ARTHUR ALLSHIRE

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EXPERIENCE

NVIDIA May 2021-December 2022, May 2023-
Deep Learning Intern with Gavriel State, Dr. Ankur Handa *Toronto, Canada & Zürich, Switzerland*

- (Summer 2023) Working on applying very large-scale RL to locomotion problems (robotic parkour) in collaboration with ETH Zürich Robotic Systems Lab.
- (Winter-Summer 2022) DeXtreme research project, showing how we can achieve near human-level dexterity on anthropomorphic hands. Lead efforts on scaling vision and reinforcement learning data generation & training. The resulting tools are soon being released as part of Nvidia's Omniverse and Isaac Gym platforms.
- (Summer-Autumn 2021) Worked on Isaac Gym new environment development, and lead refactor effort. Ran experiments and drafted paper. Resulted in successful NeurIPS 2021 benchmarks & datasets workshop, RSS 2021 worshop, and codebase used widely across the community (hundreds of stars on GitHub and $\sim$ 150 academic citations).
- Worked on and advised other projects, including DexPBT showing how scaling up can lead to unprecedented dexterity with hand+arm systems in simulation, and an upcoming work on scaling Reinforcement Learning and transferring sim2real using visual pre-training.
- Since September 2022 on contract part-time as I complete my studies.

University of Toronto, Vector Institute Jul 2020-Present
Undergraduate Researcher with Prof. Animesh Garg *Toronto, Canada*

- (Winter 2021 / Spring 2021) Lead Trifinger Real Robot Challenge submission in the PAIR lab (S2R2). Only group to be able to solve the competition via reinforcement learning, a generalisable and scalable approach to the problem. Resulted in successful IROS conference and NeurIPS workshop submissions, talk with thousands of views on YouTube. Policy resulting being used in subsequent real robot challenge by organisers and other teams.
- (Fall 2020 / Winter 2021) Lead LASER work, showing how we can improve sample efficiency in RL via learning in latent spaces.

Flatten.ca Mar 2020 - Sep 2020
Founding Engineer *Toronto, Canada*

- Lead backend, cloud and data pipelines with three other software engineers to build robust symptomatic surveillance tools for the COVID-19 pandemic in Canada and Mogadishu, Somalia.
- Funded by European Union and United Nations and > 500K users and open-sourced the project and is still being used for rapid response efforts.

FRC Team #4774, The Drop Bears Oct 2014 - Nov 2018
Member, Software Lead, and Vice Captain *University of Sydney, Sydney, Australia*

- Management of team activities. Co-ordinated development of software, overall software architecture, testing. Implementation of new approaches for novel control & localization solutions. Under my leadership in software & control systems, the team won awards from the control system every year from 2016-18.

EDUCATION

University of Toronto *September 2019 - Present*
Pursuing B.ASc. in Engineering Science.
Higher School Certificate, Redlands, Sydney, NSW, Australia *December 2018*
ATAR: 99.25[1] Valedictorian; top student in school Mathematics, Physics, and Chemistry.

[1] The Australian grading scale corresponds to a percentile within the state cohort.

TECHNICAL KNOWLEDGE

Computer Languages	Python, C++, C, Javascript
Control Systems	PID, Kalman filters, State Machines, ROS, state-space, fuzzy controllers, controller tuning, etc.
Machine Learning	Standard frameworks / methods - PyTorch, scikit-learn, Pandas Deep Learning - CNNs, RNNs, Transformers, Reinforcement Learning
Other Tools & Frameworks	ROS, git, vim, Google Cloud Platform, D3JS, React

PUBLICATIONS

DeXtreme: Transfer of Agile In-Hand Manipulation from Simulation to Reality - A. Handa, **A. Allshire**, V. Makoviychuk *et al. ICRA 2023* Website—Paper—Video

DexPBT: Scaling up Dexterous Manipulation for Hand-Arm Systems with Population Based Training - A. Petrenko, **A. Allshire**, G. State, A. Handa, V. Makoviychuk *RSS 2023* Website—Paper

Real Robot Challenge III - Learning Dexterous Manipulation from Offline Data in the Real World - G. Martius, N. Gürtler, C Sancaktar, S. Blaes, P. Kolev, S. Bauer, M. Wuethrich, M. Wulfmeier, M. Riedmiller, **A. Allshire**, A. Buchholz, B. Schölkopf. *NeurIPS 2022 Competition* Website—NeurIPS

Transferring Dexterous Manipulation from GPU Simulation to a Remote Real-World TriFinger - **A. Allshire**, M. Mittal, V. Lodaya, V. Makoviychuk, D. Makoviichuk, F. Widmaier, M. Wuthrich, S. Bauer, A. Handa, A. Garg. *IROS 2022* Website—Paper—Video

Isaac Gym: High Performance GPU-Based Physics Simulation For Robot Learning - V. Makoviychuk, L. Wawrzyniak, Y. Guo, M. Lu, K. Storey, M. Macklin, D. Hoeller, N. Rudin, **A. Allshire**, A. Handa, G. State. *NeurIPS 2021, Datasets and Benchmarks Track* Website—Paper

LASER: Learning a Latent Action Space for Efficient Reinforcement Learning - **A. Allshire**, R. Martín-Martín, C. Lin, S. Manuel, S. Savarese, A. Garg. *ICRA 2021* Website—Paper—Video