Colin Summers

Education

2018 – Present **M.S. Computer Science**
Paul G. Allen School, University of Washington, Seattle, Washington, USA
Advisor: Siddhartha Srinivasa
- In collaboration with Prof. Emo Todorov and his students, created Lyceum, a software framework for robotics, control, and reinforcement learning that is 5-35x faster than comparable tools and allows for real-time, model-predictive control [1]
- With students from the Personal Robotics Laboratory, designed and built the "Multi-agent System for non-Holonomic Racing" (MuSHR), a low-cost, open-source robotic racecar platform for education and research [2]

2018 **B.S. Computer Science, Lavin Entrepreneurship Program**
Paul G. Allen School, University of Washington, Seattle, Washington, USA
Grade: 3.85 / 4.0 *with Departmental Honors, Cum Laude*
Advisor: Dieter Fox

Experience

Professional

09/2017 – 12/2017 **Intern**, *Blue Origin*
Kent, WA, USA.
Supervisor: Brandon Haber
- Developed engine and vehicle operator training tool utilizing hardware-in-the-loop simulation capabilities and incorporated tool into standard training procedures

06/2017 – 08/2017 **Intern**, *NASA Jet Propulsion Laboratory*
Pasadena, CA, USA.
Supervisor: Brandon Rothrock, PhD
- Developed a comprehensive, physics-based simulation environment for comparing reinforcement learning algorithms against 240 human subjects on complex tasks and published research findings in the Cognitive Science 2018 Conference [3]

03/2017 – 06/2017 **Teaching Assistant**, *Paul G. Allen School, University of Washington*
Seattle, WA, USA.
Supervisor: Hal Perkins
- Designed and led a weekly review section, hosted office hours, and provided support for 120 students for CSE 333, Systems Programming

06/2016 – 08/2016 **Intern**, *NASA Glenn Research Center*
Cleveland, OH, USA.
Supervisor: Jeffrey Chin
- Developed an open-source, analytical, system-level model of the aerodynamic, electrical, and structural components in the Hyperloop system
- Identified, further assessed, and demonstrated the feasibility of various designs necessary for the viability of the Hyperloop vehicle concept and presented findings to AIAA SciTech conference and journal [4]

06/2014 – 01/2016 **Research Associate**, *Department of Chemistry, University of Washington*
Seattle, WA, USA.
Supervisor: David Ginger, PhD
- Synthesized organic polymer photovoltaic devices and tested device performance using JV, External Quantum Efficiency, and Fourier Transform Infrared Spectroscopy measurements
- Developed data analysis and processing tools for the lab

– Seattle, Washington – USA
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05/2013 – 09/2013 **Ski Patroller**, *Ski Portillo*
Los Andes, Chile.
Supervisor: Frank Coffey
- Performed avalanche control, emergency medical services, and ski area management

Projects

01/2017 – 03/2018 **Autonomous Racecar**, *Independent*
Seattle, WA, USA.
- Designed and built an autonomous 1/10th scale racecar from commercial off the shelf parts as part of an honors research project

08/2015 – 01/2017 **Power Distribution & Thermal Management Lead**, *UWashington Hyperloop*
Seattle, WA, USA.
- Designed, built, and raced a scale version of the Hyperloop transportation concept in a SpaceX hosted engineering competition, placing 6th out of over 1200 international teams

Miscellaneous

07/2018 **Summer School on Cognitive Robotics**, *Massachusetts Institute of Technology*
Boston, MA, USA.
- Attended a week long workshop on robust execution under uncertainty and risk, motion and activity planning, perception, and manipulation

01/2017 – 04/2018 **Volunteer Ski Instructor**, *Husky Winter Sports*
Snoqualmie Pass, WA, USA.
- Provide personalized ski lessons at the beginner, intermediate, and advanced levels to children and adults alike

Featured Coursework

Robotics	Machine Learning, Artificial Intelligence, Robotics, Deep Reinforcement Learning
Computer Science	HW/SW Interface, Operating Systems, Data Abstractions, Logic, Systems Programming, Embedded Systems, Scientific Computing, Signal Conditioning, Computational Methods for Data Analysis
Mathematics	Calculus, Probability Theory, Linear Algebra, Linear Analysis, Differential Equations
Physical Sciences	Honors Chemistry, Honors Organic Chemistry, Honors Physics, Chemical Transport, Computer Aided 3D Design

Skills

Advanced	C/C++, Python, Julia, Linux, ROS, Spanish
Proficient	SolidWorks, Distributed Computing

Honors & Awards

2018	Outstanding Senior Award, Paul G. Allen School
2018	NSF REU Grant Recipient
2018-Present	Phi Beta Kappa
2017-Present	Tau Beta Pi
2016-Present	NASA Academy Alumni Association
2016, 2017	Burkhardt Family Endowed Scholarship
2015, 2016	Hal C. Rathvon Memorial Scholarship
2015	James A. Hewitt, Jr. Endowed Scholarship

Publications

[1] C. Summers, K. Lowrey, A. Rajeswaran, S. Srinivasa, and E. Todorov, "Lyceum: An efficient and scalable ecosystem for robot learning," 2020, 2001.07343.

[2] S. S. Srinivasa, P. Lancaster, J. Michalove, M. Schmittle, C. Summers, M. Rockett, J. R.

Smith, S. Choudhury, C. Mavrogiannis, and F. Sadeghi, "MuSHR: A low-cost, open-source robotic racecar for education and research," 2019, 1908.08031.

[3] M. Edmonds, F. Kubricht, James, C. Summers, Y. Zhu, B. Rothrock, S.-C. Zhu, and H. Lu, "Human causal transfer: Challenges for deep reinforcement learning," in *40th Annual Meeting of the Cognitive Science Society*, 2018.

[4] K. Decker, J. Chin, A. Peng, C. Summers, G. Nguyen, A. Oberlander, G. Sakib, N. Sharifrazi, C. Heath, J. S. Gray, *et al.*, "Conceptual sizing and feasibility study for a magnetic plane concept," in *55th AIAA Aerospace Sciences Meeting*, p. 0221, 2017.