LEVI KEAY

levi.keay@gmail.com | Personal Website | Linkedin

Levi is a Data Scientist with strong Python programming skills, education in Higher Math and Physics, and excellent written and verbal communication.

Levi learned analytic and computational skills while earning his BSc in Physics, working with a variety of data sources, such as audio data and the magnetization of superconductors. His experience as a Research Assistant in a Remote Sensing graduate lab gave him an appreciation for the power of imagery. Here, Levi developed and applied computer vision methods to large datasets to find solutions in forest management and disturbance mapping. He led the research and development of a Python package which applies timeseries analysis approaches to new remotely sensed imagery datasets. Levi has demonstrated ability to communicate technical procedures and results through scientific writing and is first author on a manuscript submitted for publication.

Comfortable and experienced working across environments of GIS and Python, and quick to learn new software and coding languages, Levi is able to script, automate, and optimize methods of analyzing data from a range of sources, and wants to use these skills to help your company efficiently provide value.

SKILLS

Technical Skills:

- Geospatial analysis (Gdal, Rasterio, Shapely), ArcGIS Pro/ArcPy
- Computer vision (OpenCV, Scikit)
- Data visualization (Matplotlib, Plotly)
- Computation(Numpy, Multiprocessing, Threading, HDF5/H5PY)
- Experiment design and hypothesis testing
- Machine Learning

Advanced Math and Physics:

- Partial Differential Equations, Vector Calculus
- Computational Physics
- Electromagnetism and Quantum Mechanics
- Advanced Classical Mechanics
- Statistical Mechanics
- Fourier Analysis, Signal Processing

WORK HISTORY

Research Assistant | CubeSat Imagery Specialist | Sept. 2020 – May 2022

Integrated Remote Sensing Studio - UBC Faculty of Forestry, Vancouver, BC, Canada

- Levi designed and implemented algorithms using Python to detect forest harvest using CubeSat optical sensor data.
- Demonstrated his ability to communicate scientific results and procedures through technical writing and descriptive figures. Levi is first author of the manuscript that is submitted for review, detailing the methods and results of the Python package he designed
- Implemented open-source Python libraries for geospatial operations (GDAL, Rasterio, Shapely, AROSICS), timeseries analysis (Numpy, Ruptures, SciPy), and image processing (PIL, OpenCV, matplotlib)
- Tested and optimized code performance using Numpy, Multiprocessing and Threading, reducing processing time by 839%

Fulltime Internship | Monitoring Forest Change with Satellite Imagery | May 2020 – Sept. 2020

Integrated Remote Sensing Studio - UBC Faculty of Forestry, Vancouver, BC, Canada

- Levi downloaded, processed, and analyzed radiometric calibration of PlanetScope Satellite Imagery
- Used Planet's Python API to automate downloads of CubeSat imagery to the lab server
- Wrote and edited funding applications and reports

Teaching Assistant | Experimental Physics Lab Course Material Creator | Aug. 2020 – Dec. 2020

Faculty of Physics and Astronomy – UBC, Vancouver, BC, Canada

- Levi coded a Python interface for audio hardware to measure Johnson/Thermal Noise from resistors during a pandemic-necessitated transition to online learning
- Utilized open-source libraries and learned to use them from their documentation (PyAudio, Numpy, Threading)
- Clearly documented the solution and tested it on multiple computer operating systems to ensure full portability and troubleshot all issues prior to product release
- Corresponded with hardware manufacturers regarding technical product attributes

Alpine Ski Coach | U14 Assistant Coach | Sept. 2014 – June 2022

Grouse Mountain Tyee Ski Club – North Vancouver, BC, Canada

- Levi directed on snow and dryland training sessions for teams of 30-40 athletes aged 12-13 to improve athletic abilities specific to alpine ski racing
- Collaborated with other coaches to set and maintain a safe training environment, and used efficient radio communication
- Showed desire for continued improvement through coach education, certification and professional-development activities
- Contributed to the development of Key-Performance-Indicators relating to athlete, coach, and club well-being

Highschool Ultimate Frisbee Coach | Head Coach | Feb. 2019 – June 2019

St. Johns School – Vancouver, BC, Canada

- Levi planned and led team practices around the objective of athlete development, skill acquisition and team-play in the sport of Ultimate Frisbee for the Junior Division Team (grade 8 – 10)
- Deliberated to foster a fun, inclusive, and competitive team culture
- Engaged in conflict resolution when required
- Effectively delegated and communicated tasks to support staff and team captains

PUBLICATIONS

- Keay, L., Mulverhill, C., Coops, N.C., McCartney, G. (2022). *Automated forest harvest detection with a normalized PlanetScope imagery time series.* Manuscript submitted for publication.

EDUCATION

- BSc. in Physics, University of British Columbia: 2022

PROJECTS

Portfolio Website Design | Personal Learning | July 2022

Building a static website using Jekyll to host a project portfolio

- Levi attended extra-curricular workshops to learn how to build static websites using Jekyll, Ruby and GitHub pages
- Independently learned basic HTML and CSS coding in order to customize functionality and aesthetic of the website
- Published concise descriptions of past works using Markdown to combine text, pictures, animations, tables, and links
- Demonstrated proper GitHub procedures, making a pull-request to recommend changes to the open-source template's Repo when he found a bug in the source code

See it in action : https://levikeay.github.io/Project_Site/

Musical Note Identifier (Back-End Development) | McGill Physics Hackathon 2021 | Nov. 2021

Identifying musical note classes from a live-time microphone audio stream

- Levi prototyped, debugged and deployed back-end Python software to stream audio from the operating device's microphone and determine musical note classes
- Demonstrated knowledge of time-frequency analyses and trade-offs between temporal and pitch resolutions, and optimized the implementation of Short Time Fourier Transform (STFT) based on application conditions
- Collaborated with team members on software, using version control (GitHub) and working within a tight project timeline
- Researched and implemented open-source Python libraries for Audio recording and analysis (PyAudio, Librosa)
- Assisted with the development of the GUI using PyQT5

View our Hackathon submission : https://devpost.com/software/musical-note-identifier

Positron Emission Tomography Image Quality Study | 4th Year Experimental Physics Project | Oct. 2021

Characterizing the relationship between PET system parameters and image quality

- Levi designed experiments to quantify aspects of image quality such as image blur, SNR and resolution
- Demonstrated an ability to quickly gain understanding of technical lab equipment, observing safety procedures
- Wrote Python scripts to analyze new data types and extract image quality metrics
- Used the Inverse Radon Transforms to convert sinogram data into useable images of radiation distributions

Check out my write-up : https://levikeay.github.io/Project_Site/blog/PET

Building Distributed Mode Loudspeakers | Hobby Project | Nov. 2020

Constructing and configuring a stereo sound system

- Levi designed and constructed a stereo sound-system using unconventional sound production technology (DML speakers)
- Tuned speaker panels speakers to achieve flat frequency response using both physical design measures and DSP
- Improved his knowledge of acoustics, frequency analysis, and audio hardware and software through an iterative design process
- Sourced materials both online and locally, optimizing for cost and performance

See my build : https://levikeay.github.io/Project_Site/blog/DML_build