

Guangyu Xu

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Research Interests

Underwater acoustics and its use as a remote-sensing tool for monitoring seafloor hydrothermal systems and characterizing marine sediment properties.

Numerical modeling of deep ocean circulation and its influences on the dispersal of hydrothermal vent larvae and chemicals.

Numerical modeling of rising hydrothermal plumes and their interactions with ambient currents.

Sub-seafloor hydrothermal circulation and its response to geophysical and oceanic processes.

Current Research Grants

National Science Foundation, Division of Ocean Sciences, (APL-UW) 1851199, "Collaborative Research: Hydrothermal Estuaries: What Sets the Hydrothermal Flux of Fe and Mn to the Oceans?", \$233,205, 2019-2022

National Science Foundation, Division of Ocean Sciences, (WHOI/APL-UW) 1726920/1834813, "Collaborative Research: Heat flow mapping and quantification at ASHES hydrothermal vent field using an observatory imaging sonar", \$99,346, 2018-2022

Education

B.S. Ocean Technology, Ocean University of China, September 2004 to July 2008.

M.S. Marine Sciences, University of Georgia, August 2008 to December 2010.

Ph.D. Oceanography, Department of Marine and Coastal Sciences, Rutgers University, January 2011 to October 2015.

Current and Past Positions

Research Scientist, Applied Physics Laboratory, University of Washington, Dec 2020 - present

Postdoctoral Research Associate, Applied Physics Laboratory, University of Washington, Mar 2018 - Dec 2020

Postdoctoral Investigator, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Jul 2017 to Feb 2018.

Postdoctoral Scholar, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Oct 2015 to Jul 2017.

Publications in Peer-Reviewed Journals

Xu, G., K. Bemis, D. Jackson, A. Ivakin (2021), "Acoustic and In-situ Observations of Hydrothermal Discharge at ASHES Vent Field: an OOI Cabled Array Case Study", *Earth and Space Science*, 8, e2020EA001269. <https://doi.org/10.1029/2020EA001269>.

Xu, G., D. J. McGillicuddy, S. W. Mills, and L. S. Mullineaux (2018), "Dispersal of Hydrothermal Vent Larvae at East Pacific Rise 9-10°N Segment", *Journal of Geophysical Research Oceans*, 123, <https://doi.org/10.1029/2018JC014290>.

Xu, G., W. W. Chadwick Jr., W. S. D. Wilcock, K. G. Bemis, and J. Delaney (2018), "Observation and modeling of hydrothermal response to the 2015 Eruption at Axial Seamount, Northeast Pacific", *Geochemistry, Geophysics, Geosystems*, 19, <https://doi.org/10.1029/2018GC007607>.

Branch, A., **G. Xu**, M.V. Jakuba, C.R. German, S. Chien, J.C. Kinsey, A.D. Bowen, K.P. Hand, and J.S. Seewald (2018), "Autonomous Nested Search for Hydrothermal Venting", *Planning and Robotics: An ICAPS 2018 Workshop*, Delft, The Netherlands, Jun 26, 2018.

Xu, G. and J. W. Lavelle (2017), "Circulation, hydrography, and transport over the summit of Axial, a 1500 m deep volcano in the Northeast Pacific", *Journal of Geophysical Research Oceans*, 122, 5404-5422, [doi:10.1002/2016JC012464](https://doi.org/10.1002/2016JC012464).

Xu, G., B. I. Larson, K. G. Bemis, and M. D. Lilley (2017), "A preliminary 1-D model investigation of tidal variations of temperature and chlorinity at the Grotto mound, Endeavour Segment, Juan de Fuca Ridge", *Geochemistry Geophysics Geosystems*, 18, 75-92, [doi:10.1002/2016GC006537](https://doi.org/10.1002/2016GC006537).

Xu, G., D. R. Jackson, K. G. Bemis (2017), "The relative effect of particles and turbulence on acoustic scattering from deep sea hydrothermal vent plumes revisited", *Journal of Acoustical Society of America* 141, 1446-1458, [doi:10.1121/1.4974828](https://doi.org/10.1121/1.4974828).

Jackson, D. R., A. N. Ivakin, **G. Xu**, K. G. Bemis (2017), "Sonar observations of diffuse hydrothermal flows", *Earth and Space Science* 4, 230- 239, [doi:10.1002/2016EA000245](https://doi.org/10.1002/2016EA000245).

Rona, P. A., K. G. Bemis, **G. Xu**, K. Mitsuzawa (2015), "Estimations of heat transfer from Grotto's North Tower: a NEPTUNE Observatory case study", *Deep Sea Research II* 121, 95-111, [doi:10.1016/j.dsr2.2015.05.010](https://doi.org/10.1016/j.dsr2.2015.05.010).

Bemis, K. G., D. Silver, **G. Xu**, R. Light, D. R. Jackson, C. Jones, S. Ozer, L. Liu (2015), "The path to COVIS: a review of acoustic imaging of hydrothermal plumes", *Deep Sea Research II* 121, 159-176, [doi:10.1016/j.dsr2.2015.06.002](https://doi.org/10.1016/j.dsr2.2015.06.002).

Ivakin, A., D.R. Jackson, K. Bemis, and **G. Xu** (2015), "A correlation approach for characterizing diffuse hydrothermal flows using multi-beam sonar", *UACE2015-3rd Underwater Acoustics Conference and Exhibition*, Chania, Island of Crete, Greece, June 21-26, 2015.

Xu, G., D. R. Jackson, K. G. Bemis, and P. A. Rona (2014), "Time-series measurement of hydrothermal heat flux at the Grotto mound, Endeavour Segment, Juan de Fuca Ridge", *Earth and Planetary Science Letters*, 404, [doi:10.1016/j.epsl.2014.07.040](https://doi.org/10.1016/j.epsl.2014.07.040), 220-231.

Bemis, K. G., **G. Xu**, D. R. Jackson, P. A. Rona, and R. Light (2014), "Cabled observatory enabled acoustic monitoring of hydrothermal discharge", *UA2014*, the 2nd international conference and exhibition on Underwater Acoustics, Rhodes, Greece, June 22-27, 2014.

Xu, G., D. R. Jackson, K. G. Bemis, and P. A. Rona (2013), "Observations of the volume flux of a seafloor hydrothermal plume using an acoustic imaging sonar", *Geochemistry Geophysics Geosystems*, 14, [doi:10.1002/ggge.20177](https://doi.org/10.1002/ggge.20177).

Xu, G. and D. DiIorio (2012), "Deep sea hydrothermal plumes and their interaction with oscillatory flows", *Geochemistry Geophysics Geosystems*, 13, doi:10.1029/2012GC004188.

Daniela, D., J. William Lavelle, P. A. Rona., K. G. Bemis, **G. Xu**, L. N. Germanovich, R. P. Lowell, G. Genc (2012), "Measurements and Models of Heat Flux and Plumes from Hydrothermal Discharges Near the Deep Sea Floor", *Oceanography*, 25:168-181.

Xu, G. and D. DiIorio (2011), "The relative effects of particles and turbulence on acoustic scattering from deep-sea hydrothermal vent plumes", *Journal of the Acoustical Society of America*, 130, 1856-1867.

Other Publications

Xu, G., K. Bemis, D. Jackson (2017), "Sounding the black smoker plumes", *Eos*, 98, <https://doi.org/10.1029/2017EO086289>.

Conference Activity/Presentations

Session Convener

Session OS41C/OS43C, "Interactions Between Mid-ocean Ridge Hydrothermal Systems and the Ocean", 2013 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 9-13 Dec.

Oral Presentations

Invited Talks

Xu, G. "Modeling and measurements of hydrothermal flows", Invited talk at the GoMRI-Core1 Workshop, Tallahassee, FL, 15-17 Jan, 2019.

Xu, G., D. Jackson, K. Bemis, A. Ivakin, "Long-term, quantitative observations of seafloor hydrothermal venting using an imaging sonar", Abstract 1pAO1, Invited talk at the 174th Meeting of the Acoustical Society of America, New Orleans, LA, 4-8 Dec, 2017.

Others

Xu, G., W. Chadwick Jr., W. Wilcock, K. G. Bemis, S. Nooner, G. Sasagawa, M. Zumberge, J. Delaney, "Observation and modeling of hydrothermal response to the 2015 eruption at Axial Seamount, Northeast Pacific: An OOI Cabled Observatory case study", Abstract T33C-02, presented at 2017 Fall Meeting, American Geophysical Union (AGU), New Orleans, LA, 11-15 Dec.

Xu, G. and J. W. Lavelle, "Circulation, hydrography, and transport over the summit of Axial — the destination node of OOI's Cabled Array. Abstract OS44B-07, presented at 2016 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 12-16 Dec.

Xu, G., K. G. Bemis, D. R. Jackson, R. Light, and R. Lee, "Time-series observations of hydrothermal discharge using an observatory-enabled vent imaging sonar: a NEPTUNE observatory case study", Abstract EGU2015-8195, presented at General Assembly 2015, European Geosciences Union (EGU), Vienna, Austria, 12-17 Apr.

Xu, G., K. G. Bemis, and D. R. Jackson, "Multidisciplinary observations of an episode of hydrothermal response to earthquakes", presented at the Multidisciplinary Observatories in Vent Ecosystems (MOVE) workshop, Ifremer, Best, France, 24-27 Nov, 2014.

Xu, G., D. R. Jackson, K. G. Bemis and P. A. Rona, "Time-series measurements of hydrothermal heat flux at the Grotto Mound, Endeavour Segment, Juan de Fuca Ridge", presented at the International Symposium in Memory and Honor of Peter A. Rona, The Institute of Marine and Coastal Sciences, Rutgers University, 2014.

Xu, G., D. R. Jackson, K. G. Bemis and P. A. Rona, "Heat flux measured acoustically at Grotto Vent, a hydrothermal vent cluster on the Endeavour Segment, Juan de Fuca Ridge", Abstract OS43C-05, presented at 2013 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 9-13 Dec.

Xu, G., P. A. Rona, K. G. Bemis and D. R. Jackson, "Measurement of hydrothermal heat flux using a sonar deployed on the Canadian NEPTUNE cabled observatory", *J. Acoust. Soc. Am.* 134, 3974 (2013), presented at the 166th Meeting of the Acoustical Society of America, San Francisco, Calif., 2-6 Dec.

Xu, G. and D. DiIorio, "Hydrothermal vent flow and turbulence measurements with acoustic scintillation instrumentation", 2010 Ocean Sciences Meeting, Portland, OR.

Xu, G. and J. W. Lavelle, "Circulation, hydrography, and Transport at Axial Seamount", 2015 Woods Hole Oceanographic Institution Annual Postdoctoral Symposium, October 12th, 2016.

Xu, G. and J. W. Lavelle, "Circulation, Hydrography, and Transport at Axial Seamount: A destination node of OOI's Cabled Array", WHOI AOP&E Department Seminar, Oct 5th, 2016.

Xu, G., B. I. Larson, K. G. Bemis, and M. D. Lilley, "Investigation of tidal variations of temperature and chlorinity at the Grotto mound, Endeavour Segment, Juan de Fuca Ridge", WHOI G&G Department Seminar, Aug 23rd, 2016.

Xu, G., "Quantitative Observations of a Deep-sea hydrothermal plume using an acoustic imaging sonar", 2015 Woods Hole Oceanographic Institution Annual Postdoctoral Symposium, October 15th, 2015.

Poster Presentations

Xu, G., K. Bemis, D. Jackson, A. Ivakin, "Monitoring Hydrothermal Plumes at ASHES Vent Field, Axial Seamount through Quantitative Acoustic Imaging", Abstract #V040-0016 poster, presented at 2020 Fall Meeting, American Geophysical Union (AGU), 01-17, Dec.

Xu, G., K. Bemis, D. Jackson, A. Ivakin, "Acoustic and In-situ Observations of Hydrothermal Discharge at ASHES Vent Field: an OOI Cabled Array Case Study", Abstract #OS51B-1492 poster, presented at 2019 Fall Meeting, American Geophysical Union (AGU), San Francisco, WA, 08-12, Dec.

Bemis, K. G., **G. Xu**, D. Jackson, A. Ivakin, "Fluid composition or bottom currents: What drives extremes in behavior of plumes at ASHES vent field, Axial Volcano?", Abstract #OS51B-1493 poster, presented at 2019 Fall Meeting, American Geophysical Union (AGU), San Francisco, WA, 08-12, Dec.

Xu, G., K. Bemis, D. Jackson, A. Ivakin, T. McGinnis, A. Marburg, "Acoustic and In-situ Observations of Hydrothermal Discharge at ASHES Vent Field: an OOI Cabled Array Case Study", Abstract #190531-094 poster, presented at Oceans 2019, Seattle, WA, 27-31, Oct.

Xu, G., L. Germanovich, D. Jackson, A. Ivakin, A. Marburg, K. Bemis, "In situ and Acoustic Observations of Hydrothermal Discharge at ASHES Vent Field: preliminary results from an OOI Cabled Array Case Study", Abstract V43G-0206 poster, presented at 2018 Fall Meeting, American Geophysical Union (AGU), Washington, D.C., 10-14, Dec.

Ivakin, A. N., K. G. Bemis, and **G. Xu**, "Remote characterizing diffuse hydrothermal flows using multi-beam sonar", Abstract OS43A-1999 poster, presented at 2015 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 14-18, Dec.

K. G. Bemis, **G. Xu**, and R. Lee, "COVIS Detects Interconnections Between Atmospheric, Oceanic and Geologic systems at a Deep Sea Hydrothermal Vent", Abstract OS43A-1993 poster, presented at 2015 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 14-18, Dec.

Larson, B. I., **G. Xu**, K. G. Bemis, and D. A. Butterfield, "Integrated data from the NEPTUNE observatory highlight role of sub-seafloor processes in rapid temperature, salinity, and heat spiking after seismic activity", Abstract OS43A-1994 poster, presented at 2015 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 14-18, Dec.

Ivakin, A., D. R. Jackson, K. G. Bemis, and **G. Xu**, "Quantification of Diffuse Hydrothermal Flows Using Multibeam Sonar" Abstract V21A-4727 poster, presented at 2014 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 15-19 Dec.

Xu, G. and K. G. Bemis, "Modeling mid-ocean ridge hydrothermal response to earthquakes, tides, and ocean currents: a case study at the Grotto mound, Endeavour Segment, Juan de Fuca Ridge" Abstract V21A-4726 poster, presented at 2014 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 15-19 Dec.

Xu, G., D. R. Jackson, K. G. Bemis and P. A. Rona, "Time-series measurements of hydrothermal plume volume flux with imaging sonar" Abstract OS41C-1741 poster, presented at 2012 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 3-7 Dec.

DiIorio, D., J. W. Lavelle and **G. Xu**, "The Deep Sea Hydrothermal Plume at Dante and Its Interaction with Tidal Flow" Abstract v11e-2545 poster, presented at 2011 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 5-9 Dec.

Rona, P. A., K. G. Bemis, **G. Xu**, D. R. Jackson and C. D. Jones, "Hydrothermal flow at Main Endeavour Field imaged and measured with Cabled Operated Vent Imaging Sonar" Abstract v11e-2542 poster, presented at 2011 fall meeting, American Geophysical Union (AGU) San Francisco, Calif., 5-9 Dec.

Bemis, K. G., **G. Xu**, J. Rabinowitz, P. A. Rona, D. R. Jackson and C. D. Jones "Understanding Plume Bending at Grotto Vent on the Endeavour Segment, Juan de Fuca Ridge" Abstract v11e-2544 poster, presented at 2011 fall meeting, American Geophysical Union (AGU), San Francisco, Calif., 5-9 Dec.

Xu, G., D. R. Jackson, K. G. Bemis and P. A. Rona, "Acoustic Measurement Method of the Volume Flux of a Seafloor Hydrothermal Plume" Abstract v11e-2543 Poster, presented at 2011 Fall Meeting, American Geophysical Union (AGU), San Francisco, Calif., 5-9 Dec.

Xu, G. and D. DiIorio, "The Investigation of Hydrothermal Plumes by Acoustic Scintillation Methods", 2010 Neptune Canada Workshop, Victoria, BC, Canada.

Xu, G. and D. DiIorio, "The Investigation of Hydrothermal Plumes by Acoustic Scintillation Methods", 2010 Ridge2000 meeting, Portland, OR.