Utkarsh Aashu Mishra

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Research Statement

My research focuses on developing generative algorithms for long-horizon planning and physical reasoning. I work on compositional diffusion sampling to synthesize coherent long-horizon plans from short-horizon data. I am excited to apply my experience in multimodal learning, large-scale models, algorithm design for complex manipulation, and long-horizon visual-language-action reasoning.

Education

- **Georgia Institute of Technology** — Atlanta, Georgia
  Ph.D. in Robotics (Co-advised by Prof. Yongxin Chen and Prof. Danfei Xu); GPA: 4.0/4.0 — *(Exp.) May 2027*
  - **Minor Studies**: Mathematics (6643 Numerical Linear Algebra, 6262 Statistical Estimation)
  - **Selected Coursework**: 6601 AI, 7643 Deep Learning, 6476 Computer Vision, 6515 Grad Algo, 6553 Optimal Control
- **Indian Institute of Technology Roorkee** — Roorkee, India
  *Bachelor of Technology in Mechanical Engineering **(Degree)**; GPA: 9.11/10.0* — *May. 2021*

Selected Publications

- **Mishra, U.A.**, He, D, Chen, Y and Xu, D (2025). Compositional Diffusion with Guided search for Long-Horizon Planning. **https://umishra.me/CDGS** *(in submission)*
- **Mishra, U.A.**[*], Jung, W[*], Arachchige, N.R., Chen, Y[†], Xu, D[†] and Kousik, S[†] (2025). Joint Model-based Model-free Diffusion for Planning with Constraints. **CoRL 2025** **openreview.net/forum?id=E9t1ekt6W9**
- **Mishra, U.A.**, Chen, Y and Xu, D (2023). Generative Factor Chaining: Coordinated Manipulation with Diffusion-based Factor Graph. **CoRL 2024** **https://generative-fc.github.io/**
- **Mishra, U.A.**, Xue, S, Chen, Y and Xu, D (2023). Generative skill chaining: Long-horizon skill planning with diffusion models. **CoRL 2023** **https://generative-skill-chaining.github.io/**
- **Mishra, U.A.** and Chen, Y (2023). ReorientDiff: Diffusion Model based Reorientation for Object Manipulation. **ICRA 2024** **http://arxiv.org/abs/2303.12700**

Talks

- **Generative Factor Chaining (Spotlight Oral):** Workshop—Back to the Future: Robot Learning Going Probabilistic, ICRA 2024, Yokohama, Japan
- **Generative Skill Chaining (Spotlight Oral):** Workshop on Learning Effective Abstractions for Planning (LEAP), CoRL 2023, Atlanta, USA

Honors and Awards

- **Best Paper Award** at Back to the Future: Robot Learning Going Probabilistic, ICRA 2024, Japan
- **Best Final Year Thesis Award** (top 1% among B. Tech. students), IIT Roorkee, 2021

Internships

- **Large Behavior Models Team, Robotics, Toyota Research Institute** — Los Altos, California
  ROBO/ML Research Intern — *May 2024 - Aug 2024*
  - **Effective representations for generalizable manipulation**: Using scene and object-centric feature extractors to build effective and smooth manifolds for diffusion policy learning.
- **Sony R&D US Labs** — San Jose, California
  AI/ML Research Intern at Core AI Research (CAIR) lab — *May 2023 - Aug 2023*
  - **Physically Plausible Motion Generation**: Using a combination of imitation learning and diffusion models for realistic motion generation and imitation.

Skills

- **Programming Languages**: Python, C++, JavaScript, HTML, CSS, MySQL, Java, R, MATLAB
- **Technical Skills (ML)**: PyTorch, multi-node multi-GPU training, AWS
- **Technical Skills (Robotics)**: ROS, Isaac Gym, Drake, MuJoCo, PyBullet
- **Communications**: Video production using Adobe Premiere and AfterEffect.

Service

- Workshop Organizing: **Learning Effective Abstractions for Planning (LEAP)**, CoRL 2025, South Korea
- Philanthropic: Co-President Internal Affairs of **Asha for Education (Atlanta Chapter)**. Led fundraising efforts within the Georgia Tech community to support the education of underprivileged children in India.
- Peer Reviewing: **CoRL**, **RSS**, **ICRA**, **IROS**, **ICML**, **ICLR**, **NeurIPS**, **IEEE/ASME Transactions on Mechatronics** (IF: 5.867), **ASME Journal of Mechanism and Robotics** (IF: 2.085)