

Kyle Lukaszek

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Education

University of Guelph

Honours Bachelor of Computing, Minor in Mathematics
Completed Major in April 2024, Completing Minor ~2025

Guelph, ON, Canada

Sept 2020-Apr 2025 (Expected)

Projects @ kylelukaszek.com

Colour Spaces:

My undergraduate research project was independently designing and developing new portable, real-time 3D colour space visualization tools. Achieved sub-16ms frame time on consumer laptops rendering 16 million individual particles from the browser through WebGPU.

SDL3 WebGPU:

Simple DirectMedia Layer (SDL) recently released a new version with its graphics and compute backend using Vulkan, DX, and Metal. In my free time, I am porting the functionality of the Vulkan backend to WebGPU, as WebGPU is an abstraction of Vulkan anyway. I am currently getting Graphics Pipelines working with shader reflection. This is still a work in progress.

Google Tint WASM:

Ported Google's open-source WGSL shader cross-compiler to WASM with a C++ API so that browsers can support SPIR-V shaders for WebGPU apps by doing shader reflection on the SPIR-V binaries, and returning valid WGSL code to be used in your WebGPU applications. This is all done from the browser, which eliminates the need for cross-compilation on the host machine.

Skills / Toolset

Natural Languages: English, French (DELF B2 Certified)

Programming Languages: C, TS/JS, Python, C++, Swift, R, C#, Java, OpenCL, CUDA, GLSL, HLSL, WGSL
Frameworks/Libs:

Jax, PyTorch, SciKit, NumPy, Pandas, NVIDIA Warp, OpenGL, WebGL, Vulkan, WebGPU, UIKit, React

Developer Tools: GCC, GDB, Valgrind, Git, GitLabs CI/CD, Docker, Kubernetes

Work / Research Experience

University of Guelph

CIS*2750 TA: Software Systems Development and Integration

January 2025-April 2025

Guelph, Ontario

University of Guelph

Modelling Human Perception of Colour Based on Ambient Illumination

January 2024-January 2025

Guelph, Ontario

Worked as a full-time colour & light research assistant supervised by Dr. Denis Nikitenko.

- Worked towards developing a model to understand situational-visual-impairments in direct sunlight better. Learned a lot about optics and light transport.
- Developed a Unix-compatible JETI API for the JETI Spectral 1501 spectroradiometer using the SPECFIRM. Bluetooth is implemented for both Linux and MacOS.
- Developed an iOS app to assist in testing different colours. It uses iOS SensorKit to measure the Lux at the position of a display we are testing and makes sure the display is at the correct brightness.
- **Our paper was accepted for the Graphics Interface 2024 conference in Halifax.**

CARE AI

Modelling of Online Hate Through Psycholinguistic Patterns and Behaviours

May 2023-September 2023

Guelph, Ontario

Worked as a quantitative machine-learning research assistant supervised by Dr. Fattane Zarinkalam and Ph.D candidate Hadiseh Moradisani.

- Collaborated on a Big Data/IR machine learning project with Toronto Metropolitan University.
- Learned a lot about graduate-level quantitative analysis and NLP methods.
- Implemented various classical ML/NLP pipelines to perform quantitative/statistical analysis on large amounts of scraped Twitter information.
- Made use of NumPy, Pandas, JAX, Sci-Kit, and Huggingface. Huggingface was used to work with larger models such as BERT and BERTopic.
- Performed kernel tuning to aid in maximizing compute time efficiency.
- Since we were working with a large amount of Twitter data, it was important to try and parallelize as much of my code as possible due to hardware constraints on our work server.
- **The paper was published in the IEEE Transactions on Computational Social Systems.**

References

Dr. Denis Nikitenko: PhD in Computer Science / Professor @ UofG
• **Email:** dnikiten@uoguelph.ca

Dr. Fattane Zarrinkalam: PhD in Engineering / Professor @ UofG
• **Email:** fzarrink@uoguelph.ca

Hadiseh Moradisani: Computer Engineering PhD Candidate @ UofG
• **Email:** hmoradis@uoguelph.ca