

# Dave Pagurek van Mossel

University of Waterloo Software Engineering, class of 2019

## Work

Software Engineering Intern at [Figma](#), San Francisco, California, Sept-Dec 2018

- Added rendering system support for stacks of fill styles as backgrounds for components
- Implemented smart selections, enabling selections that look like lists to be rearranged and have items reflow

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

[Controlling Procedural Modelling Interactively with Guiding Curves](#) (Capstone research project), 2018

- Researched and implemented cost functions to pair with Sequential Monte Carlo sampling to let artists interactively control procedural models
- Created an editor to design a procedural models grammar and search model space with real-time feedback by drawing guiding curves
- Won the Yelp Early Bird prize for Capstone projects

## 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 - XI](#), 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

### **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 inverse 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 tessellated with Delaunay triangulation with houses and trees added using a grammar system

### **Scala compiler** (CS241E project), 2015

A tool written in Scala to compile a subset of Scala into MIPS instructions

- Parsed input into an AST for the Scala grammar to compile
- Implemented closures, tail recursion, type checking, and garbage collection

### **XCalc**, 2013-2014

- Created a math parser supporting evaluation and symbolic differentiation
- Developed an interactive graphing application using the math parsing library

### **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