Benjamin (Ben) Wesley Priest (they/them)

CONTACT INFORMATION	Postdoctoral Researcher Center for Applied Scientific Computing Lawrence Livermore National Laboratory	*Cell:* +1-937-681-1935 *E-mail:* 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.

RESEARCH EXPERIENCE

Lawrence Livermore National Laboratory, Livermore, CA, USA
Center for Applied Scientific Computing. Supervisors: Dr. Geoff Sanders , Dr. Michael Schneider and Dr. Roger Pearce

Computing Scientist   **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 5 graduate students. Selected research contributions include novel algorithms and software for scalable Gaussian process (GP) estimation [3], cosmology, climate, and space domain modeling [4], distributed subspace embedding and sketches, and distributed K nearest neighbors.

Postdoctoral Researcher   **04/2019 – 02/2021**
Developed novel sketching algorithms to cluster [6] and perform local query approximation [5] massive graphs on HPC. Solved reinforcement learning [2], image classification [1], and quantum machine learning [9] problems using GPs and neural kernels.

Computation Student Intern   **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 [7].

Dartmouth College, Hanover, NH, USA
Thayer School of Engineering. Advisor: Professor George Cybenko

Research and Teaching Assistant   **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

Assistant Research Scientist   **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.

EDUCATION

Thayer School of Engineering at **Dartmouth College**, Hanover, VT, USA
Ph.D., Engineering (GPA 4.0)   **09/2015 – 02/2019**
  - Advisor: Professor George Cybenko
  - Thesis: Sublinear Approximations of Vertex Centrality in Evolving Graphs

The Ohio State University, Columbus, OH, USA
B.S., Mathematics, (GPA 3.62 *Cum Laude*)   **09/2007 – 06/2011**
B.S., Computer and Information Science, (GPA 3.62 *Cum Laude*)   **09/2007 – 06/2011**

AWARDS

  - HPEC Graph Challenge Champion, 2020
  - HPEC Graph Challenge Champion, 2019
  - SECRYPT Best Paper Award, 2018

SELECTED
PUBLICATIONS

[1] Imène R Goumiri, Amanda L Muyskens, Michael D Schneider, **Benjamin W Priest**, and Robert E Armstrong. Star-galaxy separation via gaussian processes with model reduction. In *2020 Advanced Maui Optical and Space Surveillance Technologies Conference (AMOS)*, 2020

[2] Imène R Goumiri, **Benjamin W Priest**, and Michael D Schneider. Reinforcement learning via gaussian processes with neural network dual kernels. In *2020 IEEE Conference on Games (CoG)*, pages 1–8. IEEE, 2020

[3] 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

[4] 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

[5] **Benjamin W Priest**. Degreesketch: Distributed cardinality sketches on massive graphs with applications. *arXiv preprint arXiv:2004.04289*, 2020

[6] **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

[7] **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

[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

[9] Matthew Otten, Imène R Goumiri, **Benjamin W Priest**, George F Chapline, and Michael D Schneider. Quantum machine learning using gaussian processes with performant quantum kernels. *arXiv preprint arXiv:2004.11280*, 2020

[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