Shunguo Wang

Researcher

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Employment

2020 - **Researcher**, Norwegian University of Science and Technology (NTNU)
Collaborators: Ståle Johansen, Martin Landrø, and others

2018 - 2020 **Green Scholar (postdoc)**, Scripps Institution of Oceanography, UC San Diego
Advisor: Steven Constable

2019, 2020 **Lecturer**, Scripps Institution of Oceanography, UC San Diego

2018 **Visiting postdoc**, Memorial University of Newfoundland
Collaborators: Colin G. Farquharson, Hormoz Jahandari

2014, 2016 **EM geophysicist**, Geological Survey of Sweden
Collaborators: Mehrdad Bastani, Lena Persson

Education

2013 - 2017 **Ph.D.**, Solid-Earth Physics, Uppsala University
Advisors: Mehrdad Bastani, Thomas Kalscheuer, Alireza Malehmir, Laust Pedersen

2017 **Visiting graduate**, Scripps Institution of Oceanography, UC San Diego
Host: Steven Constable

2016 **Visiting graduate**, Leicester University
Host: Max Moorkamp

2012 - 2013 **Ph.D. candidate**, Applied Geophysics, Central South University
Advisor: Shikun Dai

2009 - 2012 **M.S.**, Earth Exploration and Information Technology, Central South University
Advisors: Bin Xiong, Jishan He

2011 **Master exchange program**, Guilin University of Technology

2005 - 2009 **B.S.**, Info-physics and Geomatics Engineering, Central South University

Publications

- *Undergoing journal papers/books (* corresponding author)*

[2] Johansen, S. E., Amundsen, H., Arntsen, B., Panzner, M., Mittet, R., Landrø, M. and **Wang, S.**, Key, K., 2021. Melt distribution and nature of LAB below the Norwegian – Greenland Sea and adjacent margins. *In preparation*

[1] **Wang, S.**, Constable, S., Orange, A.S., Johansen, S. E., 2021. Influences of air wave on the marine controlled source electromagnetic data. *In preparation*

- Peer-reviewed journal papers/books (corresponding author)*

[23] Dai, S., Zhao, D., **Wang, S.***, Li, K., 2022. Three-dimensional magnetotelluric modelling in a mixed space-wavenumber domain. *Geophysics*, **87**(4), https://doi.org/10.1190/geo2021-0216.1.

[22] Bastani, M., **Wang, S.**, Malehmir, A., Mehta, S., 2022. Radio-magnetotelluric and controlled-source magnetotelluric surveys on a frozen lake: opportunities for urban applications in Nordic countries. *Near Surface Geophysics,* **20**(1), DOI: 10.1002/nsg.12180

[21] Harmon, N., **Wang, S.**, Rychert, C.A., Kendall, J.M., Constable, S., 2021. Joint Interpretation of Shear Velocity and Resistivity from the PI-LAB Experiment at the Equatorial Mid Atlantic Ridge. *Journal of Geophysical Research: Solid Earth*, **126**(8), e2021JB022202. DOI: https://doi.org/10.1029/2021JB022202

[20] Rychert, C.A., Tharimena, S., Harmon, N., **Wang S.**, Kendall, J.M., Constable, S., Bogiatzis, P., Schlaphorst, D., Agius, M., Hicks, S., 2021. A dynamic lithosphere-asthenosphere boundary near the equatorial Mid-Atlantic Ridge. *Earth and Planetary Science Letters*, **566**, https://doi.org/10.1016/j.epsl.2021.116949.

[19] **Wang, S.**, Constable, S., Reyes-Ortega, V., Jahandari, H., Farquharson, C., Avilés-Esquivel, T., 2021. Two-dimensional determinant inversion of marine magnetotelluric data and a field example from the Gulf of California, Mexico. *Geophysics*, **86**(1), doi: 10.1190/GEO2019-0735.1

[18] Rychert, C.A., Harmon, N., Constable, S., **Wang, S.**, 2020. Nature of the Lithosphere-Asthenosphere Boundary. *Journal of Geophysical Research: Solid Earth*, 125(10), e2018JB016463. DOI: 10.1029/2018JB016463

[17] **Wang, S.**, Constable, S., Rychert, C.A., Harmon, N., 2020. A lithosphere-asthenosphere boundary and partial melt resolved using marine magnetotelluric data. *Geochemistry Geophysics Geosystems*, **21**(9), e2020GC009177. https://doi.org/10.1029/2020GC009177

[16] **Wang, S.**, Constable, S., Reyes-Ortega, V., Rychert, C.A., 2019. A marine magnetotelluric coast effect sensitive to the lithosphere-asthenosphere boundary. *Geophys. J. Int.*, **218**(2), 978-987. DOI:10.1093/gji/ggz202

[15] **Wang, S.**, Bastani, M., Constable, S., Kalscheuer, T., Malehmir, A., 2019. Using boat-towed radio-magnetotelluric and controlledsource audio-magnetotelluric data to resolve fracture zones at Äspö Hard Rock Laboratory site, Sweden. *Geophys. J. Int.*, **218**(2), 1008-1031. DOI:10.1093/gji/ggz162

[14] Dai, S., Zhao, D., **Wang, S.***, Xiong, B., Zhang, Q., Li, K., Chen, L., Chen, Q., 2019. Three-dimensional numerical modeling of gravity and magnetic anomaly in a mixed space-wavenumber domain. *Geophysics*, **84**(4), G41-54. DOI: 10.1190/geo2018-0491.1

[13] Li, K., Dai, S., Chen, Q, Zhang, Q., Zhao, D., **Wang, S.**, Ling, J., 2019. Three-dimensional modeling of magnetic anomaly integral solution in a mixed space-wavenumber domain. *Chinese J. of Geophys.,* **62**(11): 4437-4450, doi:10.6038/cjg2019M0362.

[12] **Wang**, **S.**, Kalscheuer, T., Bastani, M., Malehmir, A., Pedersen, L.B., Dahlin T., Meqbel, N., 2018. Joint inversion of lake-floor electrical resistivity tomography and boat-towed radio-magnetotelluric data illustrated on synthetic data and an application from the Äspö Hard Rock Laboratory site, Sweden. *Geophys. J. Int.*, **213**(1), 511-533.

[11] Bastani, M., Lundin, I. A., **Wang, S.**, Jönberger, J., 2017. Integrated Modelling of Geophysical

and Petrophysical Data for Imaging Deeper Crustal Structures in Northern Sweden. *In "Proceedings of Exploration 17: Sixth Decennial International Conference on Mineral Exploration" edited by V. Tschirhart and M.D. Thomas*, 701–714. EAGE Best Papers.

[10] **Wang, S.**, 2017. *Joint inversion and integration of multiple geophysical data for improved models of near-surface structures*. PhD thesis, Uppsala University, Uppsala. ISBN: 978-91-513-0018-4

[9] Brodic, B., Malehmir, A., Bastani, M., Mehta, S., Juhlin, C., Lundberg, E. and **Wang, S.**, 2017. Multi-component digital-based seismic landstreamer and boat-towed radio-magnetotelluric acquisition systems for improved subsurface characterization in the urban environment. *First Break*, **35**(8), 41-47.

[8] **Wang, S.**, Malehmir, A., Bastani, M., 2016. Geophysical characterization of areas prone to quick-clay landslides using radio-magnetotelluric and seismic methods. *Tectonophysics*, **677**, 248-260.

[7] Malehmir, A., **Wang, S.**, Lamminen, J., Brodic, B., Bastani, M., Vaittinen, K., Juhlin, C., Place, J., 2015. Delineating structures controlling sandstone-hosted base-metal deposits using high-resolution multicomponent seismic and radio-magnetotelluric methods: a case study from Northern Sweden. *Geophys. Prospect.*, **63**(4), 774-797.

[6] Dai, S., **Wang, S.***, Zhang, Q., Xue, D., 2013. 2.5D forward and inversion of CSEM in frequency domain. *The Chinese Journal of Nonferrous Metals (in Chinese with English abstract)*, **23**(9), 2513-2523.

[5] **Wang, S.**, Xiong, B., Dai, S., 2013. Resolution ability to E-Ex arrangement wide field electromagnetic method studied on 1-D modeling and inversion. *Journal of Central South University (in Chinese with English abstract)*, **44**(9), 3766-3775.

[4] **Wang, S.**, 2012. *2.5D forward modeling of wide field electromagnetic method with vertical magnetic dipole source*. Master thesis (*in Chinese with English abstract*), Central South University, Changsha.

[3] **Wang, S.**, Xiong, B., Wang Y., Li C., 2012. Wave-number domain features of primary field of H-Hz arrangement wild field electromagnetic method. *Journal of Guilin University of Technology (in Chinese with English abstract)*, **32**(2), 179-183.

[2] **Wang, S.**, Xiong, B., 2012. Numerical calculation methods of wide field apparent resistivity. *Computing Techniques for Geophysical and Geochemical Exploration (in Chinese with English abstract)*, **34**(4), 380-383.

[1] **Wang, S.**, Xiong, B., 2010. Electromagnetic coupling effect in double frequencies surveys over multi-layer earth. *Computing Techniques for Geophysical and Geochemical Exploration (in Chinese with English abstract)*, **32**(6), 617-620.

- *Selected conference publications and whitepapers (* corresponding author)*

[22] **Wang, S.**, Constable, S., Orange, A.S., Johansen, S. E. New insights of airwave in controlled-source electromagnetic offshore data. *EGU*, *2022*.

[21] Rift2Ridge **Whitepaper coauthor**, 2021. An NSF land and ocean bottom Electromagnetic (EM) instrument pool and support for inversion software development and access.

[20] Rift2Ridge **Whitepaper coauthor**, 2021. Deciphering lithospheric processes driven by mantle flow beneath arc systems and adjacent tectonic regions: Collision, subduction, slab pull, extension, rifting, and continental breakup.

[19] Reyes-Ortega, V., Constable, S., **Wang, S.**, 2021. Investigation of the lithosphere-asthenosphere boundary across the Mendocino Fracture Zone using marine magnetotelluric method. *Marine Seismology Symposium*, *2021*.

[18] **Wang, S.**, Constable, S., Reyes-Ortega, V., 2020. Using marine magnetotelluric determinant data in LAB studies at Middle Atlantic Ridge and Mendocino Fracture Zone to study the oceanic upper mantle. *AGUFM*, *2020*. *Oral*

[17] **White paper coauthor**, 2020. Early Career Community Vision For Future Magnetotelluric Facility.

[16] Rychert, C., Harmon, N., Constable, S., Kendall, J.M., Tharimena, S., **Wang, S.**, Agius, M.R., Bogiatzis, P., Schlaphorst, D. and Hicks, S.P., 2019. A global view on mantle melt dynamics from the lithosphere-asthenosphere boundary the transition zone, insights from the PI-LAB experiment. *AGUFM*, *2019*, pp.DI11A-05.

[15] **Wang, S.**, Constable, S., Rychert, C. and Harmon, N., 2019. A dynamic lithosphere-asthenosphere boundary revealed using marine magnetotelluric data. *AGUFM*, *2019*, T43F-0516.

[14] Rychert, C., Harmon, N., Constable, S., Kendall, J.M., Tharimena, S., **Wang, S.**, Bogiatzis, P., Agius, M.R., Schlaphorst, D. and Hicks, S.P., 2019. A dynamic lithosphere-asthenosphere boundary dictated by variations in melt generation and migration: Results from the PI-LAB Experiment in the Equatorial Mid Atlantic. *AGUFM*, *2019*, T41B-02.

[13] Rychert, C.A., Harmon, N., Kendall, M., Constable, S., Tharimena, S., Agius, M., Bogiatzis, P., Schlaphorst, D. and **Wang, S.**, 2019, January. A dynamic plate base at the slow spreading Mid-Atlantic Ridge from the PI-LAB Experiment. In *Geophysical Research Abstracts* (Vol. 21).

[12] C. Rychert, N. Harmon, M. Kendall, S. Tharimena, M. Agius, P. Bogiatzis, B. Chichester, S. Hicks, S. Constable, **S. Wang**, 2018. Seismic Imaging of Oceanic Lithosphere: The PI-LAB Experiment at the Equatorial Mid-Atlantic and the VoiLA Experiment in the Lesser Antilles. *New Advances in Geophysics: The Future of Passive Seismic Acquisition*, the Royal Society of Edinburgh, UK

[11] **Wang, S.**, Bastani, M., Constable S., Kalscheuer, T., Malehmir, A., 2018. Using boat-towed radio-magnetotelluric and controlled source audio-magnetotelluric data to resolve fracture zones at Äspö Hard Rock Laboratory site, Sweden. *24th Electromagnetic Induction Workshop*, Helsingør, Denmark.

[10] **Wang, S.**, Bastani, M., Kalscheuer, T., Malehmir, A., Dynesius, L., 2017. Controlled source boattowed radio-magnetotellurics for site investigation at Äspö Hard Rock Laboratory, southeastern Sweden. *79th EAGE Conference and Exhibition*, Paris, France. *Oral*

[9] Lundin, I.A., Bastani, M., **Wang, S.**, Jönberger, J., 2016. Imaging Deep Crustal Structures and Mineralised Zones by 3D Modeling of Potential Field and Magnetotelluric Data-Example. *Near Surface Geoscience 2016-First Conference on Geophysics for Mineral Exploration and Mining*, Barcelona, Spain.

[8] Bastani, M., **Wang, S.**, Malehmir, A., 2016. Boat-towed RMT Measurements on the Water Surface over the Äspö Hard Rock Tunnel in Sweden. *Near Surface Geoscience 2016-Second Applied Shallow Marine Geophysics Conference*, Barcelona, Spain.

[7] **Wang, S.**, Xiong B., Jiang Q., 2016. Wide field electromagnetic 2.5D modeling. *23rd Electromagnetic Induction Workshop*, Chiang Mai, Thailand.

[6] **Wang, S.**, Kalscheuer, T., Bastani, M., Malehmir, A., Pedersen, L.B., Dahlin, T., Meqbel, N., 2016. Joint inversion of on-lake radio-magnetotelluric and lake-floor direct current resistivity data and its applications. *23rd Electromagnetic Induction Workshop*, Chiang Mai, Thailand. *Oral*

[5] Bastani, M., **Wang, S.**, Lundin, I.A., 2016. 2D and 3D resistivity models from magnetotelluric measurements North East of Kiruna, Sweden. *32nd Nordic Geological Winter Meeting*, Helsinki, Finland.

[4] Mehta, S., Bastani, M., Malehmir, A., **Wang, S.** and Pedersen, L., 2014. Shallow water radio-magnetotelluric (RMT) measurements in urban environment: A case study from Stockholm city. *EGUGA*, p.4196.

[3] Malehmir, A., **Wang, S.**, Lamminen, J., Bastani, M., Juhlin, C., Vaittinen, K., Dynesius, L., Palm, H., 2014. High-resolution multicomponent hardrock seismic imaging of mineral deposits and their host rock structures. *76th EAGE Conference and Exhibition*, Amsterdam, Netherlands.

[2] **Wang, S.**, Bastani, M., Malehmir, A., 2014. Integrated use of radio-magnetotelluric and high-resolution reflection seismic data to delineate near surface structures – two case studies from Sweden. *22nd Electromagnetic Induction Workshop*, Weimar, Germany. *Oral*

[1] Xiong, B., **Wang, S.***, 2011. Wave-Number Domain Features of Primary Field of H−Hz Arrangement Wide Field Electromagneitc Method. *International Conference on Instrumentation, Measurement, Circuits and Systems*, Hong Kong, China.

Research Funding

2022 (in preparation) The Young CAS fellow at the Norwegian Academy of Science and Letters: Quantifying 2D determinant inversion of magnetotelluric data (~ $ 75,000).

2021 - The Research Council of Norway (Young Talents): Middle Atlantic Ridge Study with 3D Magnetotelluric novel Techniques (MARS3DMT), PI, ~ $ 915,000.

2018 - 2020 The Cecil H. and Ida M. Green Foundation: Develop 3D finite element modeling code for the marine magnetotelluric considering bathymetry, PI, $ 60,000.

2016 - 2017 Byzantinska resestip: Develop boat-towed controlled-source radio-magnetotelluric inversion with source effect, PI, $ 22,000.

Other Research Projects

2021 - The Research Council of Norway and industrial partners: Center for Geophysical Forecasting (Participant).

2020 - The Research Council of Norway and industrial partners: Geophysics and Applied Mathematics for Exploration and Safe production (Participant).

2018 - 2020 Nature Science Foundation of the US: iLAB - Integrated Lithosphere-Asthenosphere Boundary Study (Participant).

2013 - 2017 Formas, BeFo, SBUF, Skanska, Boliden, FQM, Trafikverket, NGI: Multicomponent seismic and EM methods, http://trust-geoinfra.se (Participant).

2013	SEG-GWB project: Integration of geophysical, hydrogeological and geotechnical methods to aid monitoring landslide in Nordic countries (Participant).
2012	National High Technology Research and Development Program of China: Marine CSEM data processing and interpreting software (Co-applicant).
2011	Natural Science Foundation of Guangxi Province: Wide field EM 2D and 3D modeling and inversion with adaptive finite element method (Co-applicant).
2009 - 2010	Natural Science Foundation of China: 2.5D adaptive finite element modeling and inversion for TEM method with magnetic source (Participant).

Field Experience

201806	Test new acoustic capacity of OBEM instrument (2 days)
201606	Aquifer delineation on Öland using radio-magnetotellurics (2 weeks)
201606	Map fracture zones using boat-towed controlled-source radio-magnetotellurics (1 week)
201603	Map fracture zones using controlled-source radio-magnetotellurics on ice (2 days)
201505	Map fracture zones using boat-towed radio-magnetotellurics and seismics (1 week)
201508	Site investigation for energy storage using seismic method (1 week)
201407	Metal deposit investigation in Kiruna using magnetotellurics (2 weeks)
201402	Test seismic landstreamer, radio-magnetotellurics, and electrical resistivity tomography methods in Stockholm (1 week)
201310	Delineate metal deposit using seismic landstreamer and radio-magnetotellurics (2 weeks)
201310	Site investigation for waste storage using audio-magnetotellurics methods (3 days)
201206	Investigate a salt deposit using wide field electromagnetic method (2 weeks, team leader)
201106	Petro-Sonde method experiment (1 week)
201010	Delineate reservoir resistivity structure using wide field electromagnetic method (2 weeks)
201009 - 11	Investigate goaf at a coal mining area using wide field electromagnetic method (2 months)

Teaching

2022	Electromagnetic Geophysics (planned) (co-lecturer at Norwegian University of Science and Technology)
2021	Electromagnetic Methods in Oil Exploration (TPG4250, sensor at Norwegian University of Science and Technology)
2020	Environmental and Exploration Geophysics (SIO 182A, guest-lecturer at Scripps Institution of Oceanography)
2019	Environmental and Exploration Geophysics (SIO 182A, co-lecturer at Scripps Institution of Oceanography)
2014 - 2016	Applied Geophysics (TA at Uppsala University)
2015 - 2016	Electromagnetic Geophysics (TA at Uppsala University)
2011	Ground Penetrating Radar (TA at Guilin University of Technology)

Supervision & Mentorship

2022 Host of Ke Yi (visiting graduate student at NTNU, planned)
2022 - Supervisor of Jianbo Long (postdoc at NTNU)
2021 - Co-supervisor of Mohammed Ettayebi (Ph.D. student at NTNU)
2018 - 2020 Mentor of Valeria Reyes-Ortega (Ph.D. student at SIO, UC San Diego)
2016 Mentor of Mehdi Mohammadi Vizheh (visiting Ph.D. student at Uppsala University)

Synergistic Activities

Reviewer:

Geophysical Journal International; Geophysics; Geophysical Research Letters; Journal of Applied Geophysics; Geophysical Prospecting; Pure and Applied Geophysics; Geoscience Frontiers; Tectonophysics; Solid Earth; Mathematical Geosciences; Earth, Planets and Space; Acta Geophysica; Journal of Environmental & Engineering Geophysics; Journal of Ocean University of China; Applied Sciences; Minerals; Energies; SEG conferences; EGU annual meeting

Membership:

2022 - European Geosciences Union
2019 - American Geophysical Union
2014 - International Association of Geomagnetism and Aeronomy, Division VI (EMIW)
2014 - Society of Exploration Geophysicists
2017 - 2018 European Association of Geoscientists and Engineers

Session Co-Convener/Chair:

2022 EGU General Assembly (EMRP2.16)
2020 AGU Fall Meeting (DI010, GP003-III)

Attended Workshop/Conferences:

2022 EGU General Assembly (short oral, planned)
2021 Multi-front Geophysics Workshop (oral, invited)
2021 Global Young Scientists Summit (nominated and selected)
2020 AGU Fall Meeting (oral)
2019 AGU Fall Meeting (poster)
2018 Electromagnetic Induction Workshop (poster)
2017 European Association of Geoscientists and Engineers Annual Meeting (oral)
2016 Electromagnetic Induction Workshop (oral & poster)
2014 Electromagnetic Induction Workshop (oral)

Invited Seminar/Talks:

2022 University of Oslo (planned)
2021 Center for Geophysical Forecasting Seminar at NTNU
2021 GAMES Seminar at NTNU
2019 Southern University of Science and Technology
2018 Memorial University of Newfoundland
2018 Scripps Institution of Oceanography
2017 Sun Yat-Sen University

2017 Central South University

Attended Training:

2022 Norwegian for Foreigners level 1
2022 Pedagogical Basic Competence (5 days)
2021 Seminar for Young Research Talents (research dissemination & ERC proposal read)
2021 NTNU IE Faculty's PhD-Supervisor Seminar
2021 NTNU's Research Leadership training
2020 InSAR Processing and Theory with GMTSAR
2019 SCEC Research Mentor Training Workshop
2019 Academic Laboratory Management & Leadership Symposium
2018 Explore Prepare Innovate Connect Postdoctoral Training Program
2017 Swedish for Immigrants (graduated from *kurs D*)
2017 Writing Research Proposals in English
2015 Joint Inversion in Geophysics Summer School

Committee Member:

2018 - 2020 Seminar organizer of Institute of Geophysics and Planetary Physics
2018 - 2020 Steward of UAW Local 5810, the union of 11,000 academic Scholars & Researchers

Awards & Honors

2022 - Outstanding Academic Fellow Program, NTNU
2020 Outstanding Graduate Representative of Geophysics at Central South University
2018 - 2020 Green Scholar at Scripps Institution of Oceanography, UC San Diego
2005 - 2018 More than 10 scholarships and travel grants (~ $ 71,850 in total)