

# Sean Yaw

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RESEARCH INTERESTS	Algorithms, networks, optimization, complexity theory, geospatial data processing, smart grid, and computational geoscience.	
EDUCATION	<b>Montana State University</b> , Bozeman, MT <i>PhD - Computer Science</i> <i>Thesis: Scheduling for Optimized Network Resource Utilization #SmartGrid #Cloud</i> <i>Advisor: Brendan Mume</i>	<b>August 2012 – May 2017</b>
	<b>Johns Hopkins University</b> , Baltimore, MD <i>MS - Applied and Computational Mathematics</i>	<b>January 2008 – December 2010</b>
	<b>University of Pittsburgh</b> , Pittsburgh, PA <i>BS - Mathematics</i>	<b>September 2002 – April 2007</b>
ACADEMIC APPOINTMENTS	<b>Assistant Professor</b> <i>Gianforte School of Computing</i> , Montana State University	<b>August 2018 – Present</b>
RESEARCH POSITIONS	<b>Postdoctoral Research Associate</b> <i>Computational Earth Sciences</i> , 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.	<b>May 2017 – July 2018</b>
	<b>Research Assistant</b> <i>Applied Algorithms Laboratory</i> , 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.	<b>August 2012 – May 2017</b>
	<b>Intern</b> 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.	<b>May 2016 – May 2017</b>
	<b>PhD Software Engineering Intern</b> <i>Technical Infrastructure - Resource Management</i> , 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.	<b>September 2015 – December 2015</b>
	<b>Summer Research Intern</b> <i>Informatics and Decision Support</i> , 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.	<b>June 2015 – August 2015</b>

**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***Teaching Assistant****August 2012 – December 2013***Gianforte School of Computing, Montana State University***JOURNAL  
PUBLICATIONS**

R. Middleton, S. Yaw, B. Hoover, K. Ellett, SimCCS: An Open-source Tool for Optimizing CO<sub>2</sub> Capture, Transport, and Storage Infrastructure, *Environmental Modelling & Software*, Feb. 2020, pp 1-11.

B. Hoover, S. Yaw, and R. S. Middleton, CostMAP: an open-source software package for developing cost surfaces using a multi-scale search kernel, *International Journal of Geographical Information Science*, Oct. 2019, pp 1-19.

R. S. Middleton, and S. Yaw, The Cost of Getting CCS Wrong: Uncertainty, Infrastructure Design, and Stranded CO<sub>2</sub>, *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. Yaw, R. Middleton, and B. Hoover, Graph Simplification for Infrastructure Network Design. *Conference on Combinatorial Optimization and Applications (COCOA)*, Dec. 2019, pp. 576-589.

Y. Wang, S. Pamidighantam, S. Yaw, E. Abeysinghe, S. Marru, M. Christie, K. Ellett, M. Pierce, and R. Middleton, A New Science Gateway to Provide Decision Support on Carbon Capture and Storage Technologies. *Practice and Experience on Advanced Research Computing (PEARC '18)*, Jul. 2018, pp. 1-3.

S. Micka, S. Yaw, B. Fasy, B. Mumey, and M. Wittie, Efficient Multipath Flow Monitoring, *IEEE IFIP Networking*, Jun. 2017, pp. 1-9.

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 (COCOA)*, 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.

**SOFTWARE**

SimCCS. A tool for optimizing carbon capture and storage infrastructure deployments. Released Jan. 2018. <https://github.com/simccs/SimCCS>. 2019 R&D 100 Award Winner.

**CONFERENCE  
ABSTRACTS**

N. Moodie, W. Jia, R. Middleton, S. Yaw, S. Lee, R. Esser, T. Xiao, D. Wheatley, P. Steele, and B.

McPherson, Geologic Carbon Storage of Anthropogenic CO<sub>2</sub> Under the Colorado Plateau in Emery County, Utah, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Orlando, FL, Nov. 2019.

B. Hoover, R. Middleton, S. Yaw, and K. Ellett, Optimizing Infrastructure for Carbon Capture and Storage Technologies: Development of a new Cost Surface Module for the SimCCS Software, *Geological Society of America Annual Meeting*, Indianapolis, IN, Nov. 2018.

R. Middleton, S. Yaw, B. Hoover, K. Ellett, and R. Kammer, Uncertainty and Infrastructure Design: Getting Commercial-scale CCS Right, *International Conference on Greenhouse Gas Control Technologies (GHGT-14)*, Melbourne, Australia, Oct. 2018.

S. Yaw, R. Middleton, K. Ellett, and Y. Wang, SimCCS: A Collaborative Tool for CCS Infrastructure Design, *Carbon Capture, Utilization & Storage Conference*, Nashville, TN, Mar. 2018.

R. Middleton, S. Yaw, K. Ellett, Y. Wang, R. Kammer, and A. Duguid, The Cost of Getting CCS Wrong, *Carbon Capture, Utilization & Storage Conference*, Nashville, TN, Mar. 2018.

#### POSTERS

*Efficient Design of CO<sub>2</sub> Capture and Storage Infrastructure*. C. Whitman, S. Yaw, R. Middleton, B. Hoover and K. Ellett, ACM e-Energy, Phoenix, AZ, Jun. 2019.

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

#### AWARDS

R&D 100 Award in *Software and Services* category with Silver Medal in *Corporate Social Responsibility* special recognition category for SimCCS software, 2019

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

#### PROFESSIONAL SERVICE

Technical Program Committee Member: Tenth International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies (ENERGY 2020).

Conference Session Chair: Conference on Combinatorial Algorithms and Applications (COCOA 2019).

Reviewer: Energy & Environmental Science (2019), Green House Gases: Science and Technology (2019), Future Internet (2019), International Journal of Greenhouse Gas Control (2017, 2018), Canadian Conference on Electrical and Computer Engineering (2016), Grace Hopper Celebration of Women in Computing (2016), International Conference on Communications (2014, 2015), International Conference on Computing, Networking and Communication (2015), Globecom (2013, 2014).