Catherine M. Gosmeyer

REMOTE SENSING DATA ANALYST & SOFTWARE DEVELOPER

github.com/cgosmeyer | linkedin.com/in/cgosmeyer

WORK EXPERIENCE

Senior Research Scientist, 100% Remote 10/2020 - Present

Science Systems and Applications, Inc./NASA's Goddard Space Flight Center, Greenbelt, MD

- Constructed a website with a Mojolicious framework and PostgreSQL database for dashboarding geolocation quality metrics for NASA's GOES-R series of Earth-observing satellites.
- Wrote Python-based Earth visualization software for anomaly investigations of GOES-R images.
- Perform weekly GOES-R data quality checking and reporting; investigate anomalies when found.

Scientific Software Developer, 20% Remote 10/2017 - 10/2020

ADNET Systems, Inc./NASA's Goddard Space Flight Center, Greenbelt, MD

- Developed a spatial PostgreSQL database of the metadata for the daily low-level data products of NASA's Ice, Cloud, and Land Elevation Satellite-2 (ICESat-2), speeding up data discovery time by over 1000%.
- Wrote Python software to verify and validate the level-1b product of ICESat-2. Discovered and tracked the resolution of over 400 issues in the product. Wrote extensive lessons learned document.
- Computed and documented four pre-launch radiometric calibrations for ICESat-2's laser altimeter.
- Presented two posters on ICESat-2 at 2018 and 2019 American Geophysical Union meetings.
- Contributed sections based on my work to the ICESat-2 Level-1B Algorithm Theoretical Basis Document.

Research & Instrument Analyst 09/2013 - 10/2017

Space Telescope Science Institute, Baltimore, MD

- Developed three verification tests for the James Webb Space Telescope (JWST) calibration pipeline.
- Principle investigator of the charge transfer efficiency, gain, and photometric stability for the Hubble Space Telescope (HST) Wide Field Camera-3 (WFC3) optical CCDs and IR detectors. Developed 10,000s of lines of Python and IDL software, optimized and automated three pipelines, built a MySQL database, published five first-author technical reports, and presented seven posters at professional meetings.
- Member of Quicklook software development team. Participated in sprints and code reviews. Maintained the Quicklook software, database, and website for inspecting WFC3 images for quality issues.
- Maintained Python-based processing pipeline for WFC3 slitless spectroscopy observations of high-redshift galaxies. Wrote data documentation and archived the 1000s of data products for science team.
- Lead of the WFC3 instrument's help desk. Tracked all questions and ensured they reached resolutions.
- Wrote procedure documentation and supported workshops for JWST solar system observers.

EDUCATION

Graduate Certificate in Geospatial Information Sciences, University of Maryland, 100% Remote 2018 - 2020

- Spatial Analysis | Spatial Statistics | Spatial Database Systems | Programming for GIS | GPA: 4.0/4.0

Audited Courses in Planetary Science, Johns Hopkins University 2014 - 2017

- Planetary Interiors | Planetary Surface Processes | Physics and Chemistry of Planetary Atmospheres

BSc in Astrophysics & BSc in Physics, Indiana University 2009 - 2013

- Minor in Computer Science | Minor in Mathematics | Certificate in Journalism | GPA: 3.83/4.0

TECHNICAL SKILLS **github.com/cgosmeyer**

Databases: ETL, PostgreSQL, PostGIS, MySQL, SQLite, pgAdmin, Python/SQLAlchemy
Digital Collaboration: Dropbox, OneDrive, Google Drive, Teams, Webex, Zoom

Geospatial Analysis: ArcCatalog, ArcGIS Pro, ArcMap 10.7.1, QGIS, Python/Arcpy, Python/Cartopy
Programming: Python 2/3, JuPyter Notebook, Perl, IDL, Fortran, C, Java, C++
Systems: Linux, Mac OSX, Windows
Web: Apache, Drupal, Google Analytics, HTML5, JavaScript, Mojolicious Web Framework, PhP
Additional: Agile Methodology, Anaconda, Bash, Crontab, Docker, GitHub/Lab, HDF5, UNIX

SELECTED RESEARCH **tinyurl.com/cgos-grad**

Geographic Analysis of Indiana's Abortion Rates, University of Maryland 2020

- Used ArcGIS Pro to run OLS regression on 17 non-collinear variables gathered from Indiana state records aggregated to the county level. Found population turnover, student status, and unstable homes were most significant variables in high-abortion counties, challenging state-aggregated findings reported in P. Gober (*Ann. Am. Assoc. Geogr.,* 1994).

Viewshed Analysis of Monocacy National Battlefield, University of Maryland 2019

- Used ArcGIS Pro to map areas at risk of development, based on 2000 to 2010 population growth, that threaten historic viewshed of the park. Recommended property easements and increased treelines.

Estimating the Ages of Pluto and Charon's Surfaces, Johns Hopkins University 2015

- Wrote Python software to select craters on images of Pluto and Charon and store their positions and diameters. Used resulting crater densities to estimate surface ages, which agreed with models developed by S. Greenstreet (*Icarus*, 2015).

SELECTED PUBLICATIONS **tinyurl.com/cgos-publications**

Gosmeyer, C.M., 2017, *WFC3 Anomalies Flagged by the Quicklook Team*
Gosmeyer, C.M. & Baggett, S., 2016, *WFC3/UVIS External CTE Monitor: Single-Chip CTE Measurements*
Hedman, M.M., **Gosmeyer, C.M.,** et al., 2013, Nature, *An Observed Correlation Between Plume Activity and Tidal Stresses on Enceladus*, 500, 182-184

SELECTED POSTER PRESENTATIONS **tinyurl.com/cgos-posters**

American Geophysical Union: *Characterizing Error in the Verification Procedure of the ICESat-2 ATLAS Instrument's Level-1B Product* (2019)
Planetary Data Workshop: *Searching the HST Archives for Solar System Observations* (2017)
Division for Planetary Sciences: *WFC3/HST Updates Impacting Exoplanet Observers* (2015)

ADDITIONAL EXPERIENCE & ACTIVITIES

Goddard Space Flight Center Engineering Colloquium Committee Member: Help choose colloquium topics, maintain the colloquium website *ecolloq.gsfc.nasa.gov,* and invite and host speakers (2019 - Present)
Astrophysics Source Code Library Editor: Seek out codes used in published astrophysics research and catalog them on *ascl.net* (2019 - Present)
Division for Planetary Sciences Webmaster: Maintain the division's website *dps.aas.org* (2017 - Present)
Historical Re-enactor: Re-enact 19th century America with 7th MD Co. A Infantry (2017 - Present)
Space Exploration Advocate: Visited over 20 representatives' offices during Space Exploration Alliance and Planetary Society-organized legislative blitzes (2017 - 2019)
Gettysburg National Military Park Volunteer: Park cleanup and maintenance (2015 - Present)
Limited Working German: More proficient at reading/writing than conversation

WORKSHOPS

SciPy: Cartopy, Geographical analysis in Python (Austin, 2018) | **SciPy:** Cython, HDF5, Parallel Python programming (Austin, 2017) | **Planetary Data Workshop:** Cosmographia, PDS4, planetpy, WebGeoCalc (Flagstaff, 2017) | **SciPy:** Bokeh, JuPyter Notebook, Machine Learning, Scikit-learn, TensorFlow (Austin, 2016)