GAUTAM SALHOTRA

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🎓 Full CV 📅 Updated October 2023

PhD candidate with interest in optimization & learning for robot manipulation tasks

SKILLS

Interests:	Inductive Biases in Learning, Optimization, Robotic Manipulation, Control Theory
Robots:	Robot arms (URs, Panda, etc.), soft robots (pneumatic)
Programming:	Python, C++, Julia, bash, ROS, git, PyTorch, Tensorflow, MATLAB, LaTeX

EDUCATION

Graduate Student, PhD Computer Science (Robotics) — Ongoing
University of Southern California — **Advisor:** Gaurav Sukhatme

MS, Computer Science (Robotics and Perception) — '18
Georgia Institute of Technology — *GPA: 4/4*

MS, Mechanical Engineering — '12
The University of Texas at Austin — *GPA: 4/4*

BTech + MTech (Dual Degree), Mechanical Engineering — '10
Indian Institute of Technology Bombay — *GPA: 8.59/10*

EXPERIENCE

PhD resident, Intrinsic (Alphabet) — Bay Area CA, Ongoing
- Robot learning for dexterous manipulation tasks. — **Host:** Stefan Schaal

Applied Scientist Intern, Amazon Robotics — MA, Summer '22
- Developed manipulation policies for delicate items, as part of the AR Sparrow project.

Robotics Research Intern, Bosch Research — Bay Area CA, Summer '19
- Reinforcement Learning for peg insertion tasks (environments, learning and classical control methods).
- Developed ROS package to deploy a learned algorithm, tested on robot hardware.

Senior Software Controls Engineer, Symbotic — MA, '16 - '18
- Implement object manipulation algorithms to pick & place cases in automated storage and retrieval systems.
- Work on low-level controllers for actuator performance and stall detection.

Robotics & Technical Writing, MathWorks — MA, '12 - '15
- Implemented locomotion control strategies as part of the MathWorks ETRobocon team (2013, 2014).
- Implemented occupancy grid mapping prototype for robotics toolbox.
- Technical writing: Wrote user examples for features in Simulink software.

LIST OF PUBLICATIONS

See 🎓Google Scholar for more information. * means equal contribution.

Conferences And Journals

[1] **Gautam Salhotra***, I-Chun Arthur Liu*, and Gaurav S. Sukhatme. Learning Robot Manipulation from Cross-Morphology Demonstration. In *Conference on Robot Learning (CoRL)*, 2023.

[2] Christopher E. Denniston, **Gautam Salhotra**, Akseli Kangaslahti, David A Caron, and Gaurav S. Sukhatme. Learned Parameter Selection for Robotic Information Gathering. *International conference on Intelligent Robots and Systems (IROS)*, 2023.

[3] Open X-Embodiment Collaboration, Abhishek Padalkar, Acorn Pooley, et al. Open X-Embodiment: Robotic learning datasets and RT-X models. https://arxiv.org/abs/2310.08864, 2023.

[4] **Gautam Salhotra***, I-Chun Arthur Liu*, Marcus Dominguez-Kuhne, and Gaurav S. Sukhatme. Learning Deformable Object Manipulation from Expert Demonstrations. *IEEE Robotics and Automation Letters (RA-L) and IROS*, 2022.

[5] **Gautam Salhotra**, Shashank Hegde, Sumeet Batra, Peter Englert, and Gaurav S. Sukhatme. Guided learning of robust hurdling policies with curricular trajectory optimization. In *Southern California Robotics Symposium*, 2022.

[6] **Gautam Salhotra***, Christopher E. Denniston*, David A. Caron, and Gaurav S. Sukhatme. Adaptive Sampling using POMDPs with Domain-Specific Considerations. In *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2385–2391, 2021.

[7] Sung-Kyun Kim*, Amanda Bouman*, **Gautam Salhotra**, et al. PLGRIM: Hierarchical value learning for large-scale exploration in unknown environments. In *Proceedings of the International Conference on Automated Planning and Scheduling*, volume 31, pages 652–662, 2021.

[8] Ali Agha, Kyohei Otsu, Benjamin Morrell, et al. NeBula: Quest for Robotic Autonomy in Challenging Environments; TEAM CoSTAR at the DARPA Subterranean Challenge. *Journal of Field Robotics*, abs/2103.11470, 2021, 2103.11470.

[9] Jun Yamada, Youngwoon Lee, **Gautam Salhotra**, et al. Motion Planner Augmented Reinforcement Learning for Robot Manipulation in Obstructed Environments. In *Conference on Robot Learning (CoRL)*, Nov 2020.

[10] Charles Kim, Alexandria Guo, **Gautam Salhotra**, Sara Sprinkhuizen, Keerthi Shetty, and David Sun Kong. Sonifying Data from the Human Microbiota: Biota Beats. *Computer Music Journal*, 44(1):51–70, 2020.

[11] Justin Lee Clough, Patricia Chaffey, **Gautam Salhotra**, Colin G Cess, Rey Pocius, and Katie Mills. Building Early Elementary Teacher Confidence in Teaching Computer Science Through a Low-Cost, Scalable Research-Practitioner Collaboration. In *2020 ASEE Virtual Annual Conference Content Access*, 2020.

[12] **Gautam Salhotra**. Model-based controller design and simulation of a marine chiller. Master's thesis, University of Texas Austin, 2012.

[13] **Gautam Salhotra**, Vivek Bajpai, and Ramesh K Singh. Finite Element Modeling of Orthogonal Cutting of Pyrolytic Carbon. In *International Manufacturing Science and Engineering Conference*, volume 44304, pages 153–160, 2011.

[14] Vivek Bajpai, **Gautam Salhotra**, and Ramesh K Singh. Micromachining characterization of anisotropic pyrolytic carbon. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 225(9):1591–1605, 2011.

[15] **Gautam Salhotra**. Simulation of machining of pyrolytic graphite. Master's thesis, Indian Institute of Technology Bombay, 2010.

[16] Vivek Bajpai, **Gautam Salhotra**, and Ramesh K. Singh. Orthogonal Micro-grooving of Anisotropic Pyrolytic Carbon. In *International Conference on MicroManufacturing (ICOMM)*, Madison WI, 2010.

Workshops

[1] **Gautam Salhotra***, I-Chun Arthur Liu*, Marcus Dominguez-Kuhne, and Gaurav S. Sukhatme. Learning Deformable Object Manipulation from Expert Demonstrations. In *3rd Workshop on Robotic Manipulation of Deformable Objects (RoMaDO-SI)*, Kyoto, Japan, Oct 2022.

[2] **Gautam Salhotra***, I-Chun Arthur Liu*, Marcus Dominguez-Kuhne, and Gaurav S. Sukhatme. Learning Deformable Manipulation from Expert Demonstrations. In *2nd Workshop on Representing and Manipulating Deformable Objects*, Philadelphia, PA, 2022.

[3] **Gautam Salhotra**, Peter Englert, and Gaurav S. Sukhatme. Curricular policy search for quadruped jumping. In *ICRA Workshop on Recent Advances in MPC and RL for legged robots*, 2021.

[4] Venkata Pradeep Kadubandi, **Gautam Salhotra**, Gaurav S. Sukhatme, and Peter Englert. Motion Planner Guided Visuomotor Policy Learning. In *Machine Learning for Motion Planning Workshop, ICRA 2021*, 2021.

[5] Jun Yamada, **Gautam Salhotra**, Youngwoon Lee, Max Pflueger, Karl Pertsch, and Peter Englert. Motion planner augmented reinforcement learning for robot manipulation in obstructed environments. In *NeurIPS 2020 Workshop on Deep Reinforcement Learning*, Dec 2020.

[6] Jun Yamada, **Gautam Salhotra**, Youngwoon Lee, Max Pflueger, Karl Pertsch, and Peter Englert. Motion Planner Augmented Spaces for Reinforcement Learning. In *RSS 2020 Workshop on Action Representations for Learning in Continuous Control*, Jul 2020.

[7] Jun Yamada, **Gautam Salhotra**, Youngwoon Lee, Max Pflueger, Karl Pertsch, and Peter Englert. Motion Planner Augmented Reinforcement Learning for Robot Manipulation in Obstructed Environments. In *NeurIPS 2020 3rd Robot Learning Workshop*, Dec 2020.

TEACHING EXPERIENCE

Teaching Assistant, University of Southern California
- *Co-created, produced and TA'ed* a master's level course: Introduction to Robotics CS 545   Fall '19, '21
- TA for multiple other courses: Introduction to Robotics (undergraduate, CS 445), Seminar (CS 591), Data Structures (CS104)

Teaching Assistant, IIT Bombay   '09 - '10
- Manufacturing Processes II, Metrology

STUDENTS MENTORED

Angel Ivan Gonsalez Garcia   '18 - '19
- Master's student at USC CS, graduated 2019.

Venkata Pradeep Kadubandi   '19 - '20
- Master's student at USC CS, graduated 2020. After graduation: Principal ML Engineer at Cognitiv.

Karkala Shashank Hegde   '21
- Master's student in USC EE, graduated 2021. After graduation: PhD student at USC RESL.

Arthur I-Chun Liu   '21 - '23
- Master's student in USC CS, graduated 2023. After graduation: PhD student at USC RESL.

TALKS AND PRESENTATIONS

- Learning Deformable Manipulation from Expert Demonstrations
  3rd Workshop on Robotic manipulation of deformable objects (ROMADO-SI) @ IROS   Nov '22
  2nd Workshop on Representing and Manipulation Deformable Objects @ ICRA   May '22

- Invited lecture, curricular trajectory optimization, CS 545 at USC   Nov '21

- Robots: Past, Present, and Future. USC Robotics week opening talk   Apr '21

- Introduction to Task and Motion Planning, invited lecture to CS 545 at USC   Nov '19

- Introduction to Reinforcement Learning, Bosch Research LLC   Jun '19

- Simulation and Control of a Marine Chiller, Electric Ship Research and Development Consortium Workshop, Austin TX   Jun '12

- Micromachining Characterization of Pyrolytic Graphite, thesis at IIT Bombay   Jun '10

- Regenerative Braking Strategies, IIT Bombay, India   Apr '08

- Nitrous Boost in cars, IIT Bombay technical presentation   Jan '06

SERVICE

Professional Service

- Reviewed papers for ISER (2020, 2023), ICRA (2021, 2023), Autonomous Robots (2022), IEEE RAL (2022, 2023) and workshops.

- ICRA 2021 chair for session on "Field Robotics: Control"   May '21
- Reviewed grant proposals for the US Department of Energy, office of SBIR/STTR   '21 - '22
- Panelist on advising first year CS PhD students on internships   Nov '19
- Panelist on advising undergraduate REU students on graduate student life   Jul '21, Jun '22

University Service

- Mentor at USC Viterbi Graduate Mentorship Programming   Spring '22
- Volunteer, USC VAST K-12 outreach, to teach robotics & programming   '18-'20
- Volunteer, USC Robotics Open House (outreach to school children)   Apr '19, Apr'21
- Volunteer, Girls Empowerment Day USC: Encouraging high school girls to pursue robotics   Dec '19
- Editor, Politics, Nazar student magazine, University of Texas   '11 - '12
- Head, IIT Bombay Chapter of PiTech, Pan IIT Technical Magazine   '09 - '10
- Institute Student Mentor for Freshmen   '09 - '10
- Student Journalist, InsIghT student newspaper, IIT Bombay   '06 - '10
- Chief Editor, Mechanical Engineering Department Magazine, MEME   '09 - '10
- Head, Mech. Engg. Dept. Academic Mentorship Programme   '09 - '10
- Cultural Activities Councillor   '07 - '08
- Founder and Chief Editor, Hostel 3 magazine - 3BUNE   '07 - '09
- Debating Activities Secretary, Hostel 3, IIT Bombay   '06 - '07

Volunteering

- USC RESL lab volunteer: student host for speakers, lab coordinators, Slack admin, etc.   '18 - Present
- Volunteer at StreetBio, a community bio-lab in Cambridge MA   Feb '17 - Apr '19
- Community Farming Volunteer, Stearns Farm, Framingham MA   May '15
- Cleanup of Lake Cochituate and nearby trails, Natick MA   Jun '13, Jun '14

AWARDS AND HONORS

- Amazon Research Award. Proposal "Watch, Practice, Learn, Do: Unsupervised Learning of Robust and Composable Robot Motion Skills by Fusing Expert Demonstrations with Robot Experience"   '18
- DAAD WISE Scholarship 2008, by German Academic Exchange Service, for internships in Germany   '08
- Indian Institute of Technology Joint Entrance Exam (JEE): 858th out of 400,000 students nationwide   '05
- Certificate of Excellence in Mathematics in Grade XII, State Govt. of Maharashtra, India   '04
- State of Maharashtra High School Scholarship (HSS), 29th in state   '99

EXTRACURRICULAR ACTIVITIES

- Adventure sports (climbing, kayaking, etc.), photography, environmental conservation, parliamentary debate.
- Member, Biota Beats project at the intersection of arts & life sciences (see [10])   '17 - '20
- Winner, UTexas Graduate Student Photography Showcase   Apr '12
- Institute Cultural Colour, IIT Bombay   '08 - '09
  Given to 6 in 6000 students, for excellence in cultural activities that year
- Hostel/Dorm Awards for Organizational & Cultural activities, IIT Bombay   '06 - '07