# Oliver White

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## THESES

### EXTREMELY LOW FREQUENCY DETECTION FOR BIOMETRIC SENSING | MSc Thesis

Sep. 2020 —Present | University of Calgary

- Designed and constructed magnetic induction sensor for detecting extremely low frequency (ELF) signals.
- Designed PCB circuits using Altium Designer.
- Conducted experiments involving human trials.
- Designed and tested various neural network architectures in Keras and Tensorflow for biometric analysis of ELF data.

### IMAGE ANALYSIS OF MITOCHONDRIAL NETWORKS IN HEALTH AND DISEASE | Senior Physics Thesis

Sep. 2019 —Dec. 2019 | University of Calgary, Live Cell Imaging Lab

- Worked with biologists to transition from qualitative visual scoring to automated quantitative scoring by designing software to analyze mitochondrial networks.
- Implemented several segmentation techniques in ImageJ on fluorescent microscopy images of mitochondrial networks.
- Developed an ImageJ macro and Python script to automate the quantitative analysis of image segmentation and data analysis.

### UPCONVERTING NANOCRYSTALS AND SOL GEL FILMS | Nanoscience Thesis

Sep. 2019 —Apr. 2020 | University of Calgary

- Investigated fluorescent properties of upconverting lanthanide doped nanocrystals, and the effects from varying dopant concentrations, crystal structure, and shape have on fluorescent yield.
- Attempted to embed nanocrystals into silica Sol-gels to produce upconverting films.
- Trained in a variety of microscopic and analytical techniques such as Scanning Electron Microscopy (SEM), Energy-Dispersive X-Ray microscopy (EDX), Dynamic Light Scattering (DLS), Fluorescent Correlation Microscopy (FCS), and Atomic Force Microscopy (AFM).
- Utilized Schlenk line techniques to work with air-sensitive chemicals in nitrogen and vacuum environments.

## TECHNICAL PROJECTS & EXPERIENCE

### IMAGE RECONSTRUCTION FROM LOW SNR SINGLE-PHOTON MICROSCOPY | Machine Learning Specialist

May. 2020 —Sept. 2020 | Bliq Photonics

- Developed software to accurately model and display the optical system of a hyperspectral satellite with MatLab.
- Designed and integrated a variety of simulated optical components, such as diffraction gratings, parabolic, elliptical, and spherical lenses and mirrors, as well as detectors and fiber optic cables.
- Virtually oriented components to simulate a modified Cassegrain reflector system and used this model to help develop a prototype.

### HYPERSPECTRAL OPTICS MODELLING | Spectral Aerospace

## EDUCATION

### UNIVERSITY OF CALGARY

M.Sc Electrical Engineering
GPA: 4.0
Exp. Apr. 2023

B.Sc Physics
Minor in Nanoscience
Major GPA: 3.3

B.Sc Natural Sciences
Double Conc. Energy Science & Mathematics
Major GPA: 3.3

## COMPUTER SKILLS

### PROGRAMMING

- Python
- MatLab
- Linux
- UNIX
- ImageJ Macro Language

### SOFTWARE & FRAMEWORKS

- Keras
- Tensorflow
- SciPy
- Scikit-learn
- Altium Designer
- Pandas
- ImageJ
- LaTeX
- Swift
- Fusion 360
- KNIME
- CoreML
- Matplotlib
- Git

### Coursework & Research Expertise

Advanced Laboratory Physics
Image Processing and Analysis
Design in Nanotechnology
Computational Physics
Renewable Energy Systems
Energy Storage Systems
Use of Sensitive Lab Equipment
Use of Dangerous Chemicals
Operation of Microscopes: SEM • EDX FCS/Confocal • DLS • AFM • UV-Vis • Spectrofluorimetry

Dec. 2018 —Jan. 2020 | Remote

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### IMAGE ANALYSIS ASSISTANT | Live Cell Imaging Lab (LCI)

May 2020 —Jan 2021 | Snyder Institute for Chronic Diseases, Calgary, AB

- Developed software to perform automated image segmentation of mitochondrial networks, as well as methods to analyze and score the images.
- Created automated image analysis software to perform specific tasks to aid biologists in their research.
- Performed a literature review on available software for automated image analysis of mitochondrial networks on a variety of platforms (i.e. ImageJ, MatLab, Python, KNIME, Java).

### WESTHOFF ENGINEERING | Intern

Summer 2018 | Calgary, AB

- Delineated wetlands using GPS and aerial data, and identified species of plants and animals in the area.
- Installed remote weather stations and data collection/monitoring systems.
- Analyzed and logged collected data from both weather stations and wetlands.

### CARLOTTA CORPORATION | Energy Storage & Solar Projects

Summer 2016 & 2017 | Calgary, AB

- Worked on finding potential clients and applications for energy storage devices throughout Canada and the United States.
- Analyzed energy prices and energy production methods throughout North America to find most suitable provinces and states for energy storage.
- Worked on a solar energy project as a contract aimed at developing commercial solar plants throughout Alberta.

### VANTAGE ELECTRIC | Summer Student

May 2016 —Aug 2016 | Calgary, AB

- Tasks involved pipe-fitting, installing electrical components and systems, operating lifts, pulling wires, installing light fixtures.
- Worked with high voltage systems.

## ACADEMIC PROJECTS

### MOOD RECOGNITION USING NEURAL NETWORKS AND ECG DATA | Biometric Systems Research Project

Jan. 2021 —Apr. 2021 | University of Calgary

- Used ECG data from the WESAD dataset to produce 5 neural network models for mood classification.
- Performed comparisons of RNNs, CNNs, and combination of RNNs and CNNs.
- Gained experience in TensorFlow, neural network modelling, and design.

### MICROWAVE IMAGING SYSTEMS FOR CANCER DETECTION | Optical Instrumentation Research Project

Sep. 2020 —Dec. 2020 | University of Calgary

- Investigated methods of imaging using microwave tomography, microwave radiometry, and thermography.
- Focusing on the application of microwave imaging systems for use in cancer detection, particularly for breast cancer.

### SUPERCAPACITOR-BATTERY HYBRID SYSTEMS | Energy Science Capstone

Fall 2018 | University of Calgary

- Investigated the technical design and applications of supercapacitor-battery hybrid systems.
- Contrasted supercapacitor-battery coupled systems and supercapacitor-battery hybrid cells.
- Explored the use of supercapacitor-battery hybrids in various energy production systems, from power generation to vehicles.

## TEACHING & VOLUNTEERING

### TEACHING ASSISTANT | Intro to Circuits and Machines

May 2019 —June 2021 | Calgary, Canada