Glen Berseth

Curriculum Vitae

✉ *glen@fracturedplane.com*

Education

2014 - Present **University of British Columbia**, Vancouver, BC
PhD. Student
Department of Computer Science
- Specializing in Computer Animation, Machine Learning, Optimization, Artificial Intelligence, Robotics and Graphics
- Member of the Imager Lab

2012 - 2014 **York University**, Toronto, ON
MSc in Computer Science
Department of Computer Science and Engineering
- Specializing in Artificial Intelligence, Animation, Optimization and Graphics
- **Thesis:** Optimizing Simulated Crowd Behaviour
- Member of the Graphics and Media at York Lab

2008 - 2012 **York University**, Toronto, ON
BSc with Honours in Computer Science
Department of Computer Science and Engineering
- Specializing in Intelligent Systems Design
- **Honours Thesis:** Implementing RTS Game Agents in Indigolog

Positions Held

2009-2013 **York University Rover Team**, *(http://roverteam.cs.yorku.ca/)*
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
- 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
- Integral part of the research, documentation and development for many projects designed to investigate the inclusion of new features and related technology
- Designed and implemented client systems to take advantage of the high availability of MDM Server
- Demonstrated leadership and teamwork by training newly-hired developers
- Evaluated and improved the Cognos Reports framework created for the MDM server system

Selected Honours and Awards

2015 **Best short paper award**
Computer Animation and Social Agents (Conference)

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

2012 **CSII Innovation Nation Robotics Competition**
1st place, university division

2010 **Mars Society's University Rover Challenge**
2nd place, for prototype Mars rover design

Publications

Refereed Journals

- Xue Bin Peng, **Berseth, Glen**, and Michiel van de Panne. Dynamic terrain traversal skills using reinforcement learning. *ACM Trans. Graph.*, 34(4), 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), 2015
- **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Robust space-time footsteps for agent-based steering. Computer Animation and Virtual Worlds, 2015

Refereed Conference Proceedings

- 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, 2016
- **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Acclmesh: Curvature-based navigation mesh generation. In *Proceedings of the 8th ACM SIGGRAPH Conference on Motion in Games*, MIG '15, 2015
- 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, 2015
- **Glen Berseth**, Mubbasir Kapadia, Brandon Haworth, and Petros Faloutsos. Steerfit: Automated parameter fitting for steering algorithms. pages 113–122, 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, 2014
- **Berseth, Glen**, Mubbasir Kapadia, and Petros Faloutsos. Steerplex: Estimating scenario complexity for simulated crowds. In *Proceedings of Motion on Games*, MIG '13, 2013

Book Chapters

- Virtual Crowds: Steps Towards Behavioural Realism, edited by Mubbasir Kapadia, Nuria Pelechano, Jan Allbeck and Norm Badler. Contributed a chapter on Crowd Optimization Techniques, (forthcoming)

Posters and Abstracts

- **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. (Poster)
- X. B. Peng, **G. Berseth**, M. van de Panne. (2015) Dynamic Locomotion Skills for Obstacle Sequences Using Reinforcement Learning. Dynamic Walking 2015
- Xue Bin Peng, **Glen Berseth**, Michiel van de Panne. (2015) Learning Dynamic Locomotion Skills for Terrains with Obstacles. Reinforcement Learning and Decision Making 2015

Technical Reports

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

Presentations

- **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

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
- Implemented physics-based biped walking controller in Bullet physics engine
- Knowledgeable in motion capture, from recording to rigging/skinning to simulation

2014 - Present

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 (http://steersuite.eecs.yorku.ca/)
- 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**
- Worked independently researching and designing a system to investigate Uniquely Satisfiable Formulas
- Prepared a professional presentation report, with reader friendly design documenting all project aspects as well as possible future research
- Completed project ahead of time under tight deadlines and a heavy work load

Technical Skills

Programming Languages
- Thorough knowledge of C/C++, Python, Java, SWI-Prolog, Eiffel, XHTML, Bash, SQL, IndiGolog
- Good knowledge of Matlab/Octave, UnrealScript, CSS, JavaScript, C#, Ajax and GLSL
- Familiar with AWK, PHP, CLISP, Verilog, Flex, ActionScript, Boo, MIPS Assembler and JNI

Software
- Object Oriented programming, Eclipse, XML, FTP, Subversion, CVS/SVN/Git, TCP/IP, UDP, SSH, DB2, Oracle, Cognos, Cognos Reports, RSA, VMWare, MySQL, PureQuery and MDM Server PostgreSQL, Microsoft Visual Studio, gcc/g++, clang++, OpenGL, BOOST, Unity3D, SmartBody, make, cmake, Unreal Development Kit, Houdini, Blender, SWIG, Android development and valgrind

Analytical
- Statistics, Optimization (linear, non-linear and derivative free), linear algebra, multi-variate calculus, inverse kinematics, physics, computational geometry, neural networks and machine learning

Hardware
- Installation and configuration of peripherals and storage devices
- Serial communications between computers and micro-controllers
- Familiar with Linux systems programming and GPUs

Operating Systems
- Advanced knowledge of Linux/Unix, Mac, Windows and Android

Teaching Experience

2014 - Present **University of British Columbia**
Teaching Assistant
- Lectured 100 students on Computer Animation
- Created many videos using professional video editing software
- Recorded, cleaned and animated motion capture data using the Vicon system

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
- Managed an undergrad student, distributing work and mentoring while juggling multiple research projects.

Academic Service

2015 **ACM SIGGRAPH Motion in Games Conference**
Program Committee Member

2013 - Present **Peer Reviewer for:**
Intelligent Virtual Agents, SIGGRAPH Conference, The Visual Computer, ACM SIGGRAPH/Eurographics Symposium on Computer Animation, Computer Animation and Virtual Worlds, SIGGRAPH Asia Conference

2015 - Present **UBC Graduate Admissions**
Committee Member

2015 **GirlSmarts4Tech**
Volunteer teaching 200 grade school girls computer programming