

Sean Yaw

RESEARCH INTERESTS Algorithms, networks, optimization, complexity theory, geospatial data processing, smart grid, and computational geoscience.

EDUCATION **Montana State University**, Bozeman, MT **August 2012 – May 2017**
PhD - Computer Science
Thesis: Scheduling for Optimized Network Resource Utilization #SmartGrid #Cloud
Advisor: Brendan Mumeey

Johns Hopkins University, Baltimore, MD **January 2008 – December 2010**
MS - Applied and Computational Mathematics

University of Pittsburgh, Pittsburgh, PA **September 2002 – April 2007**
BS - Mathematics

ACADEMIC APPOINTMENTS **Assistant Professor** **August 2018 – Present**
Gianforte School of Computing, Montana State University

RESEARCH POSITIONS **Postdoctoral Research Associate** **May 2017 – July 2018**
Computational Earth Sciences, Los Alamos National Laboratory

Research scalability and uncertainty in network optimization, with special focus on Carbon Capture and Storage (CCS) applications. Develop novel graph theoretic algorithms for resource allocation in massive infrastructure networks. Design optimization techniques robust to uncertainty in network parameters. Build software for the research community to enable collaborative CCS network design.

Research Assistant **August 2012 – May 2017**
Applied Algorithms Laboratory, Montana State University

Collaborated with faculty members to build algorithms for problems in energy management, networking, and computational biology. Efforts included developing approximation, parameterized-complexity, and machine learning algorithms for power job scheduling, cloud resource provisioning under multiple constraint optimization, and protein structure estimation based on region absorption.

Intern **May 2016 – May 2017**
Blackmore Sensors and Analytics

Researched algorithms for object identification in 3D point cloud data. Studied effectiveness of existing clustering and segmentation techniques on proprietary data. Developed novel clutter resistant feature extraction technique for Lidar sensor data. Leveraged unique data properties to build online algorithm to support future streaming data while increasing effectiveness over legacy approaches.

PhD Software Engineering Intern **September 2015 – December 2015**
Technical Infrastructure - Resource Management, Google

Worked on increasing data center resource utilization. Developed the framework to increase utilization for a major unserved tenant by leveraging statistical models of historical usage and bounding the risk of jobs going pending due to resource constraints. Managed risk by developing an alert system to notify if data center load behavior becomes concerning.

Summer Research Intern **June 2015 – August 2015**
Informatics and Decision Support, Massachusetts Institute of Technology Lincoln Laboratory

Worked on development of an automated data integration process. Built a system that autonomously extracts ontologies from data sources and merges them with an existing, domain independent, data retrieval ontology framework. Built a semi-autonomous process for integrating extracted ontologies with a domain level knowledge base to enable semantic data retrieval across disjoint data sources.

Operations Research Analyst **September 2007 – May 2012**

U.S. Army Evaluation Center, U.S. Army Test and Evaluation Command

Lead performance analyst and chair of teams tasked with evaluating weapon systems' effectiveness, suitability and survivability. Developed statistical simulation that predicts ammunition effectiveness constraints for unique ammunition designs given performance test results. Developed a novel probabilistic evaluation methodology to address new requirements for non-lethal weapons.

TEACHING
POSITIONS

Instructor **January 2014 – May 2017**

Gianforte School of Computing, Montana State University

- CSCI 111 Programming with Java 1: Spring 2014, Fall 2014, Fall 2016, Spring 2017
- CSCI 132 Basic Data Structures and Algorithms: Spring 2015
- CSCI 338 Computer Science Theory: Summer 2015

Teaching Assistant **August 2012 – December 2013**

Gianforte School of Computing, Montana State University

- CSCI 111 Programming with Java 1: Fall 2012, Fall 2013
- CSCI 132 Basic Data Structures and Algorithms: Spring 2013

MENTORSHIP

Software Factory Team Advisor **September 2016 – April 2017**

Managed Montana State University undergraduate Software Factory team sponsored by Blackmore Sensors and Analytics in developing virtual reality visualization engine for 3D geospatial data, and integration with existing algorithms and sensors. Held weekly meetings, integrated solutions into higher level services, and provided data expertise.

Research Experiences for Undergraduates (REU) Mentor **June 2013 – August 2013**

Mentored REU students in building synthetic generator of household power consumption jobs to feed smart grid scheduling algorithms. Contributed to publication: S. Yaw, B. MumeY, E. McDonald, J. Lemke, Peak Demand Scheduling in the Smart Grid, *Proceedings of IEEE SmartGridComm 2014.*,

JOURNAL
PUBLICATIONS

R. S. Middleton, and S. Yaw, The Cost of Getting CCS Wrong: Uncertainty, Infrastructure Design, and Stranded CO₂, *International Journal of Greenhouse Gas Control*, Mar. 2018, vol. 70, pp 1-11.

S. Yaw, and B. MumeY, Scheduling Non-Preemptible Jobs to Minimize Peak Demand, *Algorithms*, Oct. 2017, vol. 10, no. 4, pp 122.

S. Yaw, E. Howard, B. MumeY, and M. Wittie, Cooperative Group Provisioning with Latency Guarantees in Multi-Cloud Deployments, *SIGCOMM Computer Communication Review*, Jul. 2015, vol. 45, pp. 4-11.

CONFERENCE
PUBLICATIONS

S. Micka, S. Yaw, B. Fasy, B. MumeY, and M. Wittie, Efficient Multipath Flow Monitoring, *IEEE IFIP Networking*, Jun. 2017.

B. MumeY, S. Shahmohammadi, K. McManus, and S. Yaw, Parity Balancing Path Flow Decomposition and Routing, *IEEE Globecom Workshops*, Dec. 2015, pp. 1-6.

B. MumeY, S. Yaw, C. Fastnow, and D. Singel, Finding Pathways to Student Success from Data, *International Conference on Computer Supported Education (CSEDU)*, May 2015, pp. 457-460.

S. Yaw, and B. MumeY, An Exact Algorithm for Non-Preemptive Peak Demand Job Scheduling, *Combinatorial Optimization and Applications (COCO A)*, Dec. 2014, pp. 3-12.

S. Yaw, B. MumeY, E. McDonald, and J. Lemke, Peak Demand Scheduling in the Smart Grid, *IEEE Smart Grid Communications (SmartGridComm)*, Nov. 2014, pp. 770-775.

B. MumeY, R. Jäntti, and S. Yaw, Scheduling Uncertain Links in Multihop Cognitive Relay Networks, *IEEE Globecom*, Dec. 2013, pp. 1203-1208.

PUBLICATIONS
IN PROGRESS

S. Yaw, and R. Middleton, Minimal Steiner Tree Preserving Subset Spanners, *Discrete Applied Mathematics*, in review.

R. Middleton, S. Yaw, Y. Wang, K. Ellett SimCCS^{2.0}: An Open-Source Tool for Optimizing CO₂ Capture, Transport, and Storage Infrastructure, *Environmental Modeling & Software*, in review.

S. Yaw, B. Bothner, and B. Mumey, A Fast Linear Programming Approach to Analyzing Protein HDX Experimental Data, *BMC Bioinformatics*, in draft.

SOFTWARE SimCCS. A tool for optimizing carbon capture and storage infrastructure deployments. Released Jan. 2018. <https://github.com/simccs/SimCCS>

PRESENTATIONS *SimCCS: A Collaborative Tool for CCS Infrastructure Design*. Carbon Capture, Utilization & Storage Conference, Mar. 2018.

Peak Demand Scheduling in the Smart Grid. IEEE International Conference on Smart Grid Communications (SmartGridComm), Venice, Italy, Nov. 2014.

POSTERS *Non-Preemptive Peak Demand Job Scheduling*. S. Yaw, and B. Mumey (presented by S. Yaw), Montana State University Department of Computer Science Advisory Board Poster Exhibition, Bozeman, MT, Feb. 2014. First place poster.

AWARDS First Place Poster, Montana State University Department of Computer Science Advisory Board Poster Exhibition, 2014

Outstanding Teaching Assistant, Montana State University Department of Computer Science, 2013

Presidential Graduate Scholarship, Montana State University, 2012-2013

Commander's Award for Civilian Service, U.S. Army Evaluation Center, U.S. Army Test and Evaluation Command, 2012

Silver Finalist for Federal Employee "Rookie of the Year", Baltimore Federal Executive Board, 2009

SERVICE Reviewer, International Journal of Greenhouse Gas Control: 2017, 2018.

Reviewer, Canadian Conference on Electrical and Computer Engineering (CCECE): 2016.

Sub-reviewer, Poster Session, Grace Hopper Celebration of Women in Computing: 2016.

Reviewer, International Conference on Communications (ICC): 2014, 2015.

Reviewer, International Conference on Computing, Networking and Communication (ICNC): 2015.

Reviewer, Globecom: 2013, 2014.