Benjamin Michalowicz

PhD Student, The Ohio State University

benjaminmichalowicz98@gmail.com btmichalowicz.github.io

Park Ridge, New Jersey, USA

Education

PhD, Computer Science and Engineering, The Ohio State University, Columbus, OH 08/21 - Present
Advisor: Dr. Dhabaleswar K. (DK) Panda
Research Interests: High Performance Computing, Parallel Programming Models, Computer Architecture, Parallel Architectures, Virtualization

MS, Computer Science, Stony Brook University, Stony Brook, NY 08/19 - 05/21
Relevant Coursework: Principles of Programming Languages, System Security, Data Science Fundamentals, Analysis of Algorithms, Quantum Computing and Applications, Fundamentals of Computer Networks, Computational Geometry
Advisor: Dr. Barbara Chapman

Activities: SBUHacks Organizing Committee, Marching Band, Research

BS, Computer Science, Stony Brook University, Stony Brook, NY 08/16 - 05/20
Relevant Coursework: Principles of Programming Languages, Systems Fundamentals I/II, Operating Systems, Principles of Database Systems, Advanced Systems Programming in Unix/C, Algorithms, Calculus I-III, Linear Algebra, Theory of Computation

Activities: Marching Band, Research, SBCS, SBLive, TKD @ SBU, heading a rock band

Experience

Research Assistant, The Ohio State University, Columbus, OH 05/2021–Present
High-Performance Computing research in Dr. DK Panda's NOWLAB, focusing on the MVAPICH project and designing the MPI implementation to be more efficient and functional on current and future HPC processors, such as the A64FX and more.

Social Media Manager, SBUHacks Organizing Committee, Stony Brook, NY 03/2020–Present
Kept social media accounts up to date (Instagram, Twitter, Facebook, etc.) and otherwise helping organize the SBUHacks hackathon for the 2020 MLH season; helped successfully run Stony Brook's first-ever, student-run, virtual hackathon.

Research Assistant, Stony Brook University, Stony Brook, NY 08/2020–05/2021
High-Performance Computing research in Dr. Barbara Chapman's Exascal|lab, focusing on testing and benchmarking new HPC clusters and architecture. Ran acceptance tests and helped debug the configuration of the new Ookami cluster. Used code profilers to obtain exact behavior of performance across different HPC processor architectures. Studied/currently studying the effects of compiler toolchains and OpenMP on different applications on the A64FX processor

Teaching Assistant, Stony Brook University, Stony Brook, NY 08/2020–05/2021
Fall 2020: Held weekly office hours, led weekly recitations, and helped students understand material in Stony Brook University's CSE 216 course (Programming Abstractions). Designed recitation questions and collaborated with the course lecturer. Helped grade exams homework assignments, and led exam reviews outside of class. Kept in contact with students to answer conceptual and assignment questions.
Spring 2021: Held weekly office hours, collaborated on designing homework test cases and exam questions with the professor and fellow TA's for CSE 320: Systems Fundamentals II.

Software Technical Intern, BAE Systems, Totowa, NJ 05/2019–08/2019
Worked with full-time employees to re-design a code generation tool from interface definition files with a backing symbol table in C#. Allowed for optimization and easier redesign for larger files. Created a Common Language Runtime Environment for generated objects to communicate via C# and C++. Worked with fellow interns to redesign the mentor/mentee program for incoming interns and YearOne employees.

Undergraduate Teaching Assistant, Stony Brook University, 01/2019–
Stony Brook, NY 12/2019
Held weekly office hours, led weekly recitations, and helped students understand material in Stony Brook University's CSE 216 course (Programming Abstractions).

Undergraduate Research Assistant, Stony Brook University, 05/2018–
Stony Brook, NY 05/2019
Worked with PhD students in the COMPAS lab on projects focusing on microarchitecture and cloud infrastructure. Specifically, I primarily used C and C++ for microarchitectural components (see Projects below), and JavaScript for verifying cloud benchmarks.

Summer Recruitment Staff, Stony Brook University, 04/2018–
Stony Brook, NY 08/2018
Aided in recruitment for the 2018-2019 Season. Assisted in planning for band camp, football games, and halftime shows for fall 2018. Helped organize funds, set up equipment to be ordered, cleaned instruments, and encouraged incoming undergraduate students to join The Spirit Of Stony Brook.

Master @ Master Yoo's Summit Martial Arts, 06/2012–
Park Ridge, NJ 08/2017
Led classes of all ranked levels, from beginner to 2nd degree black belt; taught sparring, blocking/striking techniques, self-defense, and weapon techniques while keeping a safe environment for students.

Projects

Ookami/A64FX Research: Studying the FLASH code 03/2021–
Stony Brook, NY 08/2021
Collaborated with astrophysicists at the Institute for Advanced Computational Science studying FLASH: a multi-scale/multi-physics application written in Fortran. Analyzed memory constraints of FLASH through experiments revolving around 2D and 3D simulations.

Ookami/A64FX Research: Behavior analysis of Parallel Programming Libraries 08/2020–
Stony Brook, NY 05/2021
Tasked with helping run acceptance tests on the Ookami Cluster at Stony Brook University just after it had finished being installed, and repeated similar experiments on the Fugaku Supercomputer, analyzing OpenMP and MPI libraries and their behavior as well as examine several compiler toolchains and their abilities to optimize runtime, performance, and general efficiency of applications.

Chor-DNS: Implementation for Chord-based DNS Resolution | Data Management, Integration 10/2020–
Stony Brook, NY 12/2020
Implemented the Chord Ring structure with Python/DistAlgo for DNS resolution and compared runtimes to qeruies made through Linux's `dig` and homemade DNS resolvers. Github link: https://github.com/BTMichalowicz/CSE534-ChorDNS

Topologic: Library to Simulate DFAs | Co-Developer 06/2020–
Park Ridge, NJ 08/2020
Simulates DFAs and Probabilistic NFA's using context switching. Programs can start at multiple vertices, which may be run in parallel using POSIX Threads and Mutexes in C. Github project: https://github.com/mstern98/Topologic

Gerrymender: Capstone Project | DB Designer, Data Management 08/2019–
Stony Brook, NY 12/2019
Capstone Project for the Stony Brook CS major aimed to fix political Gerrymandering; designed databases using My/SQL; data pre-processing and maintenance was done through Python's Pandas library, with database entries made using PyMySql. Github link: https://github.com/BTMichalowicz/Gerry-mender

E-Commerce Pro: Database Course Project | Primary Designer and Developer 01/2019-
Stony Brook, NY 05/2019
Created a simple application using Node.js, MySQL, and standard JavaScript to demonstrate proficiency with relational databases. Github link: https://github.com/BTMichalowicz/E-Commerce

FeS2/SIMICS simulation research: COMPAS lab Research Project 05/2018–
Stony Brook, NY 12/2019

Studied the FeS2 simulator platform and the SIMICS x86 processor simulator to model its configuration to real processors. Using C/C++, I debugged the cycle-accurate platform to enable checkpoints of benchmark applications to run for durations in excess of one billion clock cycles.

Technologies

Git, Slurm, ssh, Seaborn, Pandas, Sklearn, Spring Boot, My/SQL Workbench, Hibernate/JPA, Intel Pin, Linux CLI tools, IBM Qiskit, PennyLane, LLVM, Cray, GNU Compilers, MPI/OpenMPI/MVAPICH2, OpenMP

Programming Languages

C, C++, Java, Python, OCaml, C#, Fortran, HTML, CSS, MySQL, MIPS Assembly, LaTeX

Personal Interests

Drumming, Computer Science, Martial Arts, Languages (Programming and Natural), music of all types/theory/history

Non-technical skills

Drums and assorted percussion 2007-Present

- Formal training in jazz, rock, marching, and orchestral drumming. I am also a private teacher by request, and have experience teaching drums to anyone of any age and any skill level, again in Jazz, Orchestral, Rock, Marching, and other general drum set environments.
- I was the snare-line section leader for the Spirit of Stony Brook Marching Band between 2017-2020, and played in several ensembles since 2011.

4th Degree Black Belt in TaeKwonDo 2002-Present

As of 2016, I hold a 4th degree black belt (and the rank of "Master") in Tae Kwon Do.

Awards

International Symposium on Computer Architecture 06/2019
Phoenix, AZ
A fully funded trip to ISCA 2019 and its new undergraduate workshop in Computer Architecture (uArch).

John J. Leddy Director's Award, SOSB Marching Band 05/2020
Given for displaying Academic Excellence, Musical Leadership, Creativity, and commanding exceptional attention in rehearsal and performance.

Shirley Strum Kenney Founder's Award, SOSB Marching Band 05/2018
Given for displaying qualities and skills of some of the original founding members in SOSB #1 in 2006.

Publications

Peer-reviewed Conference Papers

[1] Ookami: Deployment and Initial Experiences
Andrew Burford, Alan Calder, David Carlson, Barbara Chapman, Firat Coskun, Tony Curtis, Catherine Feldman, Robert Harrison, Yan Kang, Benjamin Michalowicz, Eric Raut, Eva Siegmann, Daniel Wood, Robert DeLeon, Mathew Jones, Nikolay Simakov, Joseph White, Dossay Oryspayev
Practice and Experience in Advanced Research Computing (PEARC) (2021)

[2] "Comparing the behavior of OpenMP Implementations with Various Applications on two Different Fujitsu A64FX Platforms"
Benjamin Michalowicz, Eric Raut, Yan Kang, Tony Curtis, Dossay Oryspayev, Barbara Chapman
Practice and Experience in Advanced Research Computing (PEARC) (2021)

[3] "Comparing OpenMP Implementations with Applications across A64FX Processor Platforms"
Benjamin Michalowicz, Eric Raut, Yan Kang, Tony Curtis, Dossay Oryspayev, Barbara Chapman
17th International Workshop on OpenMP, 2021

Invited Talks

[1] Benjamin Michalowicz, Yan Kang. *IACS Student Seminar*. "Studying OpenMP Behavior on the A64FX Processor"
Apr. 1, 2021

[2] Catherine Feldman, Benjamin Michalowicz, Alan Calder. *ACM Frontiers in Computing*. "Lessons Learned: An In-Depth Look at Running FLASH on Ookami"
May 11-13, 2021