

Daniel Blatter

Curriculum Vitae

Institute of Geophysics and Planetary Physics
Scripps Institution of Oceanography
University of California, San Diego

dblatter@ucsd.edu

Google Scholar: [link](#)

Website: <https://dblatter.github.io/>

RESEARCH INTERESTS

Investigating the impact of fluids on solid earth processes and dynamics, including the lithosphere-asthenosphere system, mid-ocean ridge melting, subduction zone seismicity and volcanism, plate tectonics, geothermal exploration, carbon capture and sequestration, groundwater exploration and characterization, and more. I also develop computational algorithms to solve nonlinear inverse problems in geosciences, including uncertainty quantification via Bayesian sampling

ACADEMIC APPOINTMENTS

2020-2022	SCRIPPS INSTITUTION OF OCEANOGRAPHY, UC SAN DIEGO <i>John W Miles postdoctoral fellow in theoretical and computational geophysics</i> • Faculty mentors: Professor Matthias Morzfeld and Professor Steven Constable	La Jolla, CA
-----------	--	--------------

EDUCATION

Jul 2020	COLUMBIA UNIVERSITY <i>PhD, Geophysics, Lamont-Doherty Earth Observatory</i> • Dissertation: “Constraining fluids in the crust and upper mantle with Bayesian inversion of electromagnetic data.” • PhD advisor: Professor Kerry Key	New York, NY
June 2015	STANFORD UNIVERSITY <i>Master of Science, Computational Science and Engineering</i> • Computational geoscience program • Research group: Stanford Exploration Project (SEP); research focus: reflection seismic imaging	Stanford, CA
May 2013	GEORGE WASHINGTON UNIVERSITY <i>Master of Arts, Middle East Studies, emphasis: energy and technology</i> • Coursework focus: energy policy and international relations • Capstone Project: field research in Tunisia on the impact of energy rents and subsidies on the politics and international relations of the Middle East	Washington, DC
May 2011	UNIVERSITY OF UTAH <i>Bachelor of Science, Physics, minor in Mathematics: GPA 3.92</i> • Honors: Graduated Cum Laude (min GPA 3.9), Phi Beta Kappa, Sigma Pi Sigma • Research: mathematical modeling of oxygenation in mammals and the denucleation of the mammalian erythrocyte.	Salt Lake City, UT

PEER REVIEWED PUBLICATIONS

[a] Blatter, D., Morzfeld, M., Key, K., Constable, S. “Efficient Bayesian sampling using stochastic optimization. Part I: theory.” Submitted to *Geophysical Journal International*

[b] Blatter, D., Morzfeld, M., Key, K., Constable, S. “Efficient Bayesian sampling using stochastic optimization. Part II: case studies in 1D and 2D electromagnetic inversion.” Submitted to *Geophysical Journal International*.

[1] Blatter, D., Naif, S., Key, K., Ray, A. “A plume origin for hydrous melt at the lithosphere-asthenosphere boundary.” In revision at *Nature*.

[2] Blatter, D., Ray, A., Key, K. (2021). Two-dimensional Bayesian inversion of magnetotelluric data using trans-dimensional Gaussian processes. *Geophysical Journal International*.

[3] Blatter, D., Key, K., Ray, A., Gustafson, C., & Evans, R. (2019). Bayesian joint inversion of controlled source electromagnetic and magnetotelluric data to image freshwater aquifer offshore New Jersey. *Geophysical Journal International*, 218(3), 1822-1837.

[4] Blatter, D., Key, K., Ray, A., Foley, N., Tulaczyk, S., & Auken, E. (2018). Trans-dimensional Bayesian inversion of airborne transient EM data from Taylor Glacier, Antarctica. *Geophysical Journal International*, 214(3), 1919-1936.

[5] Menke, William, and Daniel Blatter. (2019). Trade-off of resolution and variance computed from ensembles of solutions, with application to Markov Chain Monte Carlo methods. *Geophysical Journal International*, 218(3), 1522-1536.

FIELD WORK

Dec-Jan 2019	HT RESIST MARINE MAGNETOTELLURIC AND CONTROLLED SOURCE ELECTROMAGNETIC DEPLOYMENT <i>RV Roger Revelle, Hikurangi Margin, 29 days at sea</i> <ul style="list-style-type: none">• 170 ocean bottom electromagnetic receiver deployments; 128 recoveries• 500 line-km of controlled source electromagnetic data collected	Wellington, NZ
Nov 2015	LAND MT DEPLOYMENT <ul style="list-style-type: none">• 16 land magnetotelluric sites deployed	Pawnee, OK
Jun-Jul 2015	OKMOK VOLCANO MARINE MT SURVEY <i>RV Roger Revelle, Aleutian subduction zone, 5 days at sea</i> <ul style="list-style-type: none">• 54 ocean bottom electromagnetic receiver deployments	Dutch Harbor, AK

TEACHING

Fall 2019	UNDERSTANDING CLIMATE SCIENCE <i>Lead instructor</i> <ul style="list-style-type: none">• Designed and implemented course from scratch as part of Columbia’s Science Honors Program• 12-week course, 2.5 hours of instruction per week, 21 students• Topics: Earth’s oceans and atmosphere; climate communication; international climate policy	Columbia University
Fall 2018	UN1201: ENVIRONMENTAL RISKS AND DISASTERS <i>Teaching assistant</i> <ul style="list-style-type: none">• Taught 22 students; led two discussion sections; office hours	Columbia University

INVITED PRESENTATIONS

Oct 2021	UC BERKELEY SEISMOLOGICAL LABORATORY SEMINAR <i>Constraining melt and volatiles at the lithosphere-asthenosphere boundary with efficient Bayesian sampling based on regularized inversion</i>	Berkeley, CA
Jun 2021	SIAM CONF. ON MATHEMATICAL AND COMPUTATIONAL ISSUES IN GEOSCIENCES <i>Optimization-based Bayesian inversion for electromagnetic geophysical data</i> <ul style="list-style-type: none">• Part of “Advances in Bayesian inversion in the geosciences” minisymposium	Milan, Italy
Dec 2019	AMERICAN GEOPHYSICAL UNION ANNUAL FALL MEETING <i>Probabilistic characterization of a melt-rich channel at the base of the Cocos plate</i>	San Francisco, CA
Sept 2019	SIAM NORTHERN STATES SECTION ANNUAL MEETING <i>Sparse Model Parametrization for 2D Bayesian Inversion Using Trans-D MCMC</i> <ul style="list-style-type: none">• Part of “Statistical methods for geophysical inverse problems” minisymposium	Laramie, WY

SELECTED PRESENTATIONS

Sept 2020	UNIVERSITY OF UTAH “SEISMO-TEA” SEMINAR <i>Constraining melt fraction and volatile concentration at the LAB with Bayesian inversion of EM data</i>	Salt Lake City, UT
Dec 2019	AMERICAN GEOPHYSICAL UNION ANNUAL FALL MEETING <i>2D Bayesian inversion of MT data using parsimonious Gaussian Processes</i>	San Francisco, CA
June 2019	NEW YORK SCIENTIFIC DATA SUMMIT <i>Extracting information from data using MCMC, poster presentation</i>	New York, NY
Aug 2018	THE 24TH ELECTROMAGNETIC INDUCTION WORKSHOP <i>Bayesian Joint Inversion of Surface-towed CSEM and MT Data: Quantifying the Resolution Gain</i>	Helsingor, Denmark
Sept 2017	SECOND EUROPEAN AIRBORNE ELECTROMAGNETICS CONFERENCE <i>Bayesian Inversion of Transient Airborne EM Data from the McMurdo Dry Valleys, Antarctica, poster presentation</i>	Malmo, Sweden
Mar 2017	SCRIPPS ELECTROMAGNETIC CONSORTIUM ANNUAL MEETING <i>Uncertainty estimation in geophysical inversion---a Bayesian approach</i>	La Jolla, CA
Dec 2016	AMERICAN GEOPHYSICAL UNION FALL MEETING <i>Bayesian Inversion of 2D Models from Airborne Transient EM Data</i> <ul style="list-style-type: none">• Awarded AGU’s Outstanding Student Presentation Award	San Francisco, CA

SERVICE

2020-	COMMUNITY ORGANIZED, PEER ASSISTED EXPERTISE EXCHANGE IN ELECTROMAGNETIC GEOPHYSICS (COOPERATE EM) <i>Organizer</i>	San Diego, CA
-------	---	---------------

- COOPERATE EM is an inclusive, cooperative community of EM geophysicists based in the US. Led by early career scientists and students, we are building a network to foster collaboration and the free exchange of skills, expertise, and know-how within the US EM geophysics community
- Wrote mission statement; building a community-wide skills repository; organizing workshops and seminars

- 2020- **UAW LOCAL 5810** San Diego, CA
Union steward, organizer
- Moderated and helped organize a panel discussion on obtaining funding as a postdoc or research scientist which over 270 postdocs and research scientists attended
- 2017-2020 **GRADUATE WORKERS OF COLUMBIA (UAW LOCAL 2110)** New York, NY
Graduate student worker organizer, bargaining committee member
- 10-15 hours per week organizing fellow graduate students to dismantle barriers to equity, diversity, and inclusion in graduate education: better pay, access to health care, protections against sexual harassment, fair treatment of international student workers
 - Served on the union bargaining committee, participated in bargaining with CU representatives
 - Organized a successful strike (April 2018); engaged local politicians; spoke at rallies

INTERNSHIPS

- June-Aug 2014 **CONOCOPHILLIPS** Anchorage, AK
Summer 2014 Geoscience Intern, North Slope Development Business Unit
- Applied quantitative and qualitative seismic analysis to mature a hydrocarbon prospect
 - Utilized elastic inversion attributes, near- and far-stack seismic reflectivity, well logs, and rock physics modeling to evaluate reservoir presence
 - Impact: results of seismic analysis utilized directly in drilling decision-making (prospect drilled)
- Jan-May 2012 **AMERICAN COUNCIL ON RENEWABLE ENERGY** Washington, DC
Research Analyst, Editor, Biomass Coordinating Council
- Conducted and analyzed research on issues critical to the biomass industries, including technology, government policy, finance, the environment, and national security
 - Wrote and edited reports on key biomass issues
- May-Jul 2011 **EUROPEAN PEOPLE'S PARTY** Brussels, Belgium
Political Analyst, EPP Working Group on Foreign Affairs
- Participated in hearings, debates, and resolutions on topics such as European neighborhood policy, energy security, democracy promotion, and the Arab Spring
 - Used analytical and writing skills to produce weekly party briefs on the Arab Spring

SKILLS AND ACTIVITIES

- **Computer:** Julia, Fortran, MATLAB programming languages, regular user of Linux-based high performance computing clusters at Columbia University and UC San Diego
- **Foreign Languages:** French (fluent); Arabic (advanced); Tahitian (fluent)
- **International Experience:** lived in French Polynesia for two years; studied Arabic in Amman, Jordan, for two months; traveled extensively in Middle East, Europe and Asia