**MELISSA C. KIDO SOULE**

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Marine Chemistry and Geochemistry, MS#4 [msoule@whoi.edu](mailto:msoule@whoi.edu)

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**EDUCATION**

Ph.D. University of Oregon, 2007, Physical Chemistry

Nonlinear vibrational spectroscopic studies of the adsorption and orientation of environmentally important molecules at the vapor /water interface. Advisor: Geraldine Richmond

M.A. University of California, Berkeley, 1999, Physical Chemistry

Advisor: Richard Saykally

B.A. Carleton College, 1996, Chemistry

Advisor: Tricia Ferrett

**PROFESSIONAL EXPERIENCE**

Research Associate III, Woods Hole Oceanographic Institution, Marine Chemistry and Geochemistry (September 2007 to present)

FT-MS Facility Manager, Woods Hole Oceanographic Institution, Marine Chemistry and Geochemistry (September 2007 to present)

Visiting Chemistry Professor, The Evergreen State College, Olympia, WA (September 1999 to June 2000)

Research Assistant with Tricia Ferrett, Carleton College, Northfield, MN (Spring 1997)

Undergraduate Researcher with Tricia Ferret, Carleton College, Northfield, MN (1995 to 1996)

**HONORS AND AWARDS**

Penzance Award, Woods Hole Oceanographic Institution (2014) - Awarded to the 6 senior technical staff of Fye Laboratory, "for sustained exceptional performance, for outstanding representation of the WHOI spirit, and for major contributions to the personal and professional lives of our staff."

Whelan Award, Woods Hole Oceanographic Institution (2008) -“…given to an individual to cover research/scientific related expenses that are not covered by normal funding sources… who are commonly neglected by other Institutional grants and prizes.”

Mildred Braaten Archibald Scholarship in Science and Mathematics, University of Oregon (2005)

GAANN (Graduate Assistance in Areas of National Need) Teacher/Scholar Fellowship, University of Oregon (2002)

Phi Beta Kappa, Carleton College (1996)

**TEACHING EXPERIENCE**

*University of Oregon:*

Graduate Teaching Assistant, Advanced General Chemistry, Fall 2000 to Spring 2001.

*The Evergreen State College:*

Visiting Professor, “Introduction to Natural Science”, a year-long, team-taught integrative course in chemistry, math, and biology, September 1999 to June 2000.

*University of California, Berkeley:*

Head Teaching Assistant, General Chemistry, Fall 1998.

Teaching Assistant, General Chemistry, Fall 1997 to Spring 1998.

**PROFESSIONAL AFFILIATIONS**

American Chemical Society (2002 to 2012)

American Society for Mass Spectrometry (2008 to present)

**RESEARCH INTERESTS**

Application of ultrahigh resolution mass spectrometry to complex environmental systems; development of chromatographic and mass spectrometry-based methods for qualitative and quantitative analysis; characterization of the chemical connections between marine microbial metabolism and dissolved organic matter (marine metabolomics).

**PROFESSIONAL ACTIVITIES**

*Continuing Education:*

Metabolomics Course, 2011, ASMS National Meeting, Denver, CO.

Fundamentals of HPLC Course, 2008, ACS National Meeting, Philadelphia, PA.

FT-ICR Mass Spectrometry Course, 2008, ASMS National Meeting, Denver, CO.

*Journal Reviewer:*

Geochimica et Cosmochimica Acta, Environmental Science and Technology, and Rapid Communications in Mass Spectrometry

*Community Outreach:*

Judge, Falmouth Academy Science Fair (2015)

*Curriculum Development:*

Chemistry Curriculum Author, NSF Systemic Change Initiative in Chemical Education Reform. Modular Chemistry Consortium at the University of California, Berkeley (1998 to 1999).

**PARTICIPATION IN EDUCATION PROGRAM**

Introduction to Mass Spectrometry Short Course, January 2014

Environmental Metabolomics Short Course, October 2015

*Both courses developed with Krista Longnecker and offered to MIT/WHOI joint program students and WHOI post-docs*

**SUPERVISION AT WHOI**

*Undergraduate student fellows:*

Angela Boysen, 2010 (Stanford University); Lauren Brin, 2009 (St. Catherine’s College); Jacqueline Carozza, 2013 (Cornell University)

*Lab Technician:* Gretchen Swarr (2013 to present)

**SUBMITTED PUBLICATIONS**

David R. Griffith, Melissa C. Kido Soule, Timothy I. Eglinton, Elizabeth B. Kujawinski, and Philip M. Gschwend (*submitted, Environmental Science: Processes & Impacts*).Steroidal estrogen sources and fate in a sewage-impacted coastal ocean.

**PUBLICATIONS**

Elizabeth B. Kujawinski, Krista Longnecker, Katie L. Barott, Ralf J. M. Weber, **Melissa C. Kido Soule**. 2016. Microbial community structure affects marine dissolved organic matter composition. *Frontiers in Marine Science*, doi: 10.3389/fmars.2016.00045

Winifred M. Johnson, Melissa C. Kido Soule, Elizabeth B. Kujawinski*.* 2016. Evidence for quorum sensing and differential metabolite production by a marine bacterium in response to DMSP. *International Society for Microbial Ecology*, doi: 10.1038/ismej.2016.6.

Melissa C. Kido Soule, Krista Longnecker, Winifred M. Johnson, Elizabeth B. Kujawinski. 2015. Environmental metabolomics: Analytical strategies. *Marine Chemistry*, 177: 374-387.

Longnecker, K., J. Futrelle, E. Coburn, **M. C. Kido Soule** and E. B. Kujawinski. 2015. Environmental metabolomics: databases and tools for data analysis. *Marine Chemistry*, 177: 366-373.

# Fiore, Cara L., Krista Longnecker, **Melissa C. Kido Soule**, and Elizabeth B. Kujawinski. 2015. Release of ecologically relevant metabolites by the cyanobacterium Synechococcus elongatus CCMP 1631. *Environmental Microbiology*, 17:3949-3963.

# Krista Longnecker, **Melissa C. Kido Soule**, Elizabeth B. Kujawinski. 2015. Dissolved organic matter produced by Thalassiosira pseudonana. Marine Chemistry, 168: 114-123.

Griffith, D.R., **M.C. Kido Soule**, H. Matsufuji, T.I. Eglinton, E.B. Kujawinski, and P.M. Gschwend. 2014. Measuring free, conjugated, and halogenated estrogens in secondary treated wastewater effluent. *Environmental Science & Technology*, 48: 2569-2578.

Kujawinski, E.B., **M.C. Kido Soule**, D.L. Valentine, A.K. Boysen, K. Longnecker, M.C. Redmond. 2011. Fate of dispersants associated with the Deepwater Horizon oil spill. *Environmental Science and Technology*, 45: 1298-1306.

**Kido Soule, M.C.**, K. Longnecker, S. J. Giovannoni and E.B. Kujawinski. 2010. Impact of instrument and experiment parameters on reproducibility and repeatability of peaks within ultrahigh resolution ESI FT-ICR mass spectra of natural organic matter. *Organic Geochemistry*, 41: 725-733.

**Kido Soule, M.C.**, Blower, P., and Richmond, G.L. 2007. Effects of atmospherically important solvated ions on organic adsorption at the surface of aqueous solutions. *Journal of Physical Chemistry A,* 49: 13703-13713.

**Kido Soule, M.C.**, Blower, P., and Richmond, G.L. 2007. Nonlinear vibrational spectroscopic studies of the adsorption and speciation of nitric acid at the vapor/acid interface. *Journal of Physical Chemistry A,*111: 3349-3357.

**Kido Soule, M.C.**, Hore, D.K., Jaramillo-Fellin, D., and Richmond, G.L. 2006. Differing adsorption behavior of environmentally important cyanophenol isomers at the air-water interface. *Journal of Physical Chemistry B*, 110: 16575-16583.

**Kido, M.C.**, Kegley, S, Bothun, G., Marcy, G. 1999. What is in a Star? *John Wiley and Sons, Inc.,* New York.

**PRESENTATIONS (Oral)**

**Melissa C. Kido Soule** (2016). Environmental Metabolomics: using mass spectrometry to characterize complex biological and environmental mixtures. Marine Chemistry and Geochemistry Department Seminar, WHOI, March 2016.

Griffith, D.R., **M.C. Kido Soule**, H. Matsufuji, T.I. Eglinton, E.B. Kujawinski, and P.M. Gschwend (2014). Steroidal estrogen sources and fate in a sewage-impacted coastal ocean – Massachusetts Bay, USA. 247th American Chemical Society National Meeting, Dallas, TX. 16-20 Mar 2014.

Kujawinski , E.B., J. Carozza, W. Johnson, **M.C. Kido Soule**, K. Longnecker (2014). Insights into carbon cycling along Line-P from integration of microbial metabolomics and dissolved organic matter composition. 2014 Ocean Sciences Meeting, Hawaii.

Fiore C.L., K. Longnecker, **M.C. Kido Soule**, and E.B. Kujawinski (2014). Molecular Level Characterization of Dissolved Organic Matter Released During the Growth of Marine *Synechococcus elongatus*. Biogeochemistry Seminar Series, WHOI, May 2014.

Fiore C.L., K. Longnecker, C. Breier, **M.C. Kido Soule**, and E.B. Kujawinski (2014). Characterization of Dissolved Organic Matter Released by the Marine *Synechococcus elongatus*. Gordon Research Conference on Marine Microbes. Waltham, MA, June 2014.

**Kido Soule, M.C.** (2013). Analytical challenges in FT-MS of dissolved organic matter, FT-MS Users Workshop, 2013 American Society for Mass Spectrometry Meeting, Minneapolis, MN.

Griffith, D.R., **M.C. Kido Soule**, H. Matsufuji, T.I. Eglinton, E.B. Kujawinski, and P.M. Gschwend. (2013). Free, conjugated, and halogenated estrogens in treated wastewater effluent. 2013 ASLO Aquatic Sciences Meeting, New Orleans.

Johnson, W.M., I. Howard-Åkerfeldt, I., K. Longnecker, **M. Kido Soule**, E. Kujawinski (2013). The impact of carbon substrate on the metabolic profile of the heterotrophic bacterium Ruegeria pomeroyi. 2013 ASLO Aquatic Sciences Meeting, New Orleans.

Kujawinski E.B., K. Longnecker, **M.C. Kido Soule**, D. Valentine (2013). Composition of polar components of oil in the Gulf of Mexico water column during and after the Deep Water Horizon oil spill. 2013 Gulf of Mexico Research Initiative Conference, New Orleans.

Kujawinski, E.B., **M.C. Kido Soule**,K. Longnecker. Comparison of Internal and External Metabolites Produced by a Diatom*.* Goldschmidt Conference, Prague, Czech Republic. August 2011. (Oral presentation given by Maya Bhatia due to travel restrictions for EK.)

Kujawinski, E.B., K. Longnecker, **M.C. Kido Soule**. Sources of variability in ultrahigh resolution mass spectra of natural organic matter – and their impact on comparative analyses. Humic Sciences & Technology XII, Northeastern University. March 2009. (invited)

Kujawinski, E.B., K. Longnecker, **M.C. Kido Soule**. Sources of variability in ultrahigh resolution mass spectra of natural organic matter. 7th North American FT-MS Conference, Key West FL. April 2009. (invited)

Kujawinski, E.B., K. Longnecker, M. Bhatia, **M.C. Kido Soule**. Molecular-level resolution of natural organic matter in aquatic environments by ultrahigh resolution mass spectrometry. CoSMoS Conference on Small Molecule Science, Boston MA. August 2009. (invited)

**M. Kido Soule** and G. Richmond. Going nonlinear in probing molecular adsorption, bonding, and orientation at liquid interfaces. Pacifichem 2005 Congress, Honolulu, HI. December 2005. (invited)

**M. Kido Soule** and G. Richmond. Going nonlinear in probing adsorption at aqueous surfaces of environmental importance. American Physical Society Meeting, Los Angeles, CA. March 2005.

**M. Kido Soule** and G. Richmond. Structure and adsorption of organics at salt and acid aqueous interfaces. 231st meeting of the American Chemical Society, Atlanta, GA. March 2006.

**M. Kido Soule**, D. Hore, D. Jaramillo-Fellin, G. Richmond. Nonlinear investigations of atmospherically-relevant aqueous-organic-vapor interfaces. 230th meeting of the American Chemical Society, Washington, DC. August 2005.

**M. Kido**, S. Kegley, G. Bothun, G. Marcy. “What is in a star?” Teaching Workshop at the 219th meeting of the American Chemical Society, San Francisco, CA. March 2000.

PRESENTATIONS (Poster)

**Glazer, L.**, M.C. Kido Soule, E. Kujawinski, K. Longnecker, N. Aluru (2015). Hepatic metabolite profiling of Atlantic Killifish (Fundulus heteroclitus) from PCB-resistant and sensitive populations. 54th Annual Meeting of the Society of Toxicology, San Diego, California.

**Johnson, W.M.**, M.C. Kido Soule, K. Longnecker, E.B. Kujawinski (2015). Metabolic profiling of a latitudinal transect of the Atlantic Ocean. Gordon Research Conference, Holderness, NH.

**Kido Soule, M.C.**, K. Longnecker, E.B. Kujawinski (2014). Untargeted and targeted metabolomics methods for marine microorganisms. 2014 Ocean Sciences Meeting, Hawaii.

**Johnson, W.M.**, M.C. Kido Soule, E.B. Kujawinski (2014). Coupling targeted and untargeted metabolomics to understand the impact of carbon substrate on the metabolism of *Ruegeria pomeroyi*. 2014 Ocean Sciences Meeting, Hawaii

**Carozza, J.A.**, M.C. Kido Soule, E.B. Kujawinski (2014). Quantification of marine microbial metabolites by mass spectrometry. 2014 Ocean Sciences Meeting, Hawaii

**Griffith, D.R.**, M.C. Kido Soule, H. Matsufuji, T.I. Eglinton, E.B. Kujawinski, and P.M. Gschwend (2014). Steroidal estrogen sources and fate in a sewage-impacted coastal ocean – Massachusetts Bay, USA. Gordon Research Conference: Environmental Science – Water. Holderness, NH. 22-27 Jun 2014

**Longnecker, K.**, M.C. Kido Soule, E.B. Kujawinski (2012). Untargeted assessment of metabolites produced by a marine diatom. Gordon Research Conference, Marine Microbes, Italy

**Griffith, D.R.**, M.C. Kido Soule, P.M. Gschwend, E.B. Kujawinski and T.I. Eglinton. (2012) Quantifying free, conjugated, and chlorinated estrogens in coastal seawater and treated wastewater effluent. Gordon Research Conference/Seminar: Environmental Science – Water. Holderness, NH

**Kujawinski, E. B**., M. C. Kido Soule. Organic material released by coastal microbial consortia upon incubation with glucose: Preliminary identification of novel biomarkers for bacterial physiology. 58th ASMS Conference on Mass Spectrometry, Salt Lake City, Utah. June 2010.

**Longnecker, K.**, M. C. Kido Soule, E. B. Kujawinski. Composition of dissolved organic matter produced by marine phytoplankton. 13th International Symposium on Microbial Ecology, Seattle, WA. August, 2010.

**Kujawinski, E. B.**, K. Longnecker, M. C. Kido Soule, A. Boysen, D. Valentine. Temporal and spatial variability in composition of polar components of oil and dispersants during and after the Deep Water Horizon oil spill. American Geophysical Union Fall Meeting, San Francisco, CA. December 2010.

**Kujawinski, E. B.***,* K. Longnecker, M. C. Kido Soule. Changes in microbial diversity and DOM composition after uniformly-13C-labeled glucose addition to a coastal microbial consortium.ASLO Aquatic Sciences meeting, Nice, France. January 2009.

**M. Kido**, D. Jaramillo-Fellin, D. Hore, G. Richmond. Mid-IR spectroscopic investigations of 3- and 4-cyanophenol at the air/water interface. 52nd meeting of the Western Spectroscopy Association, Pacific Grove, CA. January 2005.

J. King, **M. Kido**, D. Hore, D. Jaramillo-Fellin, F. Moore, G. Richmond. “Extending the possibility for vibrational sum-frequency spectroscopy: exploring the mid-IR.” 50th meeting of the Western Spectroscopy Association in Pacific Grove, CA. January 2003.

CURRENT AND PENDING PROPOSALS

NSF Major Research Instrumentation Program. Acquisition of a triple-quad mass spectrometer for quantitative identification of dispersants and water-soluble oil in the Gulf of Mexico. PIs: Elizabeth B. Kujawinski and Melissa C. Kido Soule. *Funded.* 2010-11, $200,000.

NSF Major Research Instrumentation Program. Acquisition of an Ultrahigh Resolution Mass Spectrometer for Environmental and Microbial Metabolomics

PIs: Melissa C. Kido Soule and Elizabeth B. Kujawinski. *Pending.*