

Co-led a 3-hour tutorial at ECAI 2024 on Multi-Objective Multiagent Decision-Making with Patrick Mannion (University of Galway) and Roxana Rădulescu (Utrecht University), for faculty and students.

Teaching assistantships:
Machine Learning and Data Mining (2015);
Data Structures and Algorithms (2015);
Programming Paradigms with C++ (2014);
Operating System Administration (2013);
Functional Programming with Haskell (2013).

Selected Collaborations

- Alex London (Carnegie Mellon University): beneficent and stakeholder-aware autonomy
- Paul Robinette (UMass Lowell): trust in human-robot systems
- Melih Kandemir (University of Southern Denmark): epistemic uncertainty and continual adaptation

Research Funding and Grants

Contributor to multi-institution research proposals and white papers involving the National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), and Office of Naval Research (ONR), with emphasis on multiagent coordination, beneficent intelligence, and adaptation.

Awards and Honors

Magna cum laude, B.Eng. in Computer Science, University of Pune (2016).

Academic Service

- Co-led tutorial: Multi-Objective Multiagent Decision-Making, ECAI 2024, with Patrick Mannion and Roxana Rădulescu
- Organizer: MODeM (Multi-Objective Decision Making) workshop series at ECAI/IJCAI
- Program Committee: ECAI (2024–2025)
- Reviewer: Neural Computing and Applications; IEEE TEC; AAMAS; GECCO; ECAI; UAI; AAAI; IJCAI; ICRA

Scientific Impact

- Development of beneficent and human-centered decision-making methods for eldercare and decision support through the NSF AI-CARING Institute
- Open-source and simulation contributions in multiagent reinforcement learning, multi-objective optimization, and evolutionary methods
- Development of software testbeds for multi-arm manipulation and adaptive robotic autonomy, including environments relevant to ONR-supported research
- Creative collaborations exploring human-computer co-creation in art and music through C37 Collective