

# Christopher Lukas Kverne

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## Education

<b>Florida International University</b> B.S. Computer Science, Minor Mathematical Sciences	Aug 2022 – April 2026
<ul style="list-style-type: none"><li>• GPA: 3.84/4.0</li><li>• <b>Relevant Coursework:</b> Discrete Mathematics, Multivariable Calculus, Linear Algebra, Graph Theory, Probability &amp; Statistics, Differential Equations, Combinatorics, Numerical Analysis, Computational Geometry, Algorithmic Theory</li></ul>	

## 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. *CRA Outstanding Undergraduate Researcher Award 2026* – Runner up.
2. *CRA Outstanding Undergraduate Researcher Award 2025* – Honorable Mention.
3. *FIU OURS Research Scholarship (8000\$)* – One of 20 students selected for fully funded Spring-Fall research.
4. *ACM HotStorage Travel Grant (500\$)* – Fully funded registration and travel to present my paper.
5. *NSF Funded Research Stipend (4250\$)* – Awarded From DaMRL 2025.
6. *NSF Funded Research Stipend (4250\$)* – Awarded From DaMRL 2024.

## Experience

<b>Incoming Research Intern</b> , SINTEF – Oslo, Norway	May 2026 - Aug 2026
<ul style="list-style-type: none"><li>• Selected for ML/Quantum internship at Scandinavia's largest private research institution (250 applicants).</li></ul>	
<b>Machine Learning Research Intern</b> , University of Washington – Seattle, WA	Aug 2025
<ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li></ul>	

- 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 200,000 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

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- 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

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- 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

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**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).