Christopher Lukas Kverne

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Education

Florida International University   Aug 2022 – April 2026
B.S. Computer Science, Minor Mathematical Sciences

- GPA: 3.82/4.0
- **Relevant Coursework:** Discrete Mathematics, Multivariable Calculus, Linear Algebra, Graph Theory, Probability & Statistics, Differential Equations, Combinatorics, Numerical Analysis, Computational Geometry, Algorithmic Theory

Publications and Manuscripts

1. **Christopher Kverne**, Mayur Akewar, Nicholas S. DiBrita, Yuqian Huo, Tirthak Patel, Janki Bhimani. *Variational Quantum Algorithms are Lipschitz Smooth*. [Under Review ICLR 2026]. (Manuscripts available upon request).

2. **Christopher Kverne**, Mayur Akewar, Yuqian Huo, Tirthak Patel, Janki Bhimani. *WSBD: Freezing-Based Optimizer for Quantum Neural Networks*. [Under Review AISTATS 2026].

3. **Christopher Kverne**, Mayur Akewar, Yuqian Huo, Tirthak Patel, Janki Bhimani. *Quantum Neural Networks Need Checkpointing*. [ACM HotStorage 2025].

4. **Christopher Kverne**, Federico Monteverdi, Agoritsa Polyzou, Christine Lisetti, Janki Bhimani. *CourseJob Fit: Understanding the Contextual Relationship Between CS Courses and Employment Opportunities*. [ASEE 2025].

5. Mayur Akewar, **Christopher Kverne**, Yuqian Huo, Tirthak Patel, Janki Bhimani. *Variational Quantum Algorithms Under Hardware Noise: Impact and Mitigation*. [Under Review SIGMETRICS 2025].

6. Yuqian Huo, Jinbiao Wei, **Christopher Kverne**, Mayur Akewar, Janki Bhimani, Tirthak Patel. *Revisiting Noise-adaptive Transpilation in Quantum Computing: How Much Impact Does it Have?* [ICCAD 2025].

7. Manoj P. Saha, **Christopher Kverne**, Danlin Jia, Janki Bhimani, Ningfang Mi. *KVPack: Hybrid Indexing for KV-SSD*. [Under Review IEEE TC 2025].

8. Lorena Quincoso Lugones, **Christopher Kverne**, Agoritsa Polyzou, Christine Lisetti, Janki Bhimani. *Aurora: Neuro-Symbolic AI Driven Advising Agent*. [ACM SAC 2026].

Honors and Awards

1. *FIU OURS Research Scholarship (8000$)* – One of 20 students selected for fully funded Spring-Fall research.
2. *CRA Outstanding Undergraduate Researcher Award 2025* – Honorable Mention.
3. *ACM HotStorage Travel Grant (500$)* – Fully funded registration and travel to present my paper.
4. *NSF Funded Research Stipend (4250$)* – Awarded From DaMRL 2025.
5. *NSF Funded Research Stipend (4250$)* – Awarded From DaMRL 2024.

Experience

Incoming Research Intern, SINTEF – Oslo, Norway   May 2026 - Aug 2026

- Selected for ML/Quantum internship at Scandinavia's largest private research institution (250 applicants).

Machine Learning Research Intern, University of Washington – Seattle, WA   Aug 2025

- Engineered a Vision Transformer (ViT) architecture from scratch in PyTorch, implementing mechanisms like multi-head self-attention, layer normalization, and patch-based embeddings for scientific image analysis.
- Benchmarked the ViT against a fine-tuned ResNet-50 baseline on a specialized phytoplankton dataset, achieving 99% classification accuracy and demonstrating the ViT's superior performance for this task.

Research Assistant, Data Management Resource Laboratory – Miami, FL   Nov 2023 – Present

- Formulated and proved the L-smoothness property for quantum neural networks, deriving a closed-form upper

bound on the Lipschitz constant with linear Hessian scaling — currently the tightest known analytical bound.

- Developed and analyzed a novel gradient-based optimization algorithm that selects active training subsets via gradient variance; achieved 40–60% faster convergence than Adam on IBM quantum hardware.
- Invented the first QNN specific checkpoint strategy finding that they are hardware dependent and can be saved asynchronously enabling researchers to share their models.
- Benchmarked FIU computing curricula against 200K technical job postings via fine-tuned embedding transformers; identified 40–70% skill mismatch between courses and industry skills.

Software Engineer Intern, NG Nordic – Oslo, Norway   May 2024 – Aug 2024

- Developed a full stack web application using Next.js, TypeScript and PostgreSQL for a disposal facility, integrating authentication with NextAuth and AzureAD.
- Developed a data fetching script on Azure with server-side caching, enabling stored responses for recurring client requests, reducing redundant data fetches by up to 30%.
- Created multiple graphs and filters to display real-time traffic flow data, aiding onsite workers in better management, reducing traffic by 5-10% each day.

Teaching, Leadership and Outreach

Teaching Assistant, Florida International University – Miami, FL   Jan 2023 – Dec 2024

- Tutored Calculus class of 50+ students. Weekly office hours, 5 students increased their grades by 1-2 letters.
- Tutored and graded a Data Structures and Algorithms class of 40+ students.

Founding Member, Engineering Research Society – Miami, FL   Nov 2024 – Present

- Started a research organization at FIU by hosting various events and spreading awareness of Computing/Engineering based Research. Increased headcount by 200+ members through outreach.
- Led multiple machine learning workshops teaching fundamental topics and current research done.

SGA Representative, INIT – Miami, FL   Jan 2023 – Dec 2023

- Represented the INIT coding club at the FIU's student government which increased funding by $5000 and head count by 100 students, hosted Florida's largest hackathon Shellhacks.
- Led mathematical machine learning workshops with an attendance of 20-30 covering foundations.

Projects

Seq2Seq Text Summary   [GitHub Repository]

- Developed an Encoder-Decoder LSTM network for summarizing text in PyTorch using the X-sum dataset.
- Developed custom attention mechanisms to enhance decoder performance. Optimized model using beam search decoding, gradient clipping, and mixed-precision training achieving a ROUGE scores exceeding 0.24.

Neural Network from Scratch   [GitHub Repository]

- Implemented a neural network from scratch in Python only using NumPy matrices.
- Designed custom ReLU and Softmax activation functions along with categorical cross-entropy loss for forward and backwards propagation. Implemented RMSProp, SGD, Adagrad and ADAM optimizers with decay.

Technologies and Skills

Programming & Scientific Computing: C, Python, MATLAB, NumPy, SciPy, matplotlib, PostgreSQL, SQL

Machine Learning & Quantum: PyTorch, TensorFlow, Keras, CUDA, Qiskit, Pennylane

Web & Cloud: JavaScript, React, .NET, Firebase, Azure

Languages: Norwegian (Native), German (Native), English (Fluent)

Mathematical & Analytical Topics: Continuous optimization theory (Lipschitz smoothness, gradient and Hessian analysis), real and functional analysis, linear and multilinear algebra, numerical methods for non-convex systems, stochastic approximation, and discrete mathematics (graph theory, combinatorics).