

# DANIEL DELAYO

ddelayo@cs.stonybrook.edu  $\diamond$  github.com/danieldelayo

## EDUCATION

---

### **Stony Brook University**

Second Year PhD Student in Computer Science

*May 2021 - Present*

B.S. in Computer Science

*August 2017 - May 2021*

College of Engineering and Applied Science      Honors {College, CS}, Graduated Summa Cum Laude

## PUBLICATIONS

---

### **Write-Optimized IP Indexer for Cyber Security (Cluster Computing 2022)**

We designed expiration strategies that allow our system, Diventi, to support IP range queries in external memory with millisecond response times. Diventi automatically expires the oldest IP data without compromising query latency or ingestion rate.

This work was in collaboration with Sandia National Labs. DOI: 10.1007/s10586-021-03463-5

### **Automatic Management of High-Bandwidth Memory (SPAA 2022)**

High-Bandwidth Memory is an emerging type of memory that does not fit in the standard memory hierarchy; standard caching models do not apply. We present a caching model for High-Bandwidth Memory and verify it on Intel Knight's Landing processors.

We introduce Dynamic Priority, which gives a makespan constant-competitive with optimal and outperforms standard schemes. DOI: 10.1145/3490148.3538570

## UPCOMING PUBLICATIONS

---

### **Efficient and Timely Queries in External Memory for Infinite Streams in Optane PMEM**

We design and implement data structures for Optane PMEM to efficiently ingest cyber security data and generate timely and accurate alerts. This work is in collaboration with Sandia National Labs.

### **Distributed Graph Sketching at RAM bandwidth to Solve Connected Components**

We design and implement GraphZeppelin, a state-of-the-art graph processor that is able to ingest up to 195 million stream updates per second on a graph of  $2^{17}$  nodes. By leveraging linear sketching, we are able to ingest stream data at near RAM-bandwidth.

### **IncrementAndFreeze**

We design and implement a highly parallel algorithm for generating LRU cache 'Success Functions.' Our algorithm aims to reduce memory waste in content delivery networks and other large and expensive caches. This work is in collaboration with researchers at Google.

## TECHNICAL STRENGTHS

---

### **Computer Science**

Algorithms, Data Structures, Parallelism, High-Performance Computing

### **Languages**

C++, C, Python; Familiar with Java, Prolog, SML

## WORK EXPERIENCE

---

### **Stony Brook University Research Assistant**

Summer 2019 - Present

- Advised by Michael A. Bender on Theory, Memory Architecture, Data Structures and Algorithms.

### **Sandia National Labs Intern**

Summer 2021 - Present

- Collaborate with Sandians on the theory and implementation of Write-Optimized Data Structures to solve cyber security challenges.