Robert Sterling Spencer

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Developing geospatial data-driven tools for collaborative analytics, decision optimization, and visualization on the cloud.

EXPERIENCE

National Renewable Energy Laboratory (NREL) Golden, CO Mar 2017 – Present

Researcher III – Data Scientist & Engineer | Data Analytics, Tools, and Applications Group

- Creator of the Engage & Cambium cloud-based decision optimization & visualization tools: an innovation in the accessibility, communication, and collaboration of long-term power grid systems planning.
- R&D of novel methods in geospatial analytics & remote sensing to assess the techno-economics of renewables.
- Engineered data pipelines for ingesting meteorological data into node-based energy models.
- Creating interactive & immersive visualizations for exploring & analyzing large multi-dimensional datasets.
- Parallel processing of big data on NREL's High Performance Computer (HPC) & Amazon Web Services (AWS)

Kaleid, LLC Denver, CO Oct 2018 – Present

Founder - An interactively dynamic podcasting platform for decentralized crowdsourcing of ideas via the blockchain.

Science Systems and Applications, Inc. (SSAI) Greenbelt, MD Mar 2017 – Mar 2018

Scientific Programmer/Analyst I - Contractor for NASA: Goddard Space Flight Center (see below)

NASA: Goddard Space Flight Center (GSFC) Greenbelt, MD Jun 2016 – Dec 2016

Graduate Research Assistant

- Evaluated a remote sensing algorithm for detecting atmospheric aerosols at high resolution by performing spatiotemporal collocations & exploratory data analysis with satellite, aircraft and ground-based instruments.
- Aided atmospheric scientists in characterizing the interactions & uncertainties between aerosols & clouds.

UT Center for Research in Water Resources Austin, TX Jan 2016 – May 2016

Graduate Research Assistant

- Developed a rapid automated framework to produce planning maps for emergency responders in flooding events.

Institute of Arctic and Alpine Research Boulder, CO | McMurdo, Antarctica May 2013 – Aug 2015

Antarctic Field Research Grantee

- Lived and worked among a small efficient team while inhabiting Antarctica's extreme environments while collecting climate & ecological data from hydrological & meteorological stations, land surveys, and algae sampling.

Undergraduate Research Assistant

- Managed a remote network of stream gauges for curation & publication into an open research database.
- Developed a regression analysis to model synthetic hydraulic behaviors of a glacier-fed stream.
- Conducted sampling and tracer studies at various rivers & lakes within Colorado's watersheds.

Engineers Without Borders, CU Nepal Team Boulder, CO Mar 2011 – May 2013

Project Design Leader

- Sustainably co-developed a clean drinking water supply with a developing community of over 200 Nepali people by designing & constructing water storage & natural treatment systems.

Treasurer

- Maintained an annual budget of nearly $100,000, including fundraising, budgeting, and managing expenses.

EDUCATION

MS, Environmental and Water Resources Engineering Dec 2016

University of Texas at Austin

BS, Environmental Engineering Dec 2014

University of Colorado at Boulder

Publications

- Spencer, R. S., Levy, R. C., Remer, L. A., Mattoo, S., Arnold, G. T., Hlavka, D. L., et al. (2019). Exploring aerosols near clouds with high−spatial−resolution aircraft remote sensing during SEAC4RS. Journal of Geophysical Research: Atmospheres, 124, 2148– 2173. https://doi.org/10.1029/2018JD028989
- Spencer, R. S., Macknick, J., Aznar, A., Warren A., and Reese, M. O. (2019). Floating Photovoltaic Systems: Assessing the Technical Potential of Photovoltaic Systems on Man-Made Water Bodies in the Continental United States. Environmental Science & Technology 2019 53 (3), 1680-1689. DOI: 10.1021/acs.est.8b04735
- Liber, W. Bartle, C., Spencer, R., Macknick, J., Cagle, A., Lewis, T. Colorado's Statewide Potential Study for the Implementation of Floating Solar Photovoltaic Arrays (2020). Colorado Energy Office. https://drive.google.com/file/d/1PjrwsUeXygNyW7xBBvcZyxTRT8aB19N3/view
- Lee, N. Grunwald, U, Rosenlieb, E., Mirletz H., Aznar, A., Spencer, R., Cox, S., (2020). Hybrid floating solar photovoltaics-hydropower systems: Benefits and global assessment of technical potential. Renewable Energy. Volume 162. Pages 1415-1427. https://doi.org/10.1016/j.renene.2020.08.080.
- Koebrich, S., Sigrin B., Spencer R., Schwabe P., Haase S., Choi S., Kramer J. (2021). Distributed Solar Adoption in Orlando: A household-level model for distribution resource planning. National Renewable Energy Laboratory, Orlando Utilities Commission. NREL PR-6A20-77308. https://www.nrel.gov/docs/fy21osti/77308.pdf
- [PENDING] Characterizing land-cover under utility-scale solar to understand food-energy-water impacts

Awards and Honors

- An NREL Key Contributor (4 out of 4 years) 2020
- NASA Goddard Summer Student Award – 1st Place 2016
- NSF's Antarctica Service Medal of the United States of America 2015
- RMWEA/RMSAWWA Student Design Competition – 2nd Place 2014
- Engineers Without Borders – Chapter of the Year Award 2012
- Art Institute Scholarship – 2nd Place 2009

Skills

Agile (Kanban & Scrum) | Data Engineering & Data Curation | Remote Sensing, Geospatial & Timeseries Analysis | Web & API Development | Data Visualization & UI/UX | Deep Uncertainty & Systems Modeling | Multi-objective Optimization & L/NL/MIL Programming | Machine Learning | Techno-economic Analysis

Tools

Python, JavaScript, R, C# and Ruby | AWS, Docker, Django REST, Celery, Redis, Ruby On Rails | PostgreSQL & PostGIS | ArcGIS & QGIS | Git, Jira, Pivotal, and Slack | HTML/CSS, D3, MapBox, Leaflet and Plotly | Google Earth Engine & Maxar GBDX | Linux & Bash | Pyomo, GAMS, SCIP, Xpress, CPLEX, AnyLogic | GDAL, Rasterio, GeoPandas, SciKit-Learn, Keras, and TensorFlow | Adobe, 3D Studio Max, Unity and ParaView

Courses

Geographical Information Systems (GIS) | Python for Data Science | Python for Scientists & Engineers | Decision, Risk, and Reliability | Systems Engineering | Water Resources Planning & Mgmt. | Sampling & Analyses | Sustainability & Renewable Energy | Regression Analysis | Environmental Fluid Mechanics | Material & Energy Balances | Heat Transfer | Thermodynamics | Engineering Processes | Ecology | Geomorphology | Hydrology | Groundwater Engineering | Air Pollution Control | Physical and Chemical Treatment