

experience

Metis · New York, NY Mar. 2020 to June 2020
Data Scientist

Completed an immersive 12-week data science bootcamp and completed independent project work from ideation to presentation. Projects included regression modeling, classification algorithms and machine learning, clustering and natural language processing, neural networks including CNNs and RNNs, SQL and NoSQL databases, and use of cloud computing resources. *See project section.*

PAG Geology LLC, independent consultant · Milroy, IN and Honolulu, HI Sept. 2011 to Current
Principal

Serve as a Geological consultant. Investigated soil and groundwater, conducted risk assessment and cleanup. As a technical advisor, provided expert analysis of information on slope failures in Hawaii and mineral extraction opportunities in Central Asia. Selected work includes:

Indiana Site

- Analyzed multidecadal files on complex and litigated site in Indiana to provide clarity on data needs to inform further investigation and remediation work.

Honey Bee LLC

- Completed investigation & coordinated cleanup action in preparation for a planned ~\$15 M redevelopment on Waikiki.

University of Tennessee · Knoxville, TN July 2015 to May 2017
Postdoctoral Teaching Associate

Rehabilitated X-ray diffractometer, directed student research, taught mineralogy and general geology. Received Outstanding Postdoctoral Associate award for 2015-2016.

Illinois State University · Normal, IL Jan. 2014 to May 2015
Visiting Faculty

Published research on halogen content of Martian systems, directed student research, taught mineralogy, petrology, and planetary science, served with distinction on grant review panel for federal agency.

Southern Illinois University · Carbondale, IL Jan. 2012 to Dec. 2013
Postdoctoral Research Associate

Modeled and analysed the geochemistry of Martian rocks and meteorites. On emergency notice, rebuilt and taught mineralogy and economic geology courses with superb student course evaluations.

University of Illinois - Chicago · Chicago, IL Sept. 2009 to Aug. 2011
Postdoctoral Research Associate

Performed and interpreted results of carbon sequestration experiments. Designed experimental control systems for custom pressurized chambers.

Indiana Department of Environmental Management · Indianapolis, IN June 2006 to Aug. 2009
Geologist 2

Conducted technical analysis of data and documents on contaminated sites, including site investigation resulting in listing of Lusher Street / Avenue Superfund Site.

projects

Multispectral Image Processing & Landscape Clustering Analysis

- Processed geospatial raster data from multispectral remote sensor (Landsat 8 OLI) via GDAL, GRASS, numpy, and scikit-image.
- Principal component analysis to image data with maximum contrast.
- Dash / plotly / Flask dashboard to serve maps in true color, standard false color, and PCA component false color.
- DBSCAN and Mean Shift algorithms to search for clustering / individual landscape elements in spatial + spectral space.

Natural Language Processing: Discussion Forum

- Scraped ~1,000,000 posts from jeepforum.com using python, requests, BeautifulSoup.
- Processed data with scikit-learn, spaCy, CorEx to extract 20 topics.
- Used AWS instance for scraping, Google instance for CorEx analysis.
- Constructed Flask / plotly Dash web dashboard to show topic strengths and term breakdowns.

Machine Learning Classifier: Rock Age

- Gathered ~150,000 chemical analyses and age data from EarthChem database web interface.
- Processed chemical feature data, constructed interaction features.
- Compared results of scikit-learn and statsmodels output for logistic, random forest, and gradient boosting tree classifiers.
- Evaluated classifier performance on recall, precision, confusion matrices, ROC curves and AUC.
- Train-test cycling and k-fold cross validation.

Regression Analysis: Baseball Attendance

- Scraped baseball statistics data from baseball-reference.com, census data.
- Feature selection and interaction feature construction using scikit-learn and statsmodels libraries.
- Ridge, lasso, and elastic net regression results to predict MLB attendance from internal game statistics, fan attraction.

Regression Analysis and Model Construction: High Temperature Geochemistry

- Gathered and meticulously cleaned literature data on amphibole and glass chemistry.
- Constructed multi step interlocking chemical model for water activity.
- Feature selection and construction for linear regression model using Microsoft Excel.
- Model inversion to create predictions for iron valence, water content, crucial chemical parameters that are difficult and seldom measured.
- Example uses of the model on terrestrial and Martian geochemical problems.

Complexation Chemistry Analysis

- Gathered all structure solutions for uranium(VI)-organic complexes from Cambridge Structure Database.
- Constructed a classification scheme and symbol code based on bond topology.

contact

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summary

Problem solver with skills in data science, mathematics, geoscience, and materials science. Practiced in communication with technical audiences, stakeholders, and the broader community.

education

University of Notre Dame
PhD Geological Science
Arthur J. Schmitt Fellow
Dissertation: Structural hierarchy of organic uranyl complexes

Washington University in St. Louis
AM Earth & Planetary Science
BA Earth & Planetary Science / Classics
Ernest L. Ohle Award for outstanding geoscience undergraduate
Master's thesis & senior thesis: thermal conductivity of garnet from vibrational spectroscopy

skills

PROGRAMMING LANGUAGES

Python
C++

VISUALIZATION PACKAGES

matplotlib
seaborn
plotly
ggplot
gnuplot
flask
PIL / pillow
scikit-image

SYSTEM & DATA ADMINISTRATION

Linux
bash
SQL
mongoDB

DOCUMENTS & COMMUNICATION

Markdown
LaTeX
WordPress
podcasting

STATISTICAL & DATA PACKAGES

numpy
pandas
scikit-learn
statsmodels
corex
R
Excel
spaCy
GDAL
GRASS GIS