

Colton Kohnke

EDUCATION	Colorado School of Mines, Golden, CO	Ph.D. May 2019
	Ph.D. Geophysics (CWP) Minor: Applied Math	GPA 3.65
	M.Sc. Geophysics (EMREX) Minor: Applied Math	M.S. Dec 2016
	B.Sc. Geophysics and Geophysical Engineering	B.S. May 2014

Professional Organizations

- Society of Exploration Geophysicists (SEG)
- European Association of Geoscientists and Engineers (EAGE)
- Reviewer for *Geophysical Journal International* and *Geophysics*
- Society of Geophysics Graduate Students (SGGS) Social Chair

RELEVANT WORK EXPERIENCE	Shell Global Solutions International BV, Rijswijk, Netherlands	Fall 2015
	<i>Earth Science Research Intern</i>	

- Continuation of Masters project calculating the effect of steel borehole casings on electromagnetic data.
- Researched similar modeling approaches and compared with developed software.
- Integrated Masters project software into the local ecosystem.

	White River Technologies, Lebanon, NH	Summer 2015
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Engineering/Science Intern

- Supported development of next generation geophysics sensor technology for environmental, military, and civil infrastructure applications.
- Modeled the expected sensor response under different survey conditions.
- Tested sensor equipment in laboratory and field settings.
- Processed electromagnetic sensor field data and performed inversions to predict the location and size of targets of interest.
- Combined datasets using statistical methods to produce maps of geophysical data with improved resolution.

	Chevron Energy Technology Company, Houston, TX	Summer 2014
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Potential Fields Geophysics Intern

- Developed and documented a graphical user interface for software that models the simple 1D transient thermal field of sedimentary basins.
- Validated the software by comparison with established basin models.
- Applied the program to an area of geologic interest to model the geothermal gradient under variable geologic setting and history.
- Quality check and statistical analysis of onshore gravity data.

TECHNICAL SKILLS

- Potential fields, electric, electromagnetic, and seismic methods, geophysical field methods, survey design, GPS, digital signal processing, field and office safety.
- C/C++, Fortran, Python, Java, Matlab, Mathematica, Jython, Bash.
- Parallel programming using MPI, OpenMP, and mpi4py.
- AutoCAD, SolidWorks; Microsoft Excel, Word, PowerPoint, Publisher.
- Linux/UNIX, Windows, and Mac OS.

RECENT PROJECT EXPERIENCE

Ph.D Thesis: Local Joint Inversion of Seismic and Electromagnetic Data - Project to shrink the computational domain of geophysical inverse problems with a focus on joint inversion and reservoir monitoring applications.

M.Sc. Thesis: The Effect of Steel Casings on Electromagnetic Data - The controlled-source electromagnetic method is sensitive to conductivity contrasts in the subsurface. Conductive casings generate a large EM signal which obscures the signal from the subsurface. This project used a method of moments approach to compute the secondary signal from the casings to aid in interpretation of electromagnetic data.

Anisotropy Differentiation in Airborne Electromagnetic Surveys - Common magnetic dipole configurations of airborne electromagnetic surveys are well-suited for detecting vertical conductivity changes in the subsurface, while the horizontal changes

are detected as an average of the two horizontal components. This project consisted of using a quadrupole configuration to better differentiate the horizontal conductivity components in the subsurface.

Inversion of Controlled-Source Electromagnetic Data - Non-linear regularized inversion of three component marine controlled-source electromagnetic data for layered earth conductivities. The inversion implemented a Gauss-Newton Trust Region approach to minimize the objective function. The 1D forward model was expanded to allow solving for 1D anisotropy in the earth layers.

Parallel Scientific Computing - Parallelization of layered earth electric field forward modeling software. The project involved writing a hybrid EM forward modeling code using OpenMP and MPI in Fortran. The code was further developed to be optimized for computation on GPUs using CUDA.

OTHER EXPERIENCE

- Red Cross Lifeguard Instructor 2017-Present.
- GEMS Mentor 2017-Present.
- SEG/Agile Geoscience Hackathon participant 2014 & 2015.
- High Grade Literary Journal Poetry Editor 2013-14.
- Colorado School of Mines Varsity Swim Team 2010-14.
- Colorado School of Mines Club Water Polo Team 2014-Present.

HONORS & AWARDS

- Newmont Mining Scholarship recipient.
- Naval Dolphin Scholarship Foundation recipient.
- Blackwell Prize for Creative Writing: Poetry.

TEACHING

- Undergraduate Senior Design Co-Advisor - Fall 2016-Spring 2017
- Introduction to Gravity and Magnetism Teaching Assistant - Fall 2016 & 2017
- Geophysics Field Camp Teaching Assistant - Summer 2015 & 2016.
- Digital Signal Analysis Teaching Assistant - Fall 2014.
- Programming Concepts: Java Teaching Assistant - Spring 2014.
- Advanced Engineering Math Grader - Fall 2013.

JOURNAL PUBLICATIONS

Kohnke, C., Liu, L., Streich, R. & Swidinsky, A., 2017. A method of moments approach to modeling the electromagnetic response of multiple steel casings in a layered earth. *Geophysics*, **In Review**. Submission number GEO-2017-0303.

Swidinsky, A., **Kohnke, C.** & Edwards, R. N., 2017. Tutorial: The electromagnetic response of a horizontal electric dipole buried in a layered medium. *Geophysical Prospecting*, DOI: 10.1111/1365-2478.12552

CONFERENCE PAPERS

Streich, R., **Kohnke, C.**, Liu, L., Swidinsky, A., 2017. Efficient and accurate ways of modeling the electromagnetic response of metallic pipelines and well casings. *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Erlangen, Germany, September 11-14.

Kohnke, C., Liu, L., Streich, R. & Swidinsky, A., 2017. A Method of Moments Solution to the Conductive Steel Casing Problem - Theory, Validation and Model Studies. *EAGE annual conference*, Paris, France, June 12-15.

Kohnke, C., Lavoué, F., Streich, R., & Swidinsky, A., 2016. Calculating the effect of multiple steel cased deviated wells on electromagnetic surveys. *EAGE annual conference*, Vienna, Austria, May 30-June 2.