Marion Sudvarg
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EDUCATION:

Washington University, Saint Louis, MO
August 2019-May 2024 (expected)
Ph.D. Candidate 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:

Marion Sudvarg, Ao Li, Daisy Wang, Sanjoy Baruah, Jeremy Buhler, Pontus Ekberg, Chris Gill, Ning Zhang. **Elastic Scheduling for Harmonic Task Systems.** IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), May 2024. (Accepted, to appear)

Marion Sudvarg, Chenfeng Zhao, Ye Htet, Meagan Konst, Thomas Lang, Nick Song, Roger D. Chamberlain, Jeremy Buhler, James H. Buckley. **HLS Taking Flight: Toward Using High-Level Synthesis Techniques in a Space-Borne Instrument.** 21st ACM International Conference on Computing Frontiers (CF), May 2024. (Accepted, to appear)

Marion Sudvarg, Zhuoran Sun, Ao Li, Ning Zhang, and Chris Gill. **Priority-Based Concurrency and Shared Resource Access Mechanisms for Nested Intercomponent Requests in CAmkES.** *Real-Time Systems*, Springer, 2023. (Accepted, to appear)
> Also presented as a Work-already-Published at the 42nd IEEE Real-Time Systems Symposium (RTSS 2023).

Marion Sudvarg, Chris Gill, Jeremy Buhler. **Subtask-Level Elasticity for Federated Scheduling of Parallel Tasks.** Workshop on OPtimization for Embedded and ReAl-time systems (OPERA), December 2023. Held in conjunction with RTSS 2023.

Ye Htet, Marion Sudvarg, Jeremy Buhler, Roger D. Chamberlain, and James Buckley. **Localization of Gamma-ray Bursts in a Balloon-Borne Telescope.** The First Workshop on Enabling Predictive Science with Optimization and Uncertainty Quantification in HPC (EPSOUQ), November 2023. Held in conjunction with SC 2023.

Marion Sudvarg, Jeremy Buhler, Roger Chamberlain, Chris Gill, James Buckley and Wenlei Chen. **Parameterized Workload Adaptation for Fork-Join Tasks with Dynamic Workloads and Deadlines.** The 29th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA), August 2023.

Marion Sudvarg et al. **Front-End Computational Modeling and Design for the Antarctic Demonstrator for the Advanced Particle-astrophysics Telescope.** In *Proc. of 38th International Cosmic Ray Conference – PoS(ICRC2023)*, July 2023.

Ye Htet, Marion Sudvarg, et al. **Prompt and Accurate GRB Source Localization Aboard the Advanced Particle Astrophysics Telescope (APT) and its Antarctic Demonstrator (ADAPT).** In *Proc. of 38th International Cosmic Ray Conference – PoS(ICRC2023)*, July 2023.

Wenlei Chen, James H. Buckley, et al. **Simulation of the instrument performance of the Antarctic Demonstrator for the Advanced Particle-astrophysics Telescope in the presence of the MeV background.** In *Proc. of 38th International Cosmic Ray Conference – PoS(ICRC2023)*, July 2023.

Marion Sudvarg, Sanjoy Baruah, Chris Gill. **Elastic Scheduling for Fixed-Priority Constrained-Deadline Tasks.** 26th IEEE International Symposium on Real-Time Distributed Computing (ISORC), May 2023. **Best Paper.**

Marion Sudvarg, Meagan Konst, Thomas Lang, Diana Pacheco-Garcia, Roger Chamberlain, Jeremy Buhler, James Buckley. **Design of Front-end Signal Processing for the Advanced Particle-astrophysics Telescope.** 20th Divisional Meeting of the High Energy Astrophysics Division, American Astronomical Society, March 2023. (Poster Only)

Ao Li*, Marion Sudvarg*, Han Liu, Zhiyuan Yu, Chris Gill and Ning Zhang. **PolyRhythm: Adaptive Tuning of a Multi-Channel Attack Template for Timing Interference.** IEEE Real-Time Systems Symposium (RTSS), Houston, Texas, December 2022.

M. Sudvarg and C. Gill. **A Concurrency Framework for Priority-Aware Intercomponent Requests in CAmkES on seL4.** The 28th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA), August 2022. **Best Paper.**

M. Sudvarg, J. Buhler, R. Chamberlain, C. Gill, and J. Buckley. **Work in Progress: Real-Time GRB Localization for the Advanced Particle-astrophysics Telescope.** 16th annual workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPERT), July 2022. Held in conjunction with ECRTS 2022.

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

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. Held in conjunction with SC 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 (APT) 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.

AWARDS and HONORS:

May 2023: ISORC Best Paper Award
The paper entitled, "Elastic Scheduling for Fixed-Priority Constrained-Deadline Tasks" was selected as the Best Paper at the 26th IEEE International Symposium on Real-Time Distributed Computing.

Academic years 2020-21, 2021-22, & 2022-23: Honors, Washington University
Received Honors outcome (top 15-20% of students) as a result of annual Periodic Review of Doctoral Students performed by the computer science department.

April 2023: Invited Talk, Saint Louis University
Presented a talk titled, "Constrained Optimization of Elastic Task Adaptation in Real-Time Systems" for Saint Louis University's computer science colloquium.

August 2022: RTCSA Best Paper Award
The paper entitled, "Concurrency Framework for Priority-Aware Intercomponent Requests in CAmkES on seL4" was selected as the Best Paper at the 28th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications.

May 2022: CPS Rising Star
Selected as a Rising Star for the inaugural CPS Rising Stars Workshop held at the University of Virginia on May 26, 2022.

TEACHING:

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

2023SP: CSE 522S "Advanced Operating Systems"
Co-instructed the course, further refining the material based on feedback and experience from the previous semester.

2022SP: CSE 522S "Advanced Operating Systems"
Co-instructed the graduate level operating systems course that follows CSE 422S. Led an effort to change the focus and scope of the course. Developed new lecture materials and assignments, which composed most of the course syllabus.

2021FL: CSE 422S "Operating Systems Organization"
Taught the class for one week when the primary instructor was absent.

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.

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.

COLLABORATIONS:

MechWorks (April 2023-Present)
A joint collaboration between Purdue University mechanical and structural engineering and the Washington University in St. Louis computer science and engineering department. I am developing scheduling theory and platforms to support provably schedulable parallel execution for real-time hybrid simulation (RTHS) of structural response to earthquakes.

APT (October 2019-Present)
The Advanced Particle-astrophysics Telescope (APT) is a planned space-based observatory designed to localize MeV to TeV transients such as gamma-ray bursts in real time using onboard computational hardware. The Antarctic Demonstrator for APT (ADAPT) is a prototype high-altitude balloon mission scheduled to fly during the 2025–26 season. I have been involved in the simulation and design of the instrument's front-end electronics, and I have developed and evaluated adaptive real-time algorithms for prompt GRB localization.

STUDENTS SUPERVISED:

During my PhD studies, I have had the pleasure of mentoring and supervising the work of several talented undergraduate and master's students.

Primary Supervision
- Jack Heuberger, master's student, APT collaboration, Fall 2023.
- Jacob Silbert, undergraduate student, APT collaboration, Fall 2023.
- Qinzhou (Nick) Song, undergraduate student, APT collaboration, Summer and Fall 2023. Contributed to the paper, "Front-End Computational Modeling and Design for the Antarctic Demonstrator for the Advanced Particle-astrophysics Telescope."
- Ben Standaert, undergraduate student, independent study, Fall 2023.
- Ulysses Atkeson, undergraduate student, APT collaboration, Spring 2023. Contributed to the paper, "Front-End Computational Modeling and Design for the Antarctic Demonstrator for the Advanced Particle-astrophysics Telescope."

Joint Supervision and Mentoring
- Tobias Pristupin, undergraduate student, Fall 2023.
- Thomas Liang, undergraduate student, APT collaboration, Spring and Summer 2023.
  - Contributed to the paper, "Front-End Computational Modeling and Design for the Antarctic Demonstrator for the Advanced Particle-astrophysics Telescope."
  - Contributed to the poster, "Design of Front-end Signal Processing for the Advanced Particle-astrophysics Telescope."
- Muhan Yu, undergraduate student, Summer 2023.
- Zhuoran (Jordan) Sun, master's thesis, Fall 2022 and Spring 2023.
  - Contributed to the paper, "Priority-Based Concurrency and Shared Resource Access Mechanisms for Nested Intercomponent Requests in CAmkES."
- Diana Pacheco-Garcia, undergraduate student, Fall 2022.
  - Contributed to the poster, "Design of Front-end Signal Processing for the Advanced Particle-astrophysics Telescope."
- Will Gozlan, master's project, Spring and Fall 2022.

OTHER 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 Student Advisory Council (Fall 2023-Present)
I currently serve on the Graduate Student Advisory Council to the Center for Teaching and Learning at Washington University in St. Louis. I assist the Center for Teaching and Learning in making decisions related to graduate student and postdoc programming. I also help to coordinate monthly events, including faculty panel discussions and informal gatherings, to allow graduate students and postdocs to gather together and discuss relevant teaching and learning related topics.

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.