Dr. Jonny Wu

Associate Professor
Department of Geosciences, University of Arizona, USA

Research Interests

Global plate tectonics, mantle structure and convection, convergent margins, East Asia tectonics and geodynamics, 4D structural reconstructions, analog sandbox modeling, basin analysis, sustainable energy, petroleum geoscience

Academic and Industry Experience

Associate Professor 2023-present
Department of Geosciences
University of Arizona, Arizona, USA

Associate Professor 2022-2023
Department of Earth and Atmospheric Sciences
University of Houston, Texas, USA

Assistant Professor 2016-2022
Department of Earth and Atmospheric Sciences
University of Houston, Texas, USA

Postdoctoral Research Fellow (Advisor: Prof. John Suppe) 2011-2016
Department of Geosciences, National Taiwan University

Exploration Geologist 1998-2004
Shell Canada, Calgary, Canada

Education

Ph.D, Geology 2010
Royal Holloway University of London, UK
Thesis: 4D evolution of deepwater fold-thrust belt, offshore NW Borneo, South China Sea (Advisor: Ken McClay)

M.Sc *with distinction*, Basin Evolution and Dynamics 2005
Royal Holloway University of London, UK
Thesis: 4D analogue modeling of transtensional pull-apart basins (Advisor: Ken McClay)

B. Eng, Geological Engineering 1998
University of Waterloo, Canada

Publications (* = advised graduate student)

1. Rahimzadeh Bajgiran, M.*, Colli, L., **Wu, J.,** 2023, Assessing large-scale mantle compositional heterogeneity from machine learning analysis of 28 global P- and S-wave tomography models, Geophysical Journal International, https://doi.org/10.1093/gji/ggad373

2. Zhou, Y., Carter, A., **Wu, J.,** Liu, H., Yan, Y., Zhu, Z., Liu, W., Zhao, Q., Liu Q, 2023, Nature of Paleo-Pacific subduction along the East Asian continental margin: Insights from the sedimentary record of West Sarawak, Borneo, Geophysical Research Letters, 50, e2022GL102370, https://doi.org/10.1029/2022GL102370

3. Zhang, J., Zhang, G.-L., **Wu, J.,** 2023. Geochemical and geochronological constraints for the tectonic and magmatic evolution of the SW Mariana subduction zone. Deep Sea Research Part 1: Oceanographic Research Papers, https://doi.org/10.1016/j.dsr.2023.104039

4. Lin, Y.A.*, Colli, L., **Wu, J**, 2022. NW Pacific-Panthalassa intra-oceanic subduction during Mesozoic times from mantle convection and geoid models, Geochemistry, Geophysics, Geosystems, 23, e2022GC010514, https://doi.org/10.1029/2022GC010514

5. Wu, T.-J.*, **Wu, J.,** Alexandrov, I., Lapen, T., Lee, H.-Y., Ivin, V., 2022. Continental growth during migrating arc magmatism and terrane accretion at Sikhote-Alin (Russian Far East) and adjacent northeast Asia, Lithos, 432-433. https://doi.org/10.1016/j.lithos.2022.106891

6. Qian, S.-P., Salters, V.J.M., McCoy-West, A. J., **Wu, J.,** Rose-Kogam E.F., Nichols, A., Zhang, L., Zhou, H., 2022. Highly heterogeneous mantle caused by recycling of oceanic lithosphere from the mantle transition zone, Earth and Planetary Science Letters, 593, 117679. https://doi.org/10.1016/j.epsl.2022.117679

7. **Wu, J.,** Lin, Y.-A.*, Flament, N., Wu, T.-S.*, Liu, Y, 2022. Northwest Pacific-Izanagi plate tectonics since Cretaceous times from imaged and predicted mantle structure, Earth and Planetary Science Letters, 583, 117445. https://doi.org/10.1016/j.epsl.2022.117445

8. Wu, J. T.-J.*, **Wu, J.,** Okamoto, K., 2022. Intra-oceanic arc accretion along northeast Asia during Early Cretaceous provides a plate tectonic context for North China craton destruction, Earth Science Reviews, 226, 103952. https:/doi.org/10.1016/j.earscirev.2022.103952

9. Rao, G., Lu, R., Le Beon, M., Delcaillau, B., **Wu, J.,** Graveleau, F., 2021. Editorial: Active Fold-and-Thrust Belts: From Present-Day Deformation to Structural Architecture and Modelling. Frontiers in Earth Science. https://doi.org/10.3389/feart.2021.816157

10. Sibuet, J.C., Zhao, M., **Wu, J.,** Lee, C.-S., 2021. Geodynamic and kinematic context of South China Sea subduction during Okinawa trough opening and Taiwan orogeny, Tectonophysics, https://doi.org/10.1016/j.tecto.2021.229050

11. Qian, S.-P., Zhang, X., **Wu, J.**, Lallemand, S., Nichols, A., Huang, C.-Y., Miggins, D.P., Zhou, H., 2021. First identification of a Cathaysian continental fragment beneath the Gagua Ridge, Philippine Sea, and its tectonic implications, *Geology*, https://doi.org/10.1130/G48956.1

12. Amonpantang, P.*, **Wu, J.,** 2021. Structural characterization of the Phitsanulok basin, onshore Thailand, and regional tectonic implications, *Marine and Petroleum Geology* https://doi.org/10.1016/j.marpetgeo.2021.105110

13. Ward. J., Rosenbaum, G., Ubide, T., **Wu, J.,** Caulfield, J., Sandiford, M., Gürer, D., 2021. Geophysical and geochemical constraints on the formation of Holocene intraplate volcanism in East Asia, *Earth Science Reviews*, 218. https://doi.org/10.1016/j.earscirev.2021.103624

14. Hussein, M., Stewart, R., Sacrey, D., Johnston, D.H., **Wu, J.**, 2021, Unsupervised machine learning for time-lapse seismic studies and reservoir monitoring, *SEG Interpretation.* https://doi.org/10.1190/int-2020-0176.1

15. Chen, Y.-W.*, Colli, L., Bird, D.E., **Wu., J.,** Zhu, H., 2021, Caribbean plate tilted and actively dragged eastwards by low viscosity asthenospheric flow, *Nature Communications,* 12, 1603. https://doi.org/10.1038/s41467-021-21723-1

16. Hussein, M., Stewart, R., Sacrey, D., **Wu, J.,** Athale, R., 2021. Unsupervised machine learning using 3D seismic data applied to reservoir evaluation and rock type identification, *SEG Interpretation,* 9(2), T549-T568 https://doi.org/10.1190/int-2020-0108.1

17. Hussein, M., Stewart, R., **Wu, J.,** 2021. Which seismic attributes are best for subtle fault detection?, *SEG Interpretation,* 9(2), T299-T314. https://doi.org/10.1190/int-2020-0068.1

18. Fuston, S.*, **Wu, J.,** 2021. Raising the Resurrection plate from an unfolded-slab plate tectonic reconstruction of northwestern North America since early Cenozoic time, *GSA Bulletin*, 133 (5-6), 1128-1140. https://doi.org/10.1130/B35677.1

19. Lin, Y.A.*, Colli, L., **Wu, J.,** Schubert, B., 2020. Where are the proto-South China Sea slabs? SE Asian plate tectonics and mantle flow history from global mantle convection modeling, *Journal of Geophysical Research Solid Earth,* 125,12. https://doi.org/10.1029/2020JB019758

20. **Wu, J.**, McClay, K.R., De Vera, J. 2020. Growth of triangle zone fold-thrusts within the NW Borneo deepwater fold belt, offshore Sabah, southern South China Sea. *Geosphere*, https://doi.org/10.1130/GES02106.1

21. Li, L. and **Chen, Y-W.***, Zheng, Y., Hu, H., **Wu, J.,** 2019. Seismic Evidence for Plume-Slab Interaction by High-resolution Imaging of the 410-km Discontinuity Under Tonga, *Geophysical Research Letters*, 46, 13687-13694. https://doi.org/10.1029/2019GL084164

22. Zhao, M., Sibuet, J.C., **Wu, J.**, 2019. The South China Sea and Philippine Sea plate intermingled fates, National Science Review, 6, 5, 886-890. https://doi.org/10.1093/nsr/nwz107

23. Wu, J.T-S.*, **Wu, J.,** 2019. Izanagi-Pacific ridge subduction revealed by a 56 to 46 Ma magmatic gap along the NE Asian margin, Geology, 47, 10, 953-957. https://doi.org/10.1130/G46778.1

24. Amonpantang, P.*, Bedle, H., **Wu, J.**, 2019, Multi-attribute analysis for channel element discrimination in the Taranaki basin, New Zealand, SEG Interpretation, 7, 2 SBi-T563. doi: 10.1190/int-2018-0174.1.

25. Chen, Y.-W.*, **Wu, J.,** Suppe, J., 2019. Southward propagation of Nazca subduction along the Andes. Nature, 565, 441-447. doi: 10.1190/int-2018-0174.1.

26. Liu, S., Zhao, M., Sibuet, J.C., Qiu, X., Zhang, J., **Wu, J.E.**, Chen, C., Xu, Y., Sun, L., 2018. Geophysical constraints on the lithospheric structure in the northeastern South China Sea and its implications for the South China Sea geodynamics, Tectonophysics, 742-743, 101-119 doi: 10.1016/j.tecto.2018.06.002.

27. **Wu, J.**, Suppe, J., 2018. Proto-South China Sea plate tectonics using subducted slab constraints from tomography. Journal of Earth Science, 29, 6, 1304-1318, doi: 10.1007/s12583-017-0813-x.

28. **Wu, J.E.,** Suppe, J., Lu, R., Kanda, R.V.S., 2016. Philippine Sea and East Asian plate tectonics since 52 Ma constrained by new subducted slab reconstruction methods. Journal of Geophysical Research Solid Earth, 121, 6, 4670-4741. doi: 10.1002/2016JB012923

29. **Wu, J.E.**, McClay, K.R., Frankowicz, E., 2015. Niger Delta gravity-driven deformation above the relict Chain and Charcot oceanic fracture zones, Gulf of Guinea: insights from analogue models. Marine and Petroleum Geology, 65, 43-62.

30. Sugan, M., **Wu, J.E.,** and McClay, K.R, 2014. 3D analogue modelling of transtensional pull-apart basins: comparison to the Cinarcik Basin, Marmara Sea, Turkey, Bollettino di Geofisica Teorica e Applicata, 55, 4, 699-716.

31. Lu, R., He, D., Suppe, J., **Wu, J.E.**, Liu, B., Chen, Y.G., 2014. Structural model of the central Longmen Shan thrusts using seismic reflection profiles: Implications for the sediments and deformations since the Mesozoic. Tectonophysics, 630, 43-53.

32. **Wu, J.E.,** McClay, K.R., Whitehouse, P., Dooley, T., 2012. Chapter 25: 4D analogue modelling of transtensional pull-apart basins. In: Bally, A.W. and Roberts, D.G. eds., Phanerozoic Regional Geology of the World, Vol. 1, Elsevier, 675 pp.

33. **Wu, J.E**., McClay, K.R., 2011. Chapter 14: 2D analog modeling of fold and thrust belts: dynamic interactions with syn-contractional sedimentation and erosion, in: K. McClay, J. H. Shaw and J. Suppe, eds., Thrust Fault-Related Folding, American Association of Petroleum Geologists Memoir 94.

34. **Wu, J.E.,** McClay, K.R., Despinois, F., Woollard, M., Evans, R., Isa, L., Janai, S., 2010**.** Analogue modelling of deepwater fold and thrust belts: Dynamic interaction with syntectonic sedimentation. Trabajos de Geologia, 30, 331-336.

35. **Wu, J.E.,** McClay, K.R., Whitehouse, P., Dooley, T., 2009. 4D Analogue Modelling of Transtensional Pull-Apart Basins, Marine and Petroleum Geology, 26, 8, 1608-1623.

Courses Taught

Tectonic Interpretation of Seismic Tomography (graduate class)
Physical Sandbox Modeling of Structural Systems (graduate class)
Physical Geology
Petroleum Geoscience for Petroleum Engineers
Geological Field Methods
Data Science for Energy Transition

Selected Awarded Grants

NSF EAR-PF: Mantle Convection Modeling as a Test of Pacific Absolute Plate Motion, Postdoctoral Fellowship for Dr.Daniel Woodworth (scientific mentor/co-PI), $180,000. Start 09/01/2022. End 09/01/2024.

NSF CAREER Award (sole PI): Unfolding Earth history back to the Mesozoic by incorporating seismic tomography into Pacific realm plate tectonic reconstructions, $568,309. Start 04/01/2019; End 04/01/2023.

2020 AAPG Grants-in-Aid Foundation, Merrill W. Haas Memorial Grant. Detrital Zircon fieldwork, Tyaughton-Methow basin of British Columbia, Canada, for Ph.D. student Spencer Fuston, $3,000.

NSF-funded virtual organization Extreme Science and Engineering Discovery Environment (XSEDE) Computing Allocations proposal: Testing Western North American Terrane Collisional Timing from Mantle Convection Forward Modeling, (co-PI), 385,776 supercomputing node hours (official in-kind value $2,278,699.25). Start 01/01/2021. End 12/31/2021.

NSF HDR DSC: Data Science for Energy Transition (senior personnel), $1,323,016 ($44,321 share). Start 10/01/2021. End 10/01/2024.

Selected University Service

2023-present, U. Arizona, Colloquium/News and Accolades committee
2023-present, U. Arizona, Graduate Admissions committee
2020-2023, chair, U. Houston, Earth and Atmospheric Sciences DEI committee
2021-2023 co-chair, U. Houston, College Nat. Sci. and Mathematics DEI committee

Selected Awards

University of Houston Presidential 50-in-5 “Impact50 Publication Honoree”, 2021
Chinese Academy of Sciences, Presidential International Fellowship Initiative, 2021
University of Houston Presidential 50-in-5 “National Recognition Honoree, National Awards”, 2019
NSF CAREER Award, 2019