frank burkholder

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data scientist

✛ employment

Galvanize
Denver, CO
Data Science Fellow
Feb 2016 to Current
- Completing 3 month Data Science Immersive program.
- Daily class topic and exercises employ python, SQL, statistics, machine learning, natural language processing, neural nets, Spark, and AWS.
- Capstone project investigates UAV package delivery for metro Denver.

Abengoa Solar
Lakewood, CO
Manager Research & Development
2012 to 2015
- Responsible for strategic vision, R&D budgets, and research proposals. Authored and awarded $3 million grant for a novel, low-cost solar collector and managed staff of 6 to meet design specifications and Department of Energy deliverables.
- Derived , implemented, and validated a progressively 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 and implemented ray-tracing codes for solar flux predictions while developing convolution-based models for generalized design documents.

✛ awards

Department of Energy ·
Dec 2015
Drop-in helisotat for rapid installation in solar collector fields
Authored and awarded this $3 million contract by DOE as a next generation step in solar collector technology.

R&D 100 · Skyfuel SkyTrough Solar Collector
2009
Partnership between Skyfuel and NREL helped produce this award-winning, novel collector. I supplied optical modeling and testing 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, available electronically at
http://www.nrel.gov/csp/troughnet/pdfs/45633.pdf

✛ volunteering

Peace Corps - Namibia, Africa · High School Teacher
2000 to 2002
- Taught math and science to Namibian students while helping teachers and administrators to secure school improvement funds.
- Lived in a rural homestead with a Namibian family. Learned Oshiwambo to talk to them and the community.

✛ education

Galvanize
Data Scientist Certification 2016

University of Colorado - Boulder
Ph.D. Civil Engineering 2011

University of Wisconsin - Madison
M.S. Mechanical Engineering 2004

Stanford University
B.S. Mechanical Engineering 1995
B.S. Biology 1995

✛ projects

UAV package delivery for metro Denver

Though technical (Amazon, Google, NASA) and regulatory (FAA) agencies are investigating unmanned aerial vehicles (UAVs) for home package delivery, there is no public model that would quantify the effect of varying policy decisions on UAV requirements and delivery service. This DSI capstone project seeks to remedy this situation by developing a model specific to the challenging Denver metro area.

GIS information scraped from the web is integrated with US Census and Denver Open Data in a Mongo database keyed by latitude and longitude. Graphical analysis is used to plot delivery routes from Commerce City to delivery addresses downtown. The number and radii of no-fly-zones associated with skyscrapers, heliports, government buildings, schools, and police and fire stations are varied to estimate delivery metrics for lightly and highly constrained scenarios. As a proof of concept for one of the most risky aspects of delivery, landing zones near homes are identified from aerial images using a random forest classifier.

✛ skills

CODING: Python, C++, Javascript, Vim, FORTRAN
ANALYSIS: SciPy, SciKit Learn & Image, Beautiful Soup, Matlab, Excel
DATABASES: SQL, Mongo
OPERATING SYSTEMS: Linux, Windows