Louis Jenkins

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EDUCATION

BLOOMSBURG UNIVERSITY OF PENNSYLVANIA, Bloomsburg, PA *Summer 2012 - Fall 2017*

- **Degree:** Bachelor of Science (B.S.) in Computer Science
- **Scholarship:** Board of Governors *Fall 2013 - Spring 2017*

UNIVERSITY OF ROCHESTER, Rochester, NY *Fall 2018 –*

- **Degree:** PhD Candidate in Computer Science
- **Advisor:** Michael Scott
- **Fellowships:**
  - Provost Fellowship *Fall 2018 - Spring 2019*
  - Department of Energy Computational Science Graduate Fellowship *Fall 2019 –*

RESEARCH EXPERIENCE

STUDENT RESEARCHER, Lehigh University, Bethlehem, PA *Summer 2016*

- **Project:** Concurrent and Scalable Built-in Hash Table for the Go Programming Language [1]
- **Advisor:** Michael F. Spear
- **Grant:** National Science Foundation
- **Awards:**
  - Peer's Choice for Outstanding Project.
  - Honorable Mention for CRA 2017 Outstanding Undergraduate Researchers, sponsored by Microsoft Research.
- **Summary:**
  - Designed and implemented a novel scalable lock-based concurrent map for Go's runtime and compiler.
  - Implemented with compatibility for Go map syntax; supports insert/lookup/remove and concurrent iteration.
  - Outperforms sequential map by up to 7x across diverse microbenchmarks, competitive against lock-free maps.

GOOGLE SUMMER OF CODE (STUDENT) *Summer 2017*

- **Project:** Distributed Data Structures [2]
- **Mentors:** Engin Kayraklioglu, Michael Ferguson
- **Sponsor:** Google Summer of Code
- **Summary:**
  - Designed and implemented the first scalable ordered data structure for PGAS languages (≈ 100x @ 3072 Processors).
  - Designed and implemented a novel scalable unordered data structure (≈ 500x @ 3072 Processors).
  - Designed the Collections modules; all officially available as of Chapel version 1.16

STUDENT RESEARCHER, Bloomsburg University, Bloomsburg, PA *Fall 2017*

- **Project:** Introducing LLVM to the Java Virtual Machine
- **Advisor:** William Calhoun
- **Grant:** Professional Experience Grant
- **Summary:**
  - Implemented a prototype frontend to convert JVM Classfiles to LLVM Modules.
  - Explored the possibility of utilizing LLVM as backend and optimizer for JIT Compiler.
  - Designed and implemented proof-of-concept capable of running simple Java programs.

WORK EXPERIENCE

PACIFIC NORTHWEST NATIONAL LABORATORY

- **Position:**
  - Technical Intern IV Summer 2018
  - PhD Intern (Part Time) Fall 2018 - Spring 2019
  - PhD Intern (Full Time) Summer 2019
  - Non-Employee Volunteer Fall 2019 –
- **Awards:** Outstanding Performance Award
- **Project:** Chapel HyperGraph Library (CHGL) [3,4,5]
  - Lead developer of distributed global-view hypergraph library, written in Chapel [3]
  - Creator of multiple libraries and abstractions for irregular patterns such as aggregation [4]
  - Exploration of modeling DNS data and relations as hypergraphs in collaboration with HyperNetX (HNX) [5]

MENTORING EXPERIENCE

RAILS GIRLS SUMMER OF CODE (COACH), *Summer 2018*

- **Project:** Distributed Sorting Algorithms in Chapel
- **Mentees:** Rupal and Avneet
- **Summary:**
  - Provided assistance in design, implementaiton, and in profiling bottlenecks.
  - Brought some significant performance issues in the language to light.
  - End result served as bootstrap for further distributed radix sort for the Chapel language.

GOOGLE SUMMER OF CODE (MENTOR) *Summer 2019*

- **Project:** Concurrent-Safe Memory Reclamation System
- **Mentee:** Garvit Dewan
- **Summary:**
  - Co-designed and assisted in implementation of epoch-based reclamation in shared- and distributed-memory.
  - Epoch-Based Manager scaled in distributed memory on Cray-XC; tested up to 64 nodes
  - Contributed Lock Free Queue & Stack, Scalable Disributed Atomics, and Epoch-Based Manager.

PUBLICATIONS

[1] L. Jenkins, T. Zhou, and M. Spear, “Redesigning Go’s Built-In Map to Support Concurrent Operations,” in 2017 26th International Conference on Parallel Architectures and Compilation Techniques (PACT), 2017, pp. 14–26.

[2] L. Jenkins, “RCUArray: An RCU-Like Parallel-Safe Distributed Resizable Array,” in 2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), 2018, pp. 925–933.

[3] L. Jenkins, et al., “Chapel HyperGraph Library (CHGL),” 2018 IEEE High Performance extreme Computing Conference (HPEC), pp. 1–6, 2018.

[4] L. Jenkins, M. Zalewski, and M. Ferguson, “Chapel Aggregation Library (CAL),” in 2018 IEEE/ACM Parallel Applications Workshop, Alternatives To MPI (PAW-ATM), 2018, pp. 34–43.

[5] C. Joslyn, L. Jenkins, and M. Zalewski, “High Performance Hypergraph Analytics of Domain Name System Relationships,” 2019.

[6] L. Jenkins and M. Zalewski, “Chapel Graph Library (CGL),” in Proceedings of the ACM SIGPLAN 6th on Chapel Implementers and Users Workshop, New York, NY, USA, 2019, pp. 29–30.

[7] L. Jenkins, and J. Firoz, and M. Zalewski, et al., ”Graph Algorithms in PGAS: Chapel and UPC++”,2019 IEEE High Performance Extreme Computing Conference (HPEC), To Appear.