Glen Berseth

Curriculum Vitae

✉ gberseth@eecs.berkeley.edu

Education and Professional Experience

2019 - present · **University of California Berkeley**, Berkeley ,CA
Post Doctorial Researcher with Sergey Levine
- Research Interests: reinforcement learning, machine learning, life-long learning, physics-based character animation and robotics

2018 - 2019 · **ElementAI**, Montreal, QB
Research Intern with Christopher Pal
- Research Project: Visual imitation learning using reinforcement learning

2014 - 2019 · **University of British Columbia**, Vancouver, BC
PhD with Michiel van de Panne
Department of Computer Science
- **Thesis:** Scalable Deep Reinforcement Learning for Physics-Based Motion Control

2012 - 2014 · **York University**, Toronto, ON
MSc in Computer Science with Petros Faloutsos and Yves Lesperance
Department of Computer Science and Engineering
- **Thesis:** Optimizing Simulated Crowd Behaviour

2010 - 2011 · **IBM**, Markham, ON
Software Developer
- Research Project: Visual imitation learning using reinforcement learning

2008 - 2012 · **York University**, Toronto, ON
BSc with Honours in Computer Science
Department of Computer Science and Engineering
- **Honours Thesis:** Implementing Real Time Stradegy Game Agents in Indigolog

---
Selected Honours and Awards

2019 · **IVADO Postdoctoral Scholarships Program, $70,000 over 2 years (declined)**
Imitation from Video

2016 · **NSERC Postgraduate Scholarships-Doctoral, $42,000 over 2 years**
Progressive Learning of Dynamics Navigtion Skills

2016 · **Best Poster Award Graphics Interfaces 2016**
Modeling Dynamic Brachiation

2015 · **Best Short Paper Award Computer Animation and Social Agents 2015**
Robust Space-time Footsteps for Agent-based Steering

2014 · **University of British Columbia Entrance Scholarship**
Awarded for academic excellence

2013 · **Two time winner of programming competitions in machine learning**
For most accurate regression models

2012	**Mars Society's University Rover Challenge**
	1st place, for prototype Mars rover design and execution
2012	**CSII Innovation Nation Robotics Competition**
	1st place, university division
2010	**Mars Society's University Rover Challenge**
	2nd place, for prototype Mars rover design and execution

Publications

Refereed Journals

○ **Glen Berseth**, M. Brandon Haworth, Muhammad Usman, Davide Schaumann, Mahyar Khayatkhoei, Mubbasir Kapadia, and Petros Faloutsos. Interactive architectural design with diverse solution exploration. *TVCG*, 10.1109/TVCG.2019.2938961, 2019

○ V. J. Cassol, E. Smania Testa, C. Rosito Jung, M. Usman, P. Faloutsos, **G. Berseth**, M. Kapadia, N. I. Badler, and S. Raupp Musse. Evaluating and optimizing evacuation plans for crowd egress. *IEEE Computer Graphics and Applications*, 37(4):60–71, 2017. ISSN 0272-1716. doi: 10.1109/MCG.2017.3271454

○ Xue Bin Peng, **Berseth, Glen**, KangKang Yin, and Michiel van de Panne. Deeploco: Dynamic locomotion skills using hierarchical deep reinforcement learning. *SIGGRAPH 2017*, 2017

○ Brandon Haworth, Muhammad Usman, **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. On density flow relationships during crowd evacuation. *Computer Animation and Virtual Worlds 28 (3-4)*, 2017b

○ Brandon Haworth, Muhammad Usman, **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Code: Crowd optimized design of environments. *Computer Animation and Virtual Worlds*, 2017a

○ Xue Bin Peng, **Berseth, Glen**, and Michiel van de Panne. Terrain-adaptive locomotion skills using deep reinforcement learning. *ACM Transactions on Graphics (TOG)*, 35(4): 81, 2016

○ **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Acclmesh: curvature-based navigation mesh generation. *Computer Animation and Virtual Worlds*, 27(3-4):195–204, 2016

○ Xue Bin Peng, **Berseth, Glen**, and Michiel van de Panne. Dynamic terrain traversal skills using reinforcement learning. *ACM Trans. Graph.*, 34(4):80:1–80:11, July 2015

○ **Berseth, Glen**, Muhammad Usman, Brandon Haworth, Mubbasir Kapadia, and Petros Faloutsos. Environment optimization for crowd evacuation. *Computer Animation and Virtual Worlds*, 26(3-4):377–386, 2015b

○ **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Robust space-time footsteps for agent-based steering. *Computer Animation and Virtual Worlds*, 2015a

Refereed Conference Proceedings

○ **Glen Berseth** and Christopher Pal. Visual imitation learning with recurrent siamese networks. *(accepted to Deep Reinforcement Learning Symposium, NIPS 2018)*, 2018

○ **Glen Berseth**, Alex Kyriazis, Ivan Zinin, William Choi, and Michiel van de Panne. Model-based action exploration for learning dynamic motion skills. In *Proc. IEEE/RSJ Intl Conf on Intelligent Robots and Systems (IROS 2018)*, 2018a

○ Zhaoming Xie, **Glen Berseth**, Patrick Clary, Jonathan W. Hurst, and Michiel van de Panne. Feedback control for cassie with deep reinforcement learning. In *Proc. IEEE/RSJ Intl Conf on Intelligent Robots and Systems (IROS 2018)*, 2018

○ **Glen Berseth**, Cheng Xie, Paul Cernek, and Michiel Van de Panne. Progressive reinforcement learning with distillation for multi-skilled motion control. *(Presented as poster to*

ICRL 2018, Presented at Deep Reinforcement Learning Symposium, NIPS 2017), 2018c

○ Muhammad Usman, Brandon Haworth, **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Perceptual evaluation of space in virtual environments. In *Proceedings of the Tenth International Conference on Motion in Games*, MIG '17, pages 16:1–16:10, New York, NY, USA, 2017a. ACM. ISBN 978-1-4503-5541-4

○ Nilay Chakraborty, Brandon Haworth, Muhammad Usman, **Berseth, Glen**, Petros Faloutsos, and Mubbasir Kapadia. Crowd sourced co-design of floor plans using simulation guided games. In *Proceedings of the Tenth International Conference on Motion in Games*, MIG '17, pages 1:1–1:5, New York, NY, USA, 2017. ACM. ISBN 978-1-4503-5541-4

○ Muhammad Usman, Brandon Haworth, **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Understanding spatial perception and visual modes in the review of architectural designs. In *Proceedings of the ACM SIGGRAPH/Eurographics Symposium on Computer Animation, 31*, 2017b

○ Brandon Haworth, Muhammad Usman, **Berseth, Glen**, Mahyar Khayatkhoei, Mubbasir Kapadia, and Petros Faloutsos. Using synthetic crowds to inform building pillar placements. In *Virtual Humans and Crowds for Immersive Environments (VHCIE), IEEE*, pages 7–11. IEEE, 2016b

○ Brandon Haworth, Muhammad Usman, **Berseth, Glen**, Mahyar Khayatkhoei, Mubbasir Kapadia, and Petros Faloutsos. Towards computer assisted crowd aware architectural design. In *CHI '16 Extended Abstracts*, CHI EA '16, New York, NY, USA, 2016a. ACM

○ Brandon Haworth, Muhammad Usman, **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Evaluating and optimizing level of service for crowd evacuations. In *Proceedings of the 8th ACM SIGGRAPH Conference on Motion in Games*, MIG '15, pages 91–96, New York, NY, USA, 2015. ACM

○ **Glen Berseth**, Mubbasir Kapadia, Brandon Haworth, and Petros Faloutsos. Steerfit: Automated parameter fitting for steering algorithms. In *Eurographics/ ACM SIGGRAPH Symposium on Computer Animation*, pages 113–122. Eurographics Association, 2014

○ **Berseth, Glen**, M. Brandon Haworth, Mubbasir Kapadia, and Petros Faloutsos. Characterizing and optimizing game level difficulty. In *Proceedings of the Seventh International Conference on Motion in Games*, MIG '14, pages 153–160, New York, NY, USA, 2014. ACM

○ **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Steerplex: Estimating scenario complexity for simulated crowds. In *Proceedings of Motion on Games*, MIG '13, pages 45:67–45:76, New York, NY, USA, 2013. ACM

Posters and Abstracts
○ Xue Bin Peng, **Glen Berseth**, Michiel van de Panne. Learning Locomotion Skills Using DeepRL: Does the Choice of Action Space Matter?. NIPS2016 DeepRL Workshop.

○ **Glen Berseth**, Michiel van de Panne. Modeling Dynamics Brachiation. Graphics Interfaces 2016.

○ X. B. Peng, **G. Berseth**, M. van de Panne. Dynamic Locomotion Skills for Obstacle Sequences Using Reinforcement Learning. Dynamic Walking 2015

○ Xue Bin Peng, **Glen Berseth**, Michiel van de Panne. Learning Dynamic Locomotion Skills for Terrains with Obstacles. Reinforcement Learning and Decision Making 2015

○ **Glen Berseth**; Mubbasir Kapadia; Petros Faloutsos. Automated Parameter tuning for Steering Algorithms. In Proceedings of the 12th ACM SIGGRAPH/Eurographics Symposium on Computer Animation, SCA '13.

Technical Reports
○ **Glen Berseth**, Xue Bin Peng, and Michiel van de Panne. Terrain RL simulator. *CoRR*, abs/1804.06424, 2018b. URL `http://arxiv.org/abs/1804.06424`

- **Glen Berseth**; Mubbasir Kapadia; Petros Faloutsos. SteerFit: Automated Parameter Fitting for Steering Algorithms. Technical Report EECS-2014-02, York University, March 1, 2014

Invited Talks and Presentations
- **Glen Berseth**. Scalable Deep Reinforcement Learning. ElementAI 2018. Montreal Canada.
- **Glen Berseth**. Scalable Deep Reinforcement Learning. Montreal Institute for Learning Algorithms 2018. Montreal Canada.
- **Glen Berseth**. Collecting and Analyzing Twitter Data. Springboards Workshops 2016. University of British Columbia
- Isaac Desouza; **Glen Berseth**. 2012 York University Rover Team. 2012 Mars Society Convention
- Isaac Desouza; **Glen Berseth**; Shailja Sahani. (2012) York University Rover Team. Innovation Nation Robotics Competition
- Isaac Desouza; **Glen Berseth**; Shailja Sahani; Jesse Tebbs; Pablo Saldarriaga. (2012) York University Rover Team. NASA's Third Annual Robotic Mining Competition

Positions Held

2018-present   **ElementAI**, *(link)*
Research Intern
- Main research on project to allow agents to learn imitation behaviours from visual observations
- Created Recurrent memory-based deep learning model to learn semantic difference between motion videos
- Developed high performance headless rendering pipeline for generating video data from mocap
- Trained robotic agents to walk from scratch in simulation
- Submitted work to ICLR 2018 and accepted to NIPS 2018 workshop on DeepRL

2009-2013   **York University Rover Team**, *(link)*
Developement Team
Software Development Team Leader
- Lead member of team that designs, builds and competes with a Mars rover prototype
- Lead the design of third generation control system to greatly improve on the accuracy and reliability of the previous years' system
- Selected to represent the team and operate the rover in the University Rover Challenge, NASA's Lunabotics Competition and CSII's Innovation Nation Robotics Competition
- University Rover Challenge champion and first prise in CSII's Innovation Nation Robotics Competition (university division)
- Presented design and accepted award at the 2012 Mars Society Convention

2010-2011   **IBM Canada, Master Data Management (MDM) Server**
Advanced Technology Team
Software Developer
- Designed and implemented client systems to take advantage of the high availability of MDM Server
- Evaluated and improved the Cognos Reports framework created for the MDM server system
- Integral part of the research, documentation and development for many projects designed to investigate the inclusion of new features and related technology

- Trained newly-hired developers on details of product

Research Projects

2014 - Present — **Character Animation**
- Researching Deep Reinforcement Learning methods in continuous state and action spaces
- Using Deep Reinforcement Learning methods to create a physics-based controller to navigate dynamically generated terrain
- Constructed hierarchical physics-based biped walking controller using hierarchical deep reinforcement learning
- Lead Software Architect of terrainRLSim, realtime robot simulation framework (https://github.com/UBCMOCCA/TerrainRLSim)
- Exploring model-based methods for more sample efficient action exploration (MBAE)
- Knowledgeable in motion capture, from recording to rigging/skinning to simulation

2014 - 2017 — **Computational Geometry**
- Crafting navigation mesh construction method based on discrete surface curvature
- Implemented mesh subdivision using the Loop algorithm
- Developed example mesh simplification based on vertex removal
- Programed mesh deformation tool based on As-Rigid-As-Possible technique

2012 - Present — **Crowd Simulation**
- Lead Software Architect of SteerSuite, realtime crowd simulation framework (https://github.com/SteerSuite/Release)
- Linking SteerSuite library to AutoDesk Revit for optimization assisted architectural design
- Worked independently and as part of a team researching dynamic navigation (steering) behaviours for crowd simulations
- Designed and implemented a database backend to log and analyze geometric data stored from 10s of millions of experiments
- Statistically analyzed and optimized parameter settings for a collection of steering algorithms based on metrics for performance, quality and simulation solvability
- Researched Mixed-Integer Nonlinear Optimization algorithms for automatic steering algorithm parameter tuning
- Implemented UI system to allow user control of animation blending from optimized dynamic navigation algorithm parameters

2011 - 2014 — **Multi-Agent Systems**
- Designed a Multi-Agent framework to produce a competitive team of Unreal Tournament agents that work together in a game of capture the flag
- Wrote backend interface based on network connections (TCP/UDP) that supplied abstract communication between the game engine (UnrealScript/C++) and the multi-agent framework (IndiGolog)
- Multi-Agent team members were organized into roles with different subgoals, all working together to achieve a common goal

2011 — **Satisfiability**
- Researched and designed a system to investigate Uniquely Satisfiable Formulae
- Prepared a professional presentation report, with reader-friendly design documenting all project aspects as well as possible future research

Teaching Experience

2014 - 2018 **University of British Columbia**

Teaching Assistant

- Guest lectures to more than 100 students in each: Computer Graphics, Animation and graduate course on Computer Animation
- Received 4.8 out of 5 on course evaluations
- Led lab sessions on theory and applications of computer graphics
- Regular office hours on Intro to AI

2012 - 2014 **York University**

Teaching Assistant

- Lab Instructor for Software Tools,Introduction to Computer Programming and Engineering Project Management courses in the Lassonde School of Engineering
- Educated over 300 students on the Unix operating system, C programming language, Java programming language, engineering project management and financial analysis
- Planned innovative lessons geared towards teaching students essential programming and engineering skills.
- Created and delivered presentations on Solid State Drives for DBMS, Machine Learning applications of fMRI data to recognize cognitive states and Markov Decision Processes and how they are solved with Linear Programming techniques

Academic Service

2013 -
Present **Peer Reviewer for:**

NIPS DeepRL Workshop, ICLR, iROS, ICRA, Conference on Robot Learning, Intelligent Virtual Agents, SIGGRAPH, TOG, The Visual Computer, ACM SIGGRAPH/Eurographics Symposium on Computer Animation, Computer Animation and Virtual Worlds, SIGGRAPH Asia

2015 **ACM SIGGRAPH Motion in Games Conference**

Program Committee Member

2016 - 2017 **UBC Faculty Recruting**

Committee Member

2015 - 2016 **UBC Graduate Admissions**

Committee Member

2015 **GirlSmarts4Tech**

Volunteer teaching 200 grade school girls computer programming

2014 **Tri Mentoring Program**

Mentored undergrate students on the aspects of graduate school

Selected press coverage

Two Minute Papers - Terrain Traversal with Reinforcement Learning

Learned Terrain Traversal for CGI