

CURRICULUM VITAE: KYLE GWIRTZ

NASA Postdoctoral Fellow
NASA Goddard Space Flight Center
Greenbelt, Maryland

Tel. 785-341-2933
kyle.gwirtz@nasa.gov
<https://kjg136.github.io>

EDUCATION

Scripps Institution of Oceanography	Earth Sciences	Ph.D.	2021
University of Arizona	Applied Mathematics	M.S.	2019
University of Kansas	Mathematics	M.A.	2012
University of Kansas	Mathematics	B.Sc.	2009

AWARDS

NASA Postdoctoral Fellowship (NPP)	2022-present
Student Author Award, Geophysical Journal International	2021
NASA Earth and Space Science Fellowship (NESSF)	2018-2021

RESEARCH INTERESTS

Planetary magnetic fields, magnetohydrodynamics, dynamos, mathematical modeling, data assimilation, inverse problems and machine learning.

EXPERIENCE

General

Postdoctoral Researcher, NASA Goddard Space Flight Center	2022-present
Graduate Research Assistant, Scripps Institution of Oceanography	2020-2021
Graduate Research Assistant, University of Arizona	2018-2020
Graduate Intern, NASA Goddard Space Flight Center	Summer 2018
Graduate Teaching Assistant, University of Arizona	2016-2018

Specific

Working with geomagnetic field observations and models. Developing and implementing mathematical models relevant to the study of the geodynamo. Developing techniques for data analysis and inverse problems in geomagnetism. Programming in Fortran, C, Python, MATLAB and R.

PUBLICATIONS

W. Kuang, K. Gwirtz, A. Tangborn, M. Morzfeld *Understanding and predicting geomagnetic secular variation via data assimilation*, IUGG special publication series, “Applications of data assimilation and inverse problems in the Earth Sciences”, chap 4.1, editors A. Ismail-Zadeh, F. Castelli, D. Jones, S. Sanchez, (accepted)

K. Gwirtz, T. Davis, M. Morzfeld, C. Constable, A. Fournier, G. Hulot, *Can machine learning reveal precursors of reversals of the geomagnetic axial dipole field?*, Geophysical Journal International, 231(1), 520-535 (2022).

K. Gwirtz, M. Morzfeld, W. Kuang, A. Tangborn, *A testbed for geomagnetic data assimilation*, Geophysical Journal International, 227(3), 2180-2203 (2021).

K. Gwirtz, M. Morzfeld, A. Fournier, G. Hulot, *Can one use Earth’s magnetic axial dipole field intensity to predict reversals?*, Geophysical Journal International, 225(1), 277-297 (2021).

M. Brio, J.G. Caputo, K. Gwirtz, J. Liu and A. Maimistov, *Scattering of a short electromagnetic pulse from a Lorentz-Duffing film: theoretical and numerical analysis*, Wave Motion, 89, 43-56 (2019).

PROFESSIONAL ACTIVITIES

Session organizer: SIAM-Mathematics of Planet Earth

Summer 2020

Reviewer: Physics of the Earth and Planetary Interiors, IUGG special publications

TALKS & PRESENTATIONS

American Geophysical Union Fall 2021 Meeting

Fall 2021

Title of Poster: Predicting Geomagnetic Reversals with Machine Learning

Title of Poster: A testbed for geomagnetic data assimilation

Joint ICTP-IUGG Workshop on Data Assimilation and Inverse Problems

Fall 2021

Title of Talk: Understanding and predicting geomagnetic secular variation via data assimilation

SIAM-Computational Science and Engineering

Spring 2021

Title of Talk: Geomagnetic data assimilation for decadal scale forecasts: lessons from a new simplified model

Data Driven Discovery Showcase, University of Arizona

Spring 2021

Title of Talk: Investigating the predictability of Earth's magnetic field

American Geophysical Union Fall 2020 Meeting

Fall 2020

Title of Poster: Intensity based predictions of the dipole field and their value in characterizing the Earth-like nature of models

SEDI Symposium

Fall 2020

Title of Poster: Can one use Earth's magnetic axial dipole field intensity to predict reversals?

SIAM-Mathematics of Planet Earth

Summer 2020

Title of Talk: Data assimilation experiments with a reduced-order model of the geodynamo

Scripps Institution of Oceanography, Paleomagnetism Seminar

Summer 2020

Title of Talk: Can one use Earth's magnetic axial dipole field intensity to predict reversals?

American Geophysical Union Fall 2019 Meeting

Fall 2019

Title of Poster: A reduced-scale model for understanding the numerics of geomagnetic data assimilation

NASA Solid-Earth Team Meeting

Fall 2019

Title of Poster: Geomagnetic data assimilation: numerical experiments with a reduced-scale model

International Union of Geodesy and Geophysics General Assembly

Summer 2019

Title of Poster: Geomagnetic data assimilation: numerical experiments with a reduced-scale model

American Geophysical Union Fall 2018 Meeting

Fall 2018

Title of Poster: Localization and bias correction in geomagnetic data assimilation: systematic numerical experiments with reduced-scale models

U2 can UQ, University of Arizona

Spring 2018

Title of Talk: Geomagnetic data assimilation

RTG workshop, University of Arizona

Fall 2017

Title of Talk: Invariant densities for maps with noise

RTG workshop, University of Arizona

Spring 2017

Title of Talk: Thin ferroelectric films