

Benoît GALLET, Ph.D.

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SUMMARY

- Postdoctoral scholar in computer science/ecoinformatics, and cybersecurity, at Northern Arizona University.
- PhD in Informatics and Computing from Northern Arizona University: *"Efficient Euclidean Distance Calculations and Distance Similarity Searches: An Examination of Heterogeneous CPU, GPU, and Tensor Core Architectures"*.
- Interests include high-performance computing, parallel and GPU computing, machine learning, and algorithm optimizations.
- *Willing to relocate.*

SKILLS

- Proficient with C, C++, CUDA, Python, OpenMP, MPI.
- Familiar with TensorFlow and Keras.
- High-performance computing, parallel and GPU computing, algorithms, data structures, data analysis and clustering algorithms, algorithm optimizations.
- Conducting research, presenting, public speaking.
- French (native), English (bilingual), German (beginner).

EXPERIENCE

Northern Arizona University Flagstaff, AZ

Postdoctoral Scholar in Computer Science/Ecoinformatics Jun 2023 – Jun 2024

- Part of a multi-disciplinary team, focusing on the scalability and performance of the project.
- Designing and developing an algorithm to periodically retrieve satellite images for the state of Arizona and from multiple sources, using Python.
- Designing and developing an algorithm to periodically process new imagery, modeling and computing the trees water and bark beetle stresses of up to 40B pixels. Uses C++, and MPI for distributed computing and scalability.

Postdoctoral Scholar in Cybersecurity Jun 2023 – Jun 2024

- Porting and optimizing Number Theoretic Transform (NTT) operations of the Post-Quantum Cryptography (PQC) algorithm Kyber from the CPU to GPU Tensor Cores using CUDA.

Graduate Research Assistant Aug 2018 – May 2023

- Worked on data analysis and clustering algorithms, with an emphasis on similarity searches and Euclidean distance calculations.
- Designed: multiple GPU algorithms and optimizations (up to 9.7× speedup over prior GPU solution); a heterogeneous CPU-GPU algorithm (up to 5.5× speedup); and a novel GPU algorithm using Tensor Cores (up to 2.2× speedup), to compute distance similarity searches.
- Published and presented several articles in international conferences.

CS Instructor May 2022 – Aug 2022

- Instructor of record for the CS450 Instruction to Parallel Programming class.
- Taught shared memory parallelism including pthreads, OpenMP, and vectorization.
- Average course evaluation: 3.86 / 4.

Université d'Orléans

MSc Internship

Orléans, France

Apr 2018 – Sep 2018

- GPU Kernel Performance Optimizations for Efficient Similarity Joins.
- Proposed several optimizations for a GPU distance similarity searches algorithm using CUDA.

Université d'Orléans / National Center for Scientific Research Orléans, France

BSc Internship

Apr 2016 – Jun 2016

- GPU Detection of Pulse Radio Signals.
- Ported C code detecting pulse radio signals from neutron stars with a radio telescope and using FFTs to the GPU using CUDA.

EDUCATION

Northern Arizona University

Flagstaff, AZ

PhD in Informatics and Computing

2023

- *Efficient Euclidean Distance Calculations And Distance Similarity Searches: An Examination of Heterogeneous CPU, GPU, and Tensor Core Architectures*, supervised by Dr. Michael Gowanlock.
- Worked as a Graduate Research Assistant.
- Multiple first author publications, and presented in several international conferences.

Université d'Orléans

Orléans, France

MSc in Computer Science

2018

- Emphasis on Mobile Computing, Intelligence, and Security.
- With Honors.

Université d'Orléans

Orléans, France

BSc in Computer Science

2016

CERTIFICATES

Fundamentals of Deep Learning

Nvidia Deep Learning Institute

Feb 2024

- Credential id: [459a9d067084444a9354e9823d75ab1d](#)

PUBLICATIONS

1. Michael Gowanlock, **Benoit Gallet** and Brian Donnelly, *Optimization and Comparison of Coordinate- and Metric-Based Indexes on GPUs for Distance Similarity Searches*. Proceedings of the International Conference on Computational Science (ICCS), pp. 357-364. doi: [10.1007/978-3-031-36021-3_37](#), Prague, Czech Republic, July 2023.
2. **Benoit Gallet** and Michael Gowanlock, *Leveraging GPU Tensor Cores for Double Precision Euclidean Distance Calculations*. Proceedings of the 29th IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), pages 135-144, doi: [10.1109/HiPC56025.2022.00029](#), Bengaluru, India, December 2022.
3. Michael Gowanlock and **Benoit Gallet**, *Data-Intensive Computing Modules for Teaching Parallel and Distributed Computing*. NSF/TCPP Workshop on Parallel and Distributed Computing Education, Proceedings of the IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), pages 350-357, doi: [10.1109/IPDPSW52791.2021.00062](#), Portland, USA, June 2021.
4. **Benoit Gallet** and Michael Gowanlock, *Heterogeneous CPU-GPU Epsilon Grid Joins: Static and Dynamic Work Partitioning Strategies*. Data Science and Engineering, Volume 6, pages 39-62, doi: [10.1007/s41019-020-00145-x](#), October 2020.

5. **Benoit Gallet** and Michael Gowanlock, *HEGJoin: Heterogeneous CPU-GPU Epsilon Grids for Accelerated Distance Similarity Join*. Proceedings of the 25th International Conference on Database Systems for Advanced Applications (DASFAA), pages 372–388, doi: [10.1007/978-3-030-59419-0_23](https://doi.org/10.1007/978-3-030-59419-0_23), Jeju, South Korea, September 2020.
6. **Benoit Gallet** and Michael Gowanlock, *Load Imbalance Mitigation Optimizations for GPU-Accelerated Similarity Joins*. IEEE High-Performance Big Data, Deep Learning, and Cloud Computing Workshop, Proceedings of the 2019 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), pages 396–405, doi: [10.1109/IPDPSW.2019.00078](https://doi.org/10.1109/IPDPSW.2019.00078), Rio de Janeiro, Brazil, May 2019 (**Best Paper Award**).

POSTER PRESENTATIONS

1. **Benoit Gallet** and Michael Gowanlock, *Optimizing GPU-Accelerated Similarity Joins Addressing Data-Dependent Workloads*. IEEE International Parallel and Distributed Processing Symposium (IPDPS), PhD Forum, Rio de Janeiro, Brazil, 2019.
2. **Benoit Gallet** and Michael Gowanlock, *Exploring The Design-Space of GPU-Efficient Similarity Self-Join Kernels*. High-Level Parallel Programming and Applications (HLPP), 11th International Symposium, Orléans, France, 2018.

SERVICE

- Co-supervised MSc student research projects at Northern Arizona University (Flagstaff, USA), and University of Orléans (Orléans, France).
- Co-designed a Python coding course for the Tuba City high school.
- External reviewer for the International Conference on Computational Science (ICCS): 2020–2024.
- Reviewer for the Journal of Parallel and Distributed Computing (JPDC), Elsevier.
- Reviewer for the IEEE Transactions on Knowledge and Data Engineering (TKDE) journal.
- Reviewer for the Journal of Statistical Software.