

EDUCATION:

Washington University, Saint Louis, MO

August 2019-Present

Ph.D. Student in Computer Science

Washington University, Saint Louis, MO

August 2016-May 2018

M.S. in Computer Science

Graduate Certificate in Data Mining & Machine Learning

Washington University, Saint Louis, MO

Graduated May 2013

B.A. in Physics and Mathematics

PUBLICATIONS:

M. Sudvarg and C. Gill. Analysis of Federated Scheduling for Integer-Valued Workloads, International Conference on Real-Time Networks and Systems (RTNS), June 2022. (accepted, to appear)

Jacob Wheelock, William Kanu, Marion Sudvarg, Zhili Xiao, Jeremy D. Buhler, Roger D. Chamberlain, and James H. Buckley. Supporting multi-messenger astrophysics with fast gamma-ray burst localization. In *Proc. of IEEE/ACM HPC for Urgent Decision Making Workshop (UrgentHPC)*, November 2021.

Marion Sudvarg, Jacob Wheelock, Jeremy D. Buhler, James H. Buckley, and Wenlei Chen. Parallel GRB source localization pipelines for the advanced particle-astrophysics telescope. In *Proc. of IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis (SC)*, November 2021.

Sudvarg, M., Gill, C. & Baruah, S. Linear-time admission control for elastic scheduling. *Real-Time Syst* **57**, 485–490 (August 2021).

Also presented as a Work-already-Published at the 42nd IEEE Real-Time Systems Symposium (RTSS 2021).

Marion Sudvarg, Jeremy Buhler, James H. Buckley, Wenlei Chen et al. A Fast GRB Source Localization Pipeline for the Advanced Particle-astrophysics Telescope. In *Proc. of 37th International Cosmic Ray Conference — PoS(ICRC2021)*, volume 395, pages 588:1–588:9, July 2021.

James Buckley, Samer Alnussirat, Corrado Altomare, et al. The Advanced Particle-astrophysics Telescope (API) Project Status. In *Proc. of 37th International Cosmic Ray Conference — PoS(ICRC2021)*, volume 395, pages 655:1–655:9, July 2021.

Wenlei Chen, James H. Buckley, Samer Alnussirat, et al. The Advanced Particle-astrophysics Telescope: Simulation of the Instrument Performance for Gamma-Ray Detection. In *Proc. of 37th International Cosmic Ray Conference — PoS(ICRC2021)*, volume 395, pages 590:1–590:9, July 2021.

Zachary Hughes, Samer Alnussirat, Corrado Altomare, et al. Characterization of a prototype imaging calorimeter for the Advanced Particle-astrophysics Telescope from an Antarctic balloon flight and CERN beam test. In *Proc. of 37th International Cosmic Ray Conference — PoS(ICRC2021)*, volume 395, pages 137:1–137:9, July 2021.

TEACHING EXPERIENCE:

All listed courses were taught at Washington University in St. Louis.

2020FL: CSE 422S “Operating Systems Organization”

Co-instructed the advanced-undergraduate operating systems course at Washington University in St. Louis, and led a significant restructuring of course content, under the supervision of Professor Chris Gill. Refined content is still being used in the current syllabus.

2021SP: CSE 422S “Operating Systems Organization”

Performed further refinement of the syllabus, following observations from the previous semester and semester-end student course evaluations. Also assisted with grading final projects.

2021FL: CSE 422S “Operating Systems Organization”

Taught the class for one week when the primary instructor was absent.

2022SP: CSE 522S “Advanced Operating Systems”

Currently co-instructing the graduate level operating systems course that follows CSE 422S. Led an effort to change the focus and scope of the course. Developing new lecture materials and assignments accordingly as the semester progresses.

ACTIVITIES:

Friends of Honduras – Board of Directors (2017-Present)

Friends of Honduras partners with the remote communities surrounding San Marco de Sierra, Honduras to bring medical and educational resources, agricultural support, clean water technologies, and hope to the poorest of the poor in the region. I have served on the board of directors since its inception, and have travelled to the same villages 9 times since 2011 (originally under the umbrella of a different organization).

Graduate Council – Executive Committee (Fall 2020-Spring 2021)

I served as the Computer Science and Engineering department’s student representative to the Graduate Council of Washington University in St. Louis. I was also selected to be a member of the Graduate Council’s Executive Committee.

CERTIFICATIONS:

Level 1 Actuary

Passed the Society of Actuaries Exam P/1 in January 2011.

PREVIOUS EMPLOYMENT:

Seiler Instrument Saint Louis, MO

From the company’s description: *Seiler Instrument is a contract manufacturing company specializing in high precision machining and optical instrument assembly. In addition, Seiler is a distributor of surveying software and instruments, microscopes, and Zeiss Planetarium equipment.*

Information Systems Manager

June 2016-August 2019

My responsibilities included, among others, managing the information systems department; maintaining contracts with hardware and software vendors, telecom providers, and consultants; analyzing business needs and providing solutions to other areas of the company; managing the development of internal applications; and overseeing information security (Seiler is a contract

manufacturer for the U.S. Department of Defense and handles Controlled Unclassified Information and export-controlled technical data). Major projects have included:

- The implementation of an on-premise VOIP PBX system
- Installing and integrating a new quality management system
- Networking and setup of new communication and monitoring software for the company's CNC machine shop
- Changes to network security practices as directed by the NIST SP800-171 cybersecurity framework, which allows the company to remain in compliance with DoD regulations
- A major upgrade to the company's ERP system which handles accounting, procurement, manufacturing production, and many other integral company processes.

Network Administrator

July 2013-June 2016

My responsibilities included, among others, internal application maintenance and development; network, server, and database administration; and information security.

OTHER WORK:

MIDI Or Die

MIDI or Die is a soft real-time platform that converts analog audio into Musical Instrument Digital Interface (MIDI) streams. The target application is a music rhythm video game played with real instruments. One or more musical instruments are connected to USB sound cards on Raspberry Pi devices, which serve as video game controllers. Each controller performs a Fast Fourier Transform (FFT) in real-time against the digital audio signal, then sends that data over the local area network to a server. The server can multiplex several FFT streams in real-time, using a Deep Neural Network to extract individual tones. Tones are converted to MIDI notes, then forwarded to a custom video game, which uses the received notes to control a simulated guitar fretboard. This provides visual feedback to players as they play along with a song.

This project was developed as a collaborative effort for CSE520S: Real-Time Systems. More information can be found here: https://www.sudvarg.com/MIDI_or_Die.pdf and code is available from <https://github.com/msudvarg/MIDIOrDie>.

Heated Plate Simulation

This project was completed as an assignment for CSE 566S: High Performance Computing. It involved various approaches at simulating temperatures at nodes on a thermally conductive heated plate with edge temperatures held constant. This presents a nice parallel-computation problem, as each node's computations can be run on a single computational node, but each node's temperature at each time step can affect the temperatures of other nodes. Different approaches, including calculating mean temperatures of neighbors, and performing Monte-Carlo random walks to edge nodes, are studied. All material turned in for the homework assignment can be downloaded at https://www.sudvarg.com/HPC_Heated_Plate.zip.

Therepong: A Two-Player Pong Game Controlled with Capacitive Displacement Sensors

This project, put simply, involved circuit-design and programming in Arduino and Processing to create a motion-controlled video game. The paper describing the process, including circuit diagrams and all code, can be downloaded as a PDF at <https://www.sudvarg.com/therepong.pdf>.

Prosilica CCD Camera

During the summer of 2013, my advisor in physics, Dr. James Buckley, asked me to develop a computer interface for Linux/OSX to capture FITS images from a Prosilica CCD camera. FITS is the format currently used by many astronomers to take photos of the sky. As one can tell from the design of my site, this is a field that interests me, so I was excited to pursue this project. I used elements from the [CMU 1394 Camera Driver](#) package in conjunction with the [ImageMagick](#) software package to create an easy-to-use C++ program to capture frames from the camera as FITS images.