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

These Colours Do (Not) Exist:
My undergraduate research project involved designing and developing new portable, real-time 3D colour space visualization tools independently. I achieved sub-16ms frame time on consumer laptops rendering 16 million individual particles from the browser through WebGPU beating MATLAB.

SDL3 WebGPU:
Simple DirectMedia Layer (SDL) recently released a new graphics and compute backend using Vulkan, DX, and Metal for their release of SDL3. In my free time, I have been porting the functionality of the Vulkan backend to WebGPU, as WebGPU is an abstraction of Vulkan anyway. This is all being done as an open-source contribution to the SDL project.

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++, Zig, Swift, R, Java, OpenCL, CUDA, GLSL, HLSL, WGSL
Frameworks/Libs: Jax, PyTorch, SciKit, NumPy, Pandas, OpenGL, WebGL, Vulkan, WebGPU, UIKit, React
Developer Tools: GCC, GDB, Valgrind, Git, GitHub/GitLabs CI/CD, Docker, Kubernetes

Work / Research Experience

University of Guelph — January 2025-April 2025
CIS*2750 Teaching Assistant: 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 HCI 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 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 paper was accepted for the Graphics Interface 2024 conference in Halifax.**

CARE AI — May 2023-September 2023
Modelling of Online Hate Through Psycholinguistic Patterns and Behaviours   *Guelph, Ontario*

Worked as a full-time 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