Kyle Lukaszek

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Education

University of Guelph — Guelph, ON, Canada

Honours Bachelor of Computing, Minor in Mathematics — *Sept 2020-Apr 2025 (Expected)*

Completed Major in April 2024, Completing Minor ~2025

Projects @ kylelukaszek.com

ColourSpaces: 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 by leveraging WebGPU compute shader technology.

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 — January 2025-April 2025

*CIS*2750 TA: Software Systems Development and Integration* — *Guelph, Ontario*

University of Guelph — January 2024-January 2025

Modelling Human Perception of Colour Based on Ambient Illumination — *Guelph, Ontario*

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

- Research assistant helping develop a model to better understand Situational-Visual-Impairments in direct sunlight. Learned a lot about optics and light transport.
- Developed a Unix compatible JETI API for the JETI Spectraval 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 initial paper was accepted for the Graphics Interface 2024 conference in Halifax.**

CARE-AI — May 2023-September 2023

University of Guelph — *Guelph, Ontario*

Worked as a full-time 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.
- Utilized Python and R libraries such as Google Causal Impact, Huggingface, and sci-kit-learn to develop and train various statistical models to predict hate speech on Twitter.
- 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.
- Performed hardware tuning to aid in maximizing efficiency.
- Maintained well-documented notes for all code written throughout the project.
- Learned a lot about graduate-level quantitative analysis methods.

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