LEVI KEAY

levi.keay@gmail.com | Personal Website | LinkedIn | Publication

I am a Data Scientist, Geospatial Analyst, and Image Processing Specialist with strong Python programming skills. I have an education in Math and Physics and training in Machine Learning techniques. My strong communication skills, both written and oral, have been demonstrated through my experiences publishing an academic research paper, and writing and documenting code for Earth Observation algorithms.

During my studies at UBC, I studied forest-sciences, physics, and remote sensing. I had the chance to blend my passions for analytics, imaging systems, and forest ecosystems when I worked as a Research Assistant at the UBC Faculty of Forestry's Integrated Remote Sensing Studio. There, I led the research and development of a Python package which applies timeseries breakpoint analysis to Planet CubeSat imagery data, and I am the first author of the corresponding research paper.

My passion is for applying new technologies and methods (such as recent advancements in Machine Learning, Deep Learning, and CNNs) to solve the modern world's problems. I am comfortable and experienced working across coding environments and version control software. I have 6+ years experience using Python, 3+ years using GIS, and I am quick to learn new software and coding languages. A growth mindset allows me to quickly adapt to new environments and projects and create a positive impact in a variety of roles. I can script, automate, and optimize methods of analyzing data from a range of sources, and want to use these skills to help your company efficiently provide value.

SKILLS

- Processing remotely sensed data (optical, SAR, LiDAR)
- Geospatial analysis with Python: GDAL, Rasterio, Shapely
- Machine Learning, deep learning: PyTorch, Keras
- Computer vision: OpenCV, Scikit, SciPy
- AWS computing and storage, Python API access via boto3
- Data visualization: Matplotlib, Plotly, Adobe Suite
- Computation: Numpy, Multiprocessing, Threading, H5PY

- High-productivity coding leveraging GitHub copilot
- Version control : Git, GitHub
- Knowledge of UI design patterns
- Advanced Classical Mechanics
- Statistical Mechanics
- Signal Processing
- Experiment design and hypothesis testing

WORK HISTORY

Data Analyst | InSAR Processing Operator | Jan. 2023 – Present
TRE Altamira - Vancouver, BC, Canada / Milan, LOM, Italy
- Displayed understanding of satellite earth observation systems, their limitations and strategies for optimization from first principles
- Utilized AWS cloud storage and computing environments efficiently for timely processing of large SAR imagery datasets
- Automated processing pipelines using Python, Bash, and Matlab scripting in a Linux environment
- Followed Git and GitHub version control best practices
- Worked between international teams to create tools using Python, improving efficiency and consistency in generating data products
- Applied state-of-the-art interferometric SAR (InSAR) algorithms, ensuring accurate and reliable results for spatiotemporal ground motion monitoring of client infrastructure assets

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

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

- Designed algorithms for using Planet CubeSat sensor data to map forest harvest in space and time and published a peer-reviewed study detailing the methods and results
- Communicated scientific results and procedures through scientific writing, presentations, and descriptive figures (Python, matplotlib, ArcMap, ArcGIS Pro, Adobe Illustrator)
- Used 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 for processing large datasets (Numpy, Multiprocessing and Threading)
- Contributed to colleagues' research involving a wide range of sensing technologies such as LiDAR and Hyperspectral by providing software and coding support

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

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

- Automated downloads of Planet CubeSat imagery to the in-house server using Planet's Python API
- Processed Planet CubeSat imagery, performing radiometric calibration, co-registration and cloud masking
- Wrote and edited funding applications and reports, securing critical research grants

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

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

- Designed a Python interface for audio hardware allowing for at home Physics experiments
- Demonstrated thorough understanding of Johnson/Thermal Noise, its impact on circuits and techniques to quantify it
- Documented and tested code on multiple computer operating systems to ensure full portability and corrected issues prior to release
- Corresponded with hardware manufacturers regarding technical product attributes
- Utilized open-source libraries, learning quickly to use them from their documentation (PyAudio, Numpy, Threading)

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

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

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

Highschool Ultimate Frisbee Coach | Junior Team - Head Coach | Feb. 2019 – June 2019

St. Johns School – Vancouver, BC, Canada

- Planned and led team practices around the objective of athlete development, skill acquisition and team-play in the sport of Ultimate Frisbee for athletes grades 8 – 10
- Fostered a fun, inclusive, and competitive team culture
- Engaged in conflict resolution, following school procedures and athlete-coach relation best practices
- Delegated and coordinated tasks among support staff and team captains effectively

PUBLICATIONS

- Levi Keay, Christopher Mulverhill, Nicholas C. Coops & Grant McCartney (2023) *Automated Forest Harvest Detection with a Normalized PlanetScope Imagery Time Series, Canadian Journal of Remote Sensing*, 49:1, DOI: 10.1080/07038992.2022.2154598

EDUCATION

- BSc. in Physics, University of British Columbia: 2022
- Machine Learning Specialization by Stanford University and Deeplearning.AI on Coursera: 2022
- Alpine Canada Development Level Coaching Certification: 2021

PROJECTS

Portfolio Website Design | Personal Learning | July 2022
Building a static website using Jekyll to host a project portfolio

- Attended workshops to learn how to build static websites using Jekyll, Ruby and GitHub pages
- Independently learned basic HTML and CSS coding to customize functionality and aesthetic of the website
- Published concise descriptions of previous projects using Markdown to combine text, pictures, animations, tables, and links
- Demonstrated proper GitHub procedures, making useful contributions to the template's open-source Repo through pull-requests

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

- 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, trade-offs between temporal and pitch resolutions, and implementation of Short Time Fourier Transform (STFT)
- 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

- 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**