Dave Pagurek van Mossel

University of Waterloo Software Engineering, class of 2019

Research

Controlling Procedural Modelling Interactively with Guiding Curves
Co-authored with Abhishek Madan, Andrew McBurney, Paul Bardea and Tammy Liu
To appear in Graphics Interface 2019

- Defined a search function which, paired with Sequential Monte Carlo sampling, lets artists search the output of a generating grammar for 3D models in real time by drawing guiding curves
- Awarded the title of top research project at the 2019 University of Waterloo Software Engineering capstone symposium

Work

Software Engineering Intern at **Figma**, San Francisco, California, Sept-Dec 2018

- Added support for stacks of fill styles as backgrounds for components and frames into the rendering system
- Implemented smart selections, enabling selections that look like lists or grids to be rearranged and reflowed

Software Engineering Intern at **Cruise**, San Francisco, California, Jan-Apr 2018

- Researched and developed a prototype library for general path planning, creating a quick initial path and using any additional computation time given to improve it
- Visualized interactive search trees generated from the path planner using WebGL, communicating with ROS for input

Software Engineering Intern at **Google**, Mountain View, California, May-Aug 2017

- Investigated ways of using machine learning to solve problems on Internet of Things devices
- Implemented Tensorflow and OpenCV computer vision models and evaluated their performance

Software Engineering Intern at **Remind**, San Francisco, California, Sept-Dec 2016

- Designed and implemented a REST API for district management, efficiently querying the graph of districts, schools, and users
- Developed features for backend Ruby and Go payments services, plus accompanying client work in React and Redux

Software Developer Intern at **Athos**, Redwood City, California, Jan-Apr 2016

- Created a C++ library for defining signal processing pipelines by parsing a JSON-based language definition into a tree of filters, allowing variable scoping and mapping over lists
- Developed infrastructure and UI features in Objective C and Swift to allow users to run through athletic training plans and receive a score calculated from garment sensor data

Software Developer Intern at **Shopify**, Ottawa, Canada, May-Aug 2015

- Introduced new language constructs in the Shopify Query Language parser allowing granular querying of data in Go and Ruby

Projects

Content-Aware Fill for Sequenced Music (CS480 project), 2019

- Explored an approach to gap filling in music scores using an LSTM network and Markov Chain Monte Carlo sampling

Contact

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Skills

- Professional experience working with **Javascript, C++14, GLSL, Ruby, Java, Go, Swift, SQL, Git,** and **Unix**
- Passion for creative approaches to visual and algorithmic design problems

Awards

- Dean's honour list, Winter 2017, Fall 2017, and Spring 2018
- First place in Waterloo EngHack, both fall and winter 2015
- University of Waterloo President's Scholarship, $2000 for a high school entrance average of over 90%, 2015
- Top 25% distinction on the Canadian Computing Competition, senior division, 2013 - 2014
- Jerry Dermer Memorial Prize in Engineering, 2014
- Ottawa-Carleton District School Board Silver Medal, given to high school averages of over 90%, 2010-2014

Leadership

- Founder and Organizer, TerribleHack I - XIII, a hackathon for programming for its own sake rather than for a practical purpose, 2015-present
- Organizer, Tech Retreat, a hackathon for high school students, 2015-16

Flute Synthesis (CS489 project), 2019

- Recorded and analyzed the sound of flute to break it down into its base components
- Constructed an expressive flute synthesizer combining additive and subtractive synthesis based on findings in the data

The Engulfed Cathedral (CS488 project), 2018

- Created a raytraced 3D renderer and a short film created with it for Waterloo's computer graphics course
- Implemented graphics techniques such as silhouette-constrained procedural generation, photon mapped lighting, ambient occlusion, volumetric materials, constructive solid geometry, and inverse kinematics
- Won the prize for top project in the class of Spring 2018

Frontier, 2016

- Rendered procedurally generated 3D landscapes as an art project
- Generated terrain using Perlin noise tesselated with Delaunay triangulation with houses and trees added using a grammar system

Open-source contributions

- Contributed bug fixes and features to rosbag.js, Radiant Player, a Facebook Messenger Mac client and CLI, Vim Auto-Pairs, and Emerald language

Creative Interests

Newgrounds Annual Tournament of Animation, 2012-2013

- Achieved second Place, 2013. Received two Daily Feature awards, a Daily Second award, a Daily Third award, a Weekly First award, a Weekly Fourth award, and a Review Crew Pick award throughout the competition.
- Achieved second place, 2012. Received four Daily Feature awards, a Daily Second award and a Weekly Fourth award throughout the competition.

Skills Canada 2D Character Animation competition, 2009-2014

- Achieved silver, provincial level; silver, regional level; 2014
- Achieved silver, national level; gold, provincial level; gold, regional level; 2013
- Achieved gold, regional level, 2012
- Achieved bronze, national level; gold, provincial level; gold, regional level; 2011

Music recordings, 2011-present

- Composed and performed music for a flute duet, 2018
- Composed and arranged synthesized music, occasionally featuring flute and melodica, 2011-present
- Recorded many shamelessly bad covers of pop music, 2014-present

Flautist, 2009-present

- University of Waterloo Concert Band Club, 2014-2015 and 2018-present
- Lisgar Collegiate Wind Ensemble, 2012-2014
- Lisgar Collegiate Senior Orchestra, 2013-2014