

Chris Foster

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Professional Experience

Chief Technology Officer

June 2019 - Present | Remote

Two Story Robot Labs Inc.

Technical leadership role as the co-owner and CTO of a boutique consulting company specializing in web application development and machine learning. My position focuses on engineering and architecture while also involving management, coaching, business development, hiring, strategic planning, and product responsibilities. I work with modern technologies including React, GraphQL, Node, Docker, AWS, MongoDB, Postgres, and Kubernetes.

Software Developer

September 2016 - June 2019 | Remote

Two Story Robot Labs Inc.

Full stack developer for multiple SaaS products, and consulting for both government and private organizations. While I primarily focused on engineering and architecture, the consulting positions often required support, research, data science, and mentoring roles. I developed with modern technologies including Javascript, Node, AWS, C++, Elasticsearch, RethinkDB, Angular, RabbitMQ, CouchDB, Docker, React, Apollo, GraphQL, and Redux.

Software Developer

September 2012 - September 2016 | Kamloops, B.C.

MemoryLeaf Media Inc.

Full stack web application developer for multiple company SaaS products, as well as external contracting work for government and private organizations. Primarily worked with Javascript. Developed with technologies such as Node, Backbone, Marionette, jQuery, Elasticsearch, MongoDB, Angular, CouchDB, RethinkDB, Docker, and React.

Freelance Web Developer

April 2011 - November 2012 | Kamloops, B.C.

Independent Professional

Freelance web developer for a number of local businesses, organizations, and government entities. Many smaller projects focusing on simple web design for commercial businesses or community outreach, with a few larger projects consisting of full stack web applications made to handle large amounts of data and users. Websites were designed in raw HTML/CSS and web applications were built with MySQL, PHP, jQuery, and Backbone.

Education

Master of Science

Major in Computing Science

Research in Machine Learning and Computational Neuroscience

September 2016 - June 2019

University of Victoria, Victoria, British Columbia

Bachelor of Computing Science

Specialization in Software Engineering

Awarded the TRU Medal of Computing Science for highest graduating GPA

September 2012 - June 2016

Thompson Rivers University, Kamloops, British Columbia

Conferences and Publications

Using EGG to decode semantics during an artificial language learning task

Chris Foster, Chad C. Williams, Olave E. Krigolson, Alona Fyshe

Brain and Behavior, 2021

This research showed that EGG can be used to detect word meaning even during the process of language learning. Using electroencephalography and an artificial language that maps symbols to English words, we show that it is possible to use machine learning models to detect a newly formed semantic mapping as it is acquired. This work hints at new directions for studying brain function and the neural underpinnings of learning.

Words as a window: Using word embeddings to explore the learned representations of Convolutional Neural Networks

Dhanush Dharmaretnam, Chris Foster, Alona Fyshe

Neural Networks, Volume 137, 2021

This research shows different neural networks will build internal representations of knowledge which have similar patterns. We showed that the values in semantic models such as Skip-Gram have a correlation to the activations in convolutional neural networks like Inception-v3. Despite the fact that one is trained only on images and the other is trained only on text, they appear to learn similar representations of a word or image of the same semantic entity.

Improving Response Time Prediction for Stack Overflow Questions

Di Wu, Simon Johnson, Chris Foster, Erwin Li, Haytham Elmiligi, Musfiq Rahman

IEEE 10th Annual Information Technology, Electronics and Mobile Communication Conference
October 2019 - Vancouver, Canada

This research proposes a new machine learning model to predict the response times for questions posted on Stack Overflow. Our proposed problem formulation focuses on whether or not a question will receive an answer within a

certain time frame, rather than predicting a specific interval of time within which an answer should be received. The paper also introduces a new set of features that help developers better characterize the properties of questions.

Decoding Music in the Human Brain using EEG Data

Chris Foster, Dhanush Dharmaretnam, Haoyan Xu, Alona Fyshe, George Tzanetakis

IEEE 20th International Workshop on Multimedia Signal Processing

August 2018 - Vancouver, Canada

This research project utilizes representational similarity analysis to measure the relationship between music features and the EEG data of subjects listening to the music. We show correlation between the mel spectrogram cepstral coefficients and tempogram features of the songs with the brain data of the subjects. We also use a simplified machine learning approach to achieve state-of-the-art classification of song titles from the EEG data on this dataset.

Decoding Word Semantics and Learning in EEG Data via an Artificial Language

Chris Foster, Chad C. Williams, Olave E. Krigolson, Alona Fyshe

Inaugural Conference on Cognitive Computational Neuroscience

September 2017 - New York, USA

This research project utilizes machine learning ridge regressors to predict word vector features based on input EEG data of a subject reading a word. The experiment is designed as a reinforcement learning paradigm, where the subject is viewing a series of symbols with a 1-to-1 mapping to an English word. As the subject learns the mappings we see word semantics begin to correlate to the brain's EEG readings as detected by a standard "2 vs. 2" test.

Response Time Predictions for Stack Overflow

Guojin Tang, Erwin Li, Chris Foster, Haytham El Miligi

12th Annual TRU Undergraduate Research and Innovation Conference

March 2017 - Kamloops, Canada

This research project surrounds the investigation of applications for machine learning algorithms on large web datasets. We explore the application of machine learning in the context of developer mailing list data and communities such as StackOverflow and Github. We improve on the work of a paper which predicts response times to Stack Overflow questions and explore ideas for improving the accuracy and applying to alternative datasets.

Tracking Cattle with Infrared Imaging Drones

Chris Foster, Matthew McInnes, John Church, Kevin O'Neil

10th Annual Irving K. Barber School Undergraduate Research Conference

April 2015 - Kelowna, Canada

This research project surrounds the development and investigation of a prototype quadcopter automated drone that can fly over ranching fields and identify cattle with a high-quality infrared camera and our custom computer vision algorithm. By utilizing the onboard GPS, we can generate a list of coordinates for the rancher. This is magnitudes cheaper for ranchers than the traditional method.

Scholarships and Awards

President's Research Scholarship

September 2016 - \$4,000

University of Victoria

University of Victoria Fellowship

September 2016 - \$13,500 (Declined)

University of Victoria

Outstanding Graduate Entrance Award

September 2016 - \$5,000

University of Victoria

Canada Graduate Scholarship Master's Award

September 2016 - \$17,500

Natural Sciences and Engineering Research Council of Canada

TRU Alumni Association Award

November 2015 - \$1,200

Thompson Rivers University

British Columbia District Award

November 2012 - \$500

Government of British Columbia

BC Interior Community Foundation Award

October 2012 - \$300

BC Interior Community Foundation

British Columbia Provincial Award

September 2012 - \$1,000

Government of British Columbia

Relevant Volunteer Experience

Victoria Machine Learning Meetup

February 2019 - Present

Lead Organizer

TRUCS Support Lab

September 2015 - December 2015

Support Lab Volunteer

TRUSU Computer Science Club

November 2014 - June 2016

Board Member - President

TRUSU Computer Science Club

March 2014 - November 2014

Board Member - Vice President

TRUSU Computer Science Club

November 2013 - March 2014

Board Member - Events Coordinator

Startup Weekend Kamloops

June 2013 - July 2015

Assistant Organizer

Community Talks and Presentations

Deep Learning for Self Driving Cars

Presented at the Thompson Rivers University Data Science Seminar

February 2021

Component Driven Development with Storybook

Presented at Startup Slam 2019

September 2019

Deep Learning for Self Driving Cars

Presented at the Victoria Machine Learning Meetup

July 2019

A Short Intro to Reinforcement Learning

Presented at Polyglot Unconference 2019

May 2019

Introduction to Reinforcement Learning

Presented at the Victoria Machine Learning Meetup

February 2019

Decoding Semantics During an Artificial Language Learning Task Using EEG

Presented at the University of Victoria Cognition and Brain Sciences Seminar

September 2017

The Fundamentals of Neural Networks

Presented at the Victoria Machine Learning Meetup

May 2017

Deep Learning for Self Driving Cars

Presented at the University of Victoria Advanced Software Engineering Research Seminar

April 2017

Video Super Resolution with Deep Learning

Presented to the University of Victoria Computing Science department

April 2017

SwoopVR: A Web-based Mesh Viewer

Presented to Thompson Rivers University faculty

April 2016

Mining Stack Overflow

Presented to Thompson Rivers University faculty

April 2016

Introduction to Functional Programming

Presented to the TRUSU Computer Science Club

February 2016

Introduction to Automated Testing

Presented to the TRUSU Computer Science Club

November 2015

Tracking Cattle with Infrared Imaging

Presented to Thompson Rivers University faculty

May 2015

Introduction to Python

Presented to the TRUSU Computer Science Club

April 2015

Creating Zero-Knowledge SaaS Applications

Presented at the Okanagan Developers Group Meetup

October 2014

Introduction to Git

Presented to the TRUSU Computer Science Club

October 2014

Introduction to Cryptography

Presented to the TRUSU Computer Science Club

September 2014

Certifications and Courses

How to Manage a Remote Team

October 2020

Coursera / GitLab

AWS Certified Solutions Architect Associate

September 2017

Amazon Web Services

Standard First Aid & CPR

January 2015

Canadian Red Cross

MongoDB Developer Course Certification

December 2012

MongoDB Inc.

Machine Learning Course Certification

December 2011

Coursera / Stanford University

Research Interests

- Artificial intelligence, machine learning
- Privacy, applied cryptography, secure communications, and zero-knowledge services
- Software development, open source software, web technologies
- Security in mobile applications, web applications, and networks
- Practical applications of new types of software for fields other than computing science

Personal Achievements

- Placed 1st in the M:18-24 category for Oliver Half Iron 2018 Triathlon
- Placed 10th in the M:18-24 category for Ironman Santa Rosa 2017 Qualifier Triathlon
- Placed 1st in the M:20-24 category for Oliver Half Iron 2016 Triathlon
- Placed 2nd in the M:20-29 category for Kamloops Sprint Sprint 2016 Triathlon
- Placed 3rd in the M:20-29 category for Pavillion Sprint 2015 Triathlon
- Placed 1st in the M:20-29 category for Kamloops Sprint Sprint 2015 Triathlon
- Placed 3rd in the M:20-29 category for Pavillion Sprint 2014 Triathlon
- Placed 1st in the M:16-19 category for Pavillion Sprint 2013 Triathlon

Languages

English

Native Speaker

Esperanto

Elementary Proficiency

Spanish

Elementary Proficiency