

# Hayden Gunraj

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## Skills

- Extensive programming experience in Python, C++, C, and Matlab
  - Prior work in development of image processing algorithms using both Python and Matlab
  - Knowledge of several imaging modalities, such as MRI, CT, and spectroscopy
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## Experience

### Industrial Imaging Software Developer P&P Optica, September 2018 – December 2018

- Created software tools for use in a hyperspectral imaging system
- Upgraded calibration tools for imaging hardware to improve ease of use and traceability
- Developed image analysis algorithms to automate data post-processing and measure classifier performance
- Designed user interfaces and asynchronous real-time displays to show material classification results
- Operated imaging system during data captures, software testing, and customer demos

### Medical Software Developer Sunnybrook Research Institute, January 2018 – April 2018

- Developed novel segmentation algorithms for cardiovascular magnetic resonance images using Matlab
- Implemented image registration methods to facilitate image analysis
- Integrated new algorithms into a fully automated image reconstruction and analysis pipeline using Python
- Validated the accuracy of the pipeline by comparing automatic data to expert results

### Technical Systems Analyst CIBC Enterprise Architecture, May 2017 – August 2017

- Aided in design of wire transfer systems to align with SWIFT GPI and ISO20022 standards
  - Utilised Unified Modelling Language to illustrate systems architecture and solutions
  - Implemented task automation in VBA to remove several manual processes, and re-wrote formulas to improve speed by ~50%
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## Projects

### Optical Tomography

- Experimented with tomographic image reconstruction using Python, an iPhone, and a lamp
- Images acquired via light transmitted through a translucent medium are reconstructed into a 3D volume
- Used SART to create volumes since this technique performs well despite noise and sparse data
- Colour channels are reconstructed separately such that they may be recombined to create an RGB volume

### Simple 3D Graphics

- Created a minimal 3D graphics engine using Pygame which can animate simple scenes
  - Implemented linear algebra functions to perform manipulations and conversions of object coordinate systems
  - Employed manager classes to perform updates to object and camera locations and orientations
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## Education

### University of Waterloo BSc, Mechatronics Engineering, 2016 – present

- **Relevant Courses** – Algorithms and Data Structures (C++), Computer Structures and Real-time Systems (C), Digital Computation (C++), Microprocessors and Digital Logic, Sensors and Instrumentation
- **Self-study** – Medical Image Processing (Matlab)