

INTERESTS

I am a computer scientist studying functional programming, parallel programming, and programming language design and implementation.

EDUCATION

Indiana University 2020 (expected)
Computer Science PhD (ongoing)
Advisor: Ryan Newton

California State University, Sacramento 2013
Computer Science BS

PROJECTS**Gibbon: Programming with serialized data**

Gibbon is an experimental whole-program compiler that transforms high-level functional programs to operate on pointer-less, serialized data. As part of this research project I did significant engineering work on the compiler, and I designed a type-safe intermediate language for expressing low-level operations on the bytes of serialized recursive data.

Sequentially consistent Haskell

SC-Haskell is an extension to the Glasgow Haskell compiler that guarantees sequential consistency. We implemented SC-Haskell by extending the Glasgow Haskell Compiler to insert fences, and use Haskell's type system to guide where the fences needed to be inserted.

DSLs for GPU programming

I was involved in research on two domain-specific languages for GPU programming (both embedded in Haskell): Accelerate, an array programming language where GPU programs are expressed in terms of high-level combinators like map and fold; and Obsidian, a language for programmatically generating low-level GPU code.

PUBLICATIONS

LoCal: A Language for Programs Operating on Serialized Data 2019
Michael Vollmer, Chaitanya Koparkar, Mike Rainey, Laith Sakka, Milind Kulkarni, and Ryan R. Newton
Programming Language Design and Implementation (PLDI 2019)

Compiling Tree Transforms to Operate on Packed Representations 2017
Michael Vollmer, Sarah Spall, Buddhika Chamith, Laith Sakka, Milind Kulkarni, Sam Tobin-Hochstadt, and Ryan Newton
European Conference on Object-Oriented Programming (ECOOP 2017)

SC-Haskell: Sequential Consistency in Languages That Minimize Mutable Shared Heap 2017
Michael Vollmer, Ryan G. Scott, Madanlal Musuvathi, and Ryan R. Newton
Symposium on Principles and Practice of Parallel Programming (PPoPP 2017)

Meta-programming and Auto-tuning in the Search for High Performance GPU Code 2015
Michael Vollmer, Bo Joel Svensson, Eric Holk, and Ryan R. Newton
Workshop on Functional High-Performance Computing (FHPC 2015)

Converting Data-parallelism to Task-parallelism by Rewrites: Purely Functional Programs Across Multiple GPUs 2015
Bo Joel Svensson, *Michael Vollmer*, Eric Holk, Trevor L. McDonell, and Ryan R. Newton
Workshop on Functional High-Performance Computing (FHPC 2015)

TEACHING

Compilers

Lecturer

Fall 2019

Teaching assistant

Fall 2017 & Fall 2018

Introduction to Computer Science

Teaching assistant

Spring 2016

WORK EXPERIENCE

Research Intern

Summer/Fall 2017

Microsoft

Improving performance of program synthesis algorithms using parallel hardware.

Research Assistant

2014 to present

Indiana University

Compiler optimization, language design, and parallel functional programming

Software Engineer

2013 to 2014

Eyefinity/VSP Global

Java Enterprise application development.

Web Developer

2010 to 2013

Sacramento State University Union

Front-end coding using Javascript and JQuery, including experience with mobile websites and responsive layouts.