**Mentor:** Joel Brandt

**Tittle**: A Study of High Performance Image Processing in the Browser

**Abstract**— This study explores the possibilities of executing complex image processing algorithms inside the browser. Using experimental technologies/researches and official standards, this study explores the possibilities of moving native high performance image processing software (such as Photoshop) to a web environment by using the heterogeneous resources of modern computing and recent compiling tools.

Recent technologies such as HTML5, WebCL, and LLVM open a world of possibilities to browser’s applications and innovation. All these technologies along with experimental projects such as Emscripten and the Halide Language were explored in combination with commercial browsers (Mozilla, Chrome) in order to implement, benchmark, and analyze different processing algorithms in the browser’s JavaScript engine.

The study exposes many details of the benchmark implementation and other elements such as code optimization, combination of technologies, JavaScript performance and limitations, viability and risks, security challenges, and code structure’s performance. A set of code snippets, graphs and diagrams are provided to illustrate and explain the different elements of the study. The result of the study is a potential start up point to future research/implementations of high performance image processing by combining these technologies to create pipelines, optimization tools, and experiments in a browser platform.

**Bio**: Victor is a PhD student at Purdue University working with Prof. Jan Vitek. His research involves Compilers, Programming Languages, and Big Data.