

Benjamin (Min) Wesley Priest (they/them)

CONTACT INFORMATION	Computing Scientist Center for Applied Scientific Computing Lawrence Livermore National Laboratory	<i>github:</i> https://github.com/bwpriest <i>E-mail:</i> priest2@llnl.gov
RESEARCH INTERESTS	Efficient analysis of large, dynamic datasets: sketching, streaming algorithms, machine learning, high performance computing, graph algorithms, numerical linear algebra, compressed sensing, graph theory, optimization, network analysis, and theory of deep learning.	
EDUCATION	Thayer School of Engineering at Dartmouth College , Hanover, VT, USA Ph.D., Engineering 09/2015 – 02/2019 <ul style="list-style-type: none">- Advisor: Professor George Cybenko- Thesis: Sublinear Approximations of Vertex Centrality in Evolving Graphs The Ohio State University , Columbus, OH, USA B.S., Mathematics 09/2007 – 06/2011 B.S., Computer and Information Science 09/2007 – 06/2011	
RESEARCH EXPERIENCE	Lawrence Livermore National Laboratory , Livermore, CA, USA Center for Applied Scientific Computing . Supervisors: Geoff Sanders, Michael Schneider and Roger Pearce <i>Computing Scientist</i> 02/2021 – present PI and Co-I of multiple research projects investigating scalable graph analytics, machine learning, and statistical modeling on High-Performance Computing (HPC) systems. Supervised 1 postdoc and more than a dozen graduate students. Selected research contributions include novel algorithms and software for scalable Gaussian process (GP) estimation [1], cosmology, climate, and space domain modeling [2], distributed subspace embedding and sketches [3], and distributed K nearest neighbors. <i>Postdoctoral Researcher</i> 04/2019 – 02/2021 Developed novel sketching algorithms to cluster [3] and perform local query approximation [4] massive graphs on HPC. Solved reinforcement learning [5], image classification [6], and quantum machine learning [7] problems using GPs and neural kernels. <i>Computation Student Intern</i> 05/2018 – 01/2019 Designed novel HPC communication library to accelerate non-traditional communications [8]. Used cardinality sketches to estimate local triangle counts in distributed graphs [9]. Dartmouth College , Hanover, NH, USA Thayer School of Engineering . Advisor: Professor George Cybenko <i>Research and Teaching Assistant</i> 09/2015 – 02/2019 Invented streaming approximation algorithms for several centrality indices on massive graphs using sketches. Designed game and graph-theoretic models for advanced persistent threats in cyber defense. Taught courses in machine learning and lead a team of TAs. MIT Lincoln Laboratory , Lexington, MA, USA Cyber Analytics and Decision Systems. Supervisor: Dr. Kevin M. Carter <i>Assistant Research Scientist</i> 08/2011 – 07/2015 Modeled computer networks using novel machine learning algorithms. Developed multi-agent systems for high-fidelity network simulations and cyber defense evaluation.	
AWARDS	<ul style="list-style-type: none">- HPEC Graph Challenge Champion, 2020- HPEC Graph Challenge Champion, 2019- SECURE Best Paper Award, 2018	

MOST CLOSELY
RELATED
PUBLICATIONS

- [3] **Benjamin W Priest**, Alec Dunton, and Geoffrey Sanders. Scaling graph clustering with distributed sketches. In *2020 IEEE High Performance Extreme Computing Conference (HPEC)*, pages 1–7. IEEE, 2020
- [4] **Benjamin W Priest**. Degreesketch: Distributed cardinality sketches on massive graphs with applications. *arXiv preprint arXiv:2004.04289*, 2020
- [8] **Benjamin W Priest**, Trevor Steil, Geoffrey Sanders, and Roger Pearce. You’ve got mail (ygm): Building missing asynchronous communication primitives. In *2019 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pages 221–230. IEEE, 2019
- [10] Trevor Steil, Tahsin Reza, Keita Iwabuchi, **Benjamin W Priest**, Geoffrey Sanders, and Roger Pearce. TriPoll: computing surveys of triangles in massive-scale temporal graphs with metadata. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, pages 1–12, 2021
- [11] Roger Pearce, Trevor Steil, **Benjamin W Priest**, and Geoffrey Sanders. One quadrillion triangles queried on one million processors. In *2019 IEEE High Performance Extreme Computing Conference (HPEC)*, pages 1–5. IEEE, 2019

OTHER
PUBLICATIONS

- [1] Amanda Muyskens, **Benjamin W Priest**, Imène Goumiri, and Michael Schneider. MuyGPs: Scalable gaussian process hyperparameter estimation using local cross-validation. *arXiv preprint arXiv:2104.14581*, 2021
- [2] Amanda L Muyskens, Imène R Goumiri, **Benjamin W Priest**, Michael D Schneider, Robert E Armstrong, Jason Bernstein, and Ryan Dana. Star–galaxy image separation with computationally efficient gaussian process classification. *The Astronomical Journal*, 163(4):148, 2022
- [9] **Benjamin W Priest**, Roger Pearce, and Geoffrey Sanders. Estimating edge-local triangle count heavy hitters in edge-linear time and almost-vertex-linear space. In *2018 IEEE High Performance extreme Computing Conference (HPEC)*, pages 1–7. IEEE, 2018
- [12] Alec M Dunton, **Benjamin W Priest**, and Amanda Muyskens. Fast gaussian process posterior mean prediction via local cross validation and precomputation. *arXiv preprint arXiv:2205.10879*, 2022
- [13] Trevor Steil, **Benjamin W Priest**, Geoffrey Sanders, Roger Pearce, Timothy La Fond, and Keita Iwabuchi. Distributed kronecker graph generation with ground truth of many graph properties. In *2019 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pages 251–260. IEEE, 2019