

## Benjamin (Ben) Wesley Priest (they/them)

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CONTACT INFORMATION	Computing Scientist Center for Applied Scientific Computing Lawrence Livermore National Laboratory	<i>github:</i> <a href="https://github.com/bwpriest">https://github.com/bwpriest</a> <i>E-mail:</i> <a href="mailto:priest2@llnl.gov">priest2@llnl.gov</a>
RESEARCH INTERESTS	<b>Efficient analysis of large, dynamic datasets:</b> 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	<b>Thayer School of Engineering</b> at <b>Dartmouth College</b> , Hanover, VT, USA Ph.D., Engineering <b>09/2015 – 02/2019</b> <ul style="list-style-type: none"><li>- Advisor: Professor George Cybenko</li><li>- Thesis: Sublinear Approximations of Vertex Centrality in Evolving Graphs</li></ul> <b>The Ohio State University</b> , Columbus, OH, USA B.S., Mathematics <b>09/2007 – 06/2011</b> B.S., Computer and Information Science <b>09/2007 – 06/2011</b>	
RESEARCH EXPERIENCE	<b>Lawrence Livermore National Laboratory</b> , Livermore, CA, USA <b>Center for Applied Scientific Computing.</b> Supervisors: Geoff Sanders, Michael Schneider and Roger Pearce <i>Computing Scientist</i> <b>02/2021 – present</b> 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 8 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> <b>04/2019 – 02/2021</b> 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> <b>05/2018 – 01/2019</b> Designed novel HPC communication library to accelerate non-traditional communications [8]. Used cardinality sketches to estimate local triangle counts in distributed graphs [9]. <b>Dartmouth College</b> , Hanover, NH, USA <b>Thayer School of Engineering.</b> Advisor: Professor George Cybenko <i>Research and Teaching Assistant</i> <b>09/2015 – 02/2019</b> 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. <b>MIT Lincoln Laboratory</b> , Lexington, MA, USA Cyber Analytics and Decision Systems. Supervisor: Dr. Kevin M. Carter <i>Assistant Research Scientist</i> <b>08/2011 – 07/2015</b> 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"><li>- HPEC Graph Challenge Champion, 2020</li><li>- HPEC Graph Challenge Champion, 2019</li><li>- SECURE Best Paper Award, 2018</li></ul>	

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