# frank burkholder

data scientist

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## employment

### Galvanize
Denver, CO

Data Science Fellow
Feb 2016 to Current

- Completed 12 week Data Science bootcamp that focuses on Python, SQL, statistics, machine learning, natural language processing, neural nets, Mongo, and AWS.
- Worked in teams to deploy a fraud detection web application, predict churn for a ride-sharing company, and build a movie recommender system.
- Capstone project investigates UAV package delivery for Denver area.

### Abengoa Solar
Lakewood, CO

Manager Research & Development
2012 to 2015

- Responsible for strategic vision and funding. Managed projects and staff to meet design specifications and Department of Energy deliverables for novel solar collector contracts.
- Simulated power plant performance using scripting language in NREL's SolarPilot and SolTrace programs.
- Derived, programmed, and validated a learning heliostat tracking algorithm to maintain the center of the reflected beam within 1 m of the desired aimpoint located on a target 1 km away.

### National Renewable Energy Laboratory
Golden, CO

Mechanical Engineer IV
2006 to 2012

- Ph.D. determined noble gas concentrations necessary to limit heat loss caused by hydrogen permeation into the annuli of parabolic trough receivers. Monte Carlo simulation aided by Latin Hypercube Sampling predicted distinct molecular trajectories while minimizing the number of runs required for statistically significant results.
- Derived, programmed, and implemented ray-tracing codes for solar flux predictions. Employed convolution based methods for general design studies.

## awards

Department of Energy · 2015
Drop-in helisotat for rapid installation in solar collector fields
Authored and awarded $3 million contract to pursue next generation collector.

R&D 100 · Skyfuel SkyTrough Solar Collector 2009
Partnership with NREL produced this novel design. Supplied modeling and test expertise.

American Society of Mechanical Engineers · 2007
Outstanding Graduate Student Award in Solar Energy

## technical writing

Heat Loss Testing of Schott's 2008 PTR70 Parabolic Trough Receiver
http://www.nrel.gov/csp/troughnet/pdfs/45633.pdf

Aerial Distant Observer for Analysis of Solar Collector Fields
http://www.nrel.gov/docs/fy09osti/44332.pdf

## volunteering

Peace Corps - Namibia, Africa · High School Teacher 2000 to 2002

- Taught math and science to Namibian students while helping teachers with school funding.
- Lived with a family in a rural homestead.

## education

### Galvanize
Data Science Immersive 2016

### University of Colorado - Boulder
Ph.D. Civil Engineering 2011
Successfully completed 2011; diploma delivered 2015; transcripts available upon request

### University of Wisconsin - Madison
M.S. Mechanical Engineering 2004
transcripts available upon request

### Stanford University
B.S. Mechanical Engineering 1995
B.S. Biology 1995
transcripts available upon request

## projects

### UAV package delivery for Denver
Though technical and regulatory agencies continue investigating unmanned aerial vehicles (UAVs) for home package delivery, no public model exists that quantifies the effect of policy decisions on delivery service. This project addresses this question by creating a delivery network simulation from web-scraped GIS information stored in a Mongo database. Graphical analysis based on a custom recursive pathing algorithm plots delivery routes from Commerce City to home addresses. The number and radii of no-fly-zones associated with heliports, schools, and other locations are varied to estimate the effects on delivery service. Landing zones near homes are identified from aerial images using a random forest classifier.

## skills

**CODE:** Python, C++, FORTRAN, Vim, Git & Github
**WEB:** BeautifulSoup, Javascript, Google Maps API
**ANALYSIS:** SciPy, SciKit Learn & Image, Matlab, Octave, Excel
**DATABASES:** SQL, Mongo, AWS
**ENVIRONMENTS:** Linux, Windows
**LANGUAGES:** English, Spanish, Oshiwambo