

## *CURRICULUM VITÆ*

### **Johan Schijf**

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### **Education**

- 1992 Ph.D. in Marine Geochemistry. University of Utrecht, The Netherlands.  
Faculty of Geosciences, Department of Earth Sciences.  
Dissertation Title: “Aqueous Geochemistry of the Rare Earth Elements  
in Marine Anoxic Basins.”  
Promotors: Prof. Dr. C.H. van der Weijden, emeritus (University of Utrecht),  
Prof. Dr. W.G. Mook, deceased (University of Groningen), Prof. Dr. H.N.A. Priem,  
emeritus (University of Utrecht).  
Co-promotor: Prof. Dr. Ir. H.J.W. de Baar, emeritus (Royal Netherlands Institute for Sea  
Research).
- 1987 M.Sc. (*cum laude*) in Nuclear Physics. University of Groningen, The Netherlands.  
Department of Mathematics & Natural Sciences.  
Thesis Title: “Angular Momentum Transfer Studies for the  $^{20}\text{Ne} + ^{209}\text{Bi}, ^{232}\text{Th}$  Reactions  
at 204.4 MeV.”  
Advisor: Prof. Dr. R.H. Siemssen, emeritus (University of Groningen).

### **Professional Background**

- 2012–present Associate Professor (with tenure). University of Maryland Center for  
Environmental Science. Chesapeake Biological Laboratory.
- 2006–2012 Assistant Professor. University of Maryland Center for Environmental Science.  
Chesapeake Biological Laboratory.
- 2004–2006 Research Associate (research faculty appointment). University of South  
Florida (St. Petersburg). College of Marine Science.  
Supervisor: Dr. R.H. Byrne.  
*Laboratory manager in charge of the USF Inductively Coupled Plasma Mass  
Spectrometer (ICP-MS) and clean room facilities.*
- 2000–2004 Consultant. Agilent Technologies, Inc. (Newark, DE).  
*Instructor responsible for customer training on the Agilent 4500 ICP-MS  
instrument (bimonthly 1-week training course H8974A, serving the eastern US).*

- 1995-2004 Senior Chemist (non-faculty appointment). University of South Florida (St. Petersburg). College of Marine Science.  
Supervisor: Dr. R.H. Byrne.  
*Laboratory manager in charge of the USF Inductively Coupled Plasma Mass Spectrometer (ICP-MS) and clean room facilities.*
- 1994–1995 Research Assistant. Florida State University (Tallahassee).  
Department of Oceanography.  
Supervisor: Dr. W.M. Landing.  
*Responsible for the logistics of monthly sample collections from nine 48-foot atmospheric monitoring towers located throughout Florida, in support of the Florida Atmospheric Mercury Study (FAMS).*
- 1993 Postdoctoral Fellow. Harvard University (Cambridge, MA).  
Department of Earth and Planetary Sciences.  
Supervisors: Dr. E.R. Sholkovitz, emeritus, Dr. M.P. Bacon, emeritus (WHOI).  
*Development of methods to determine the concentrations of rare earth elements, zirconium, hafnium, protactinium, and thorium in seawater by isotope dilution/thermal ionization quadrupole mass spectrometry.*
- 1992–1993 Postdoctoral Fellow. Woods Hole Oceanographic Institution (Woods Hole, MA).  
Supervisor: Dr. E.R. Sholkovitz, emeritus (WHOI).  
*Study of rare earth element geochemistry in Gull Pond (Wellfleet, MA), a seasonally anoxic freshwater lake.*

## **Research Interests and Experience**

### 1. Areas of professional expertise.

Chemical oceanography; physical chemistry; aqueous geochemistry of the lanthanides; metal interactions with organic and inorganic sorbents; ocean acidification; geochemistry of marine anoxic basins; dissolution/precipitation processes; speciation modeling; analytical geochemistry; inductively coupled plasma mass spectrometry; isotope dilution mass spectrometry; ion chromatography; synchrotron X-ray absorption spectroscopy; potentiometric titration; UV/visible light spectrophotometry; column chromatography; contamination-free sample collection and processing; deep-water oceanographic sensors and instrumentation.

### 2. Field experience.

- Florida Keys. Semi-annual gridded surface sampling and deployment of underwater osmotic pumps and live coral cultures for analysis of matched seawater and aragonite Sr/Ca ratios. Summer and winter 2016–2021.
- US and British Virgin Islands. Annual gridded surface sampling and deployment of underwater osmotic pumps for analysis of seawater Sr/Ca ratios. Winter 2016–2019.
- Anegada, British Virgin Islands. Hydraulic coring of fossil coral heads washed ashore in a suspected tsunami event, in support of a research project by Dr. K.H. Kilbourne. March

- 13–23, 2013.
- Station Papa Repeat Hydrography, Mission No. 2011-26; CCGS *John P. Tully*, Northeast Pacific, 2011 (3 weeks).
  - Station Papa Repeat Hydrography, Mission No. 2009-10; CCGS *John P. Tully*, Northeast Pacific, 2009 (3 weeks).
  - Station Papa Repeat Hydrography, Mission No. 2008-27; CCGS *John P. Tully*, Northeast Pacific, 2008 (3 weeks).
  - Station Papa Repeat Hydrography, Mission No. 2007-15; CCGS *John P. Tully*, Northeast Pacific, 2007 (2 weeks).
  - US CLIVAR/CO<sub>2</sub> Repeat Hydrography Program, Line P16N: Honolulu, HI – Kodiak, AK; University of Washington R/V *Thomas G. Thompson*, North Pacific, 2006 (3 weeks).
  - Orca Basin Cruise; University of Texas R/V *Longhorn*, Gulf of Mexico, 2003 (2 weeks).
  - Orca Basin Cruise; Florida Institute of Oceanography R/V *Suncoaster*, Gulf of Mexico, 2002 (2 weeks).
  - Submarine Geothermal Springs; Florida Institute of Oceanography R/V *Suncoaster* or R/V *Bellows*, West Florida Shelf, 1997–2003 (1 week each year).
  - Cruise CGC96, WOCE Line P15S: Hobart, Tasmania - Wellington, New Zealand; NOAA Ship *Discoverer R-102* (Cruise DI-96-01), Southwest Pacific, 1996 (4 weeks).
  - JGOFS North Atlantic Pilot Study: Den Helder, The Netherlands – Reykjavik, Iceland – Funchal, Madeira; Dutch R/V *Tyro*, Eastern North Atlantic, 1989 (6 weeks).
  - WINDOWS Expedition; Dutch R/V *Tyro*, Doggersbank, North Sea, 1988 (2 weeks).

## **Publications**

### 1. Papers in peer-reviewed journals.

**Schijf J.** and R.H. Byrne (2021) Speciation of yttrium and the rare earth elements in seawater: Review of a 20-year analytical journey (Invited Research Article). *Chemical Geology* **585**, 120479.

Khare A., H.P. Hughes, K.H. Kilbourne, and **J. Schijf** (2021) An ICP-AES method for routine high-precision measurement of seawater Sr/Ca ratios to validate coral paleothermometry calibrations. *Limnology & Oceanography: Methods* **19**, 416–430.

**Schijf J.**, C. Jeandel, K.H. Johannesson and A.H. Osborne (2020) Editorial: REE marine geochemistry in the 21st century: A tribute to the pioneering research of Henry Elderfield (1943–2016). *Frontiers in Marine Science* **7:114**, doi: 10.3389/fmars.2020.00114.

Garvin M.C., **J. Schijf**, S.R. Kaufman, C. Konow, D. Liang, A.E. Nigra, N.H. Stracker, R.J. Whelan and G.C. Wiles (2020) A survey of trace metal burdens in increment cores from eastern cottonwood (*Populus deltoides*) across a childhood cancer cluster, Sandusky County, OH, USA. *Chemosphere* **238**, doi: 10.1016/j.chemosphere.2019.124528.

**Schijf J.** and I.J. Christy (2018) Effect of Mg and Ca on the stability of the MRI contrast agent Gd–DTPA in seawater. *Frontiers in Marine Science* **5:111**, doi: 10.3389/fmars.2018.00111.

de Baar, H.J.W., K.W. Bruland, **J. Schijf**, S.M.A.C. van Heuven and M.K. Behrens (2018) Low cerium among the dissolved rare earth elements in the central North Pacific Ocean. *Geochimica et Cosmochimica Acta* **236**, 5-40.

**Schijf J.** and M.C. Garvin (2018) Validation and application of a new microwave-digestion/ICP-MS method for the analysis of trace metals in tree increment cores. *Geochemical Journal* **52**, 347-358.

Glandon H.L., K.H. Kilbourne, **J. Schijf** and T.J. Miller (2018) Counteractive effects of increased temperature and  $p\text{CO}_2$  on the thickness and chemistry of the carapace of juvenile blue crab, *Callinectes sapidus*, from the Patuxent River, Chesapeake Bay. *Journal of Experimental Marine Biology and Ecology* **498**, 39-45.

Osborne A.H., E.C. Hathorne, **J. Schijf**, Y. Plancherel, P. Böning and M. Frank (2017) The potential of sedimentary foraminiferal rare earth element patterns to trace water masses in the past. *Geochemistry, Geophysics, Geosystems* **18**, 1550-1568.

**Schijf J.** and S.M. Burns (2016) Determination of the side-reaction coefficient of the trihydroxamate siderophore desferrioxamine B in trace-metal-free seawater. *Frontiers in Marine Science* **3:117**, doi: 10.3389/fmars.2016.00117.

**Schijf J.**, E.A. Christenson and R.H. Byrne (2015) YREE scavenging in seawater: A new look at an old model. *Marine Chemistry (Special Issue: Cycles of metals and carbon in the oceans – A tribute to the work stimulated by Hein de Baar)* **177 Part 3**, 460–471.

**Schijf J.**, E.A. Christenson and K.J. Potter (2015) Different binding modes of Cu and Pb vs. Cd, Ni, and Zn with the trihydroxamate siderophore desferrioxamine B at seawater ionic strength. *Marine Chemistry (Special Issue: SCOR WG 139: Organic Ligands – A Key Control on Trace Metal Biogeochemistry in the Ocean)* **173**, 40–51.

Zoll A.M. and **J. Schijf** (2012) A surface complexation model of YREE sorption on *Ulva lactuca* in 0.05–5.0 M NaCl solutions. *Geochimica et Cosmochimica Acta* **96**, 183–199.

Christenson E.A. and **J. Schijf** (2011) Stability of YREE complexes with the trihydroxamate siderophore desferrioxamine B at seawater ionic strength. *Geochimica et Cosmochimica Acta* **75**, 7047–7062.

**Schijf J.** and A.M. Zoll (2011) When dissolved is not truly dissolved—The importance of colloids in studies of metal sorption on organic matter. *Journal of Colloid and Interface Science* **361**, 137–147.

**Schijf J.** and K.S. Marshall (2011) YREE sorption on hydrous ferric oxide in 0.5 M NaCl solutions: A model extension. *Marine Chemistry* **123**, 32–43.

**Schijf J.** and A.M. Ebling (2010). Investigation of the ionic strength dependence of *Ulva lactuca* acid functional group  $pK_a$ s by manual alkalimetric titrations. *Environmental Science & Technology* **44**, 1644–1649.

**Schijf J.** and R.H. Byrne (2008) Comment on “An experimental study of the solubility and speciation of neodymium (III) fluoride in F-bearing aqueous solutions” by A.A. Migdisov and A.E. Williams-Jones. *Geochimica et Cosmochimica Acta* **72**, 5574–5577.

**Schijf J.** (2007) Alkali elements (Na, K, Rb) and alkaline earth elements (Mg, Ca, Sr, Ba) in the anoxic brine of Orca Basin, northern Gulf of Mexico. *Chemical Geology* **243**, 255–274.

Quinn K.A., R.H. Byrne and **J. Schijf** (2007) Sorption of yttrium and rare earth elements by amorphous ferric hydroxide: Influence of temperature. *Environmental Science & Technology* **41**, 541–546.

**Schijf J.** and R.H. Byrne (2007) Progressive dolomitization of Florida limestone recorded by alkaline earth element concentrations in saline, geothermal, submarine springs. *Journal of Geophysical Research—Oceans* **112**, C01003, doi:10.1029/2006JC003659.

Quinn K.A., R.H. Byrne and **J. Schijf** (2006b) Sorption of yttrium and rare earth elements by amorphous ferric hydroxide: Influence of solution complexation with carbonate. *Geochimica et Cosmochimica Acta* **70**, 4151–4165.

Quinn K.A., R.H. Byrne and **J. Schijf** (2006a) Sorption of yttrium and rare earth elements by amorphous ferric hydroxide: Influence of pH and ionic strength. *Marine Chemistry* **99**, 128–150.

Quinn K.A., R.H. Byrne and **J. Schijf** (2004) Comparative scavenging of yttrium and the rare earth elements in seawater: Competitive influences of solution and surface chemistry. *Aquatic Geochemistry* **10**, 59–80.

**Schijf J.** and R.H. Byrne (2004) Determination of  $\text{SO}_4\beta_1$  for yttrium and the rare earth elements at  $I = 0.66\text{ m}$  and  $t = 25^\circ\text{C}$ —Implications for YREE solution speciation in sulfate-rich waters. *Geochimica et Cosmochimica Acta* **68**, 2825–2837.

Cosden J.M., **J. Schijf** and R.H. Byrne (2003) Fractionation of platinum group elements in aqueous systems: Comparative kinetics of palladium and platinum removal from seawater by *Ulva lactuca* L. *Environmental Science & Technology* **37**, 555–560.

Savov I., J. Ryan, I. Haydoutov and **J. Schijf** (2001) Late Precambrian Balkan-Carpathian ophiolite – a slice of the Pan-African ocean crust?: geochemical and tectonic insights from the Tcherni Vrah and Deli Jovan massifs, Bulgaria and Serbia. *Journal of Volcanology and Geothermal Research* **110**, 299–318.

Toler S.K., P. Hallock and **J. Schijf** (2001) Mg/Ca ratios in stressed foraminifera, *Amphistegina gibbosa*, from the Florida Keys. *Marine Micropaleontology* **43**, 199–206.

**Schijf J.** and R.H. Byrne (2001) Stability constants for mono- and dioxalato-complexes of Y and the REE, potentially important species in groundwaters and surface freshwaters. *Geochimica et Cosmochimica Acta* **65**, 1037–1046.

**Schijf J.** and R.H. Byrne (1999) Determination of stability constants for the mono- and difluoro-complexes of Y and the REE, using a cation-exchange resin and ICP-MS. *Polyhedron* **18**, 2839–2844.

- Byrne R.H. and **J. Schijf** (1998) Comment on "Rare earth elements as geochemical tracers of regional groundwater mixing" by K.H. Johannesson, K.J. Stetzenbach and V.F. Hodge. *Geochimica et Cosmochimica Acta* **62**, 2199–2200.
- Bernstein R.E., R.H. Byrne and **J. Schijf** (1998) Acantharians: A missing link in the oceanic biogeochemistry of barium. *Deep-Sea Research I* **45**, 491–505.
- Liu X., R.H. Byrne and **J. Schijf** (1997) Comparative coprecipitation of phosphate and arsenate with yttrium and the rare earths: The influence of solution complexation. *Journal of Solution Chemistry* **26**, 1187–1198.
- Saager P.M., H.J.W. de Baar, J.T.M. de Jong, R.F. Nolting and **J. Schijf** (1997) Hydrography and local sources of dissolved trace metals Mn, Ni, Cu, and Cd in the northeast Atlantic Ocean. *Marine Chemistry* **57**, 195–216.
- Byrne R.H., X. Liu and **J. Schijf** (1996) The influence of phosphate coprecipitation on rare earth distributions in natural waters. *Geochimica et Cosmochimica Acta* **60**, 3341–3346.
- Schijf J.** and H.J.W. de Baar (1995) Rare earth element exchange through the Bosphorus: The Black Sea as a net source of REEs to the Mediterranean Sea. *Geochimica et Cosmochimica Acta* **59**, 3503–3509.
- Schijf J.**, H.J.W. de Baar and F.J. Millero (1995) Vertical distributions and speciation of dissolved rare earth elements in the anoxic brines of Bannock Basin, eastern Mediterranean Sea. *Geochimica et Cosmochimica Acta* **59**, 3285–3299.
- Schijf J.**, H.J.W. de Baar and F.J. Millero (1994) Kinetics of Ce and Nd scavenging in Black Sea waters. *Marine Chemistry* **46**, 345–359.
- Saager P.M., **J. Schijf** and H.J.W. de Baar (1993) Trace-metal distributions in seawater and anoxic brines in the eastern Mediterranean Sea. *Geochimica et Cosmochimica Acta* **57**, 1419–1432.
- de Baar H.J.W., C. Brussaard, J. Hegeman, **J. Schijf** and M.H.C. Stoll (1993) Sea-trials of three different methods for non-volatile dissolved organic carbon in seawater during the JGOFS North Atlantic Pilot Study. *Marine Chemistry* **41**, 145–152.
- Schijf J.**, H.J.W. de Baar, J.R. Wijbrans and W.M. Landing (1991) Dissolved rare earth elements in the Black Sea. *Deep-Sea Research A* **38**(Suppl. 2; Black Sea Oceanography: Results from the 1988 Black Sea Expedition), S805–S823.
- de Baar H.J.W., **J. Schijf** and R.H. Byrne (1991) Solution chemistry of the rare earth elements in seawater. *European Journal of Solid State and Inorganic Chemistry* **28**, 357–373.
- Hebeda E.H. and **J. Schijf** (1991) Bleeding  $\text{CCl}_2\text{F}_2$  as a tool to enhance the emission of metal ions and to suppress isobaric interferences by oxide ions during a multi-element analysis of rare earth elements on a thermal ionization mass spectrometer. *International Journal of Mass Spectrometry and Ion Processes* **104**, 227–234.

## 2. Book chapters, conference proceedings, and other publications.

North E., A. Place, **J. Schijf**, G. Silsbe, Y. Li, Y.-Y. Lee, J. Cornwell, S. Hunsicker, H. Kilbourne, M.W. Gray, R. Hoover, G. Franchi, M. Gonsior, A. Heyes, W. Nardin, M. Khademishamami, M. Owens, A. Sanford, J. Trommutter, J. Alvarez, J. Veenhof, K. Vijayaragavan and J. Blair (2022) The Coral Defense Project: Capturing carbon and rebuilding reefs. *ASLO/AGU/TOS Ocean Sciences Meeting (virtual). February 27–March 4, 2022.*

Powers L.C, **J. Schijf** and M. Gonsior (2022) Evaluating the role of sunlight in the halogenation of marine organic matter. *ASLO/AGU/TOS Ocean Sciences Meeting (virtual). February 27–March 4, 2022.*

North E., A. Place, G. Silsbe, Y. Li, Y.-Y. Lee, **J. Schijf**, J. Cornwell, S. Hunsicker, H. Kilbourne, M. Gray, R. Hoover, G. Franchi, M. Gonsior, A. Heyes, W. Nardin, M. Khademishamami, M. Owens, A. Sanford, J. Trommutter, J. Alvarez, J. Veenhof, K. Vijayaragavan, D. Sterling and J. Blair (2021) Replicating whiting events: Testing a process for sequestering carbon in calcium carbonate using microalgae. *CERF 26<sup>th</sup> Biennial Conference (virtual). November 8–21, 2021.*

*REE marine geochemistry in the 21st century: A tribute to the pioneering research of Henry Elderfield (1943–2016).* **Schijf J.**, C. Jeandel, K.H. Johannesson and A.H. Osborne (eds.) Frontiers eBook (11 articles, 56 authors). ISBN 978-2-88963-655-6 doi:10.3389/978-2-88963-655-6

North E., A. Place, G. Silsbe, Y. Li, Y.-Y. Lee, **J. Schijf**, J. Cornwell, J. Veenhof, M. Owens, M. Gonsior, A. Heyes, H. Kilbourne, K. Vijayaragavan, S. Hunsicker, G. Franchi, J. Trommutter, F. Galasso and J. Blair (2020) Replicating whiting events: Testing a process for carbon sequestration using algae, sunlight, nutrients, and calcium-rich water. *ASLO/AGU/TOS Ocean Sciences Meeting. February 16–21, 2020. San Diego, CA.*

**Schijf J.** and R.H. Byrne (2020) Speciation of yttrium and the rare earth elements in seawater: Review of a 20-year analytical journey. *ASLO/AGU/TOS Ocean Sciences Meeting. February 16–21, 2020. San Diego, CA.*

Dalo J.W. and **J. Schijf** (2020) Complexation of yttrium and the rare earth elements with silicate at seawater ionic strength. *ASLO/AGU/TOS Ocean Sciences Meeting. February 16–21, 2020. San Diego, CA.*

Hughes H.P., K.H. Kilbourne and **J. Schijf** (2019) Seasonal and episodic variability in seawater strontium-calcium ratios on the coral reefs of the Western Hemispheric Warm Pool: A confounding variable for coral paleoclimate reconstructions. *AGU Fall Meeting. December 9–13, 2019. San Francisco, CA.*

Crocket K.C., T. Baer, R.E. Abell, C. Beveridge, D. Hughes, E. Hathorne and **J. Schijf** (2019) Rare earth elements in biogenic carbonate as proxies for the marine carbonate system? *Goldschmidt Conference. August 18–23, 2019. Barcelona, Spain.*

Hughes H.P., K.H. Kilbourne and **J. Schijf** (2018) Seawater Sr/Ca and  $\delta^{18}\text{O}$  variability in the

Florida Keys and Virgin Islands demonstrate the importance of location in choosing sites for coral paleoclimate studies. *AGU Fall Meeting. December 10–14, 2018. Washington, DC.*

**Schijf J.**, A. Khare and K.H. Kilbourne (2018) A new ICP-AES method shows that spatial and seasonal variations in the seawater Sr/Ca ratio may have a significant effect on coral paleotemperature calibrations in the Florida Keys, USA. *AGU Fall Meeting. December 10–14, 2018. Washington, DC.*

**Schijf J.** and I.J. Christy (2018) Effect of Mg and Ca on the stability of the MRI contrast agent Gd–DTPA in seawater. *Goldschmidt Conference. August 12–17, 2018. Boston, MA.*

Khare A., K.H. Kilbourne and **J. Schijf** (2017) High precision seawater Sr/Ca measurements in the Florida Keys by inductively coupled plasma atomic emission spectrometry: Analytical method and implications for coral paleothermometry. *AGU Fall Meeting. December 11–15, 2017. New Orleans, LA.*

Christy I.J. and **J. Schijf** (2017) Effect of Mg and Ca on the stability of the MRI contrast agent Gd–DTPA in seawater. *ASLO Aquatic Sciences Meeting. February 26–March 3, 2017. Honolulu, HI.*

Osborne A.H., E.C. Hathorne, Y. Plancherel, **J. Schijf**, P. Böning and M. Frank (2017) Rare earth element patterns in sedimentary foraminifer: Potential water mass tracers? *ASLO Aquatic Sciences Meeting. February 26–March 3, 2017. Honolulu, HI.*

**Schijf J.** and C.G. Coulter (2016) The potential use of Ba/Sr ratios as an indicator of fracking fluid spills. *Goldschmidt Conference. June 26–July 1, 2016. Yokohama, Japan.*

**Schijf J.** and S.M. Burns (2016) Determination of the side-reaction coefficient of the trihydroxamate siderophore desferrioxamine B in metal-free seawater. *ASLO/AGU/TOS Ocean Sciences Meeting. February 21–26, 2016. New Orleans, LA.*

Coulter C.G. and **J. Schijf** (2014) Methane, Sr, and Ba in Maryland streams above the Marcellus Shale. *Goldschmidt Conference. June 8–13, 2014. Sacramento, CA.*

**Schijf J.** and E.A. Christenson (2014) Rare earth element scavenging in seawater: A new look at an old model. *ASLO/AGU/TOS Ocean Sciences Meeting. February 23–28, 2014. Honolulu, HI.*

**Schijf J.** and M.C. Garving (2013) Using increment cores of eastern cottonwood trees (*Populus deltoides*) to assess the timing of cadmium pollution. *Goldschmidt Conference. August 25–30, 2013. Florence, Italy.*

Potter K.J., **J. Schijf** and E.A. Christenson (2013) Different binding modes of Ni(II) and Cu(II) to the bacterial siderophore desferrioxamine B in seawater-like solutions. *Abstracts of Papers of the American Chemical Society* **245**, Abstract 762-CHED.

**Schijf J.**, E.A. Christenson and K.J. Potter (2013) Different binding modes of Cu and Pb vs. Ni, Zn, and Cd with the trihydroxamate siderophore desferrioxamine B at seawater ionic strength. *ASLO Aquatic Sciences Meeting. February 17–22, 2013. New Orleans, LA.*



**Schijf J.** and K.S. Marshall (2012) Effect of Ce(III) oxidation by Mn(IV) on its use as a paleo-redox proxy. 22<sup>nd</sup> V.M. Goldschmidt Conference. June 24–29, 2012. Montréal, Canada.

**Schijf J.** and K.S. Marshall (2012) Cerium oxidation in suboxic sediments is caused by sorption on Mn oxides, not Fe oxides. 243<sup>rd</sup> ACS National Meeting. March 25–29, 2012. San Diego, CA.

Christenson E.A. and **J. Schijf** (2012) Stability of cadmium complexes with the siderophore desferrioxamine B at 0.7 M ionic strength. ASLO/AGU/TOS Ocean Sciences Meeting. February 20–24, 2012. Salt Lake City, UT.

Marshall K.S. and **J. Schijf** (2010) YREE sorption on hydrous manganese oxide (MnO<sub>x</sub>) in 0.5 M NaCl. AGU Fall Meeting. December 13–17, 2010. San Francisco, CA.

Straka A.M. and **J. Schijf** (2010) Effects of colloids on the calculation of distribution coefficients in studies of metal sorption on organic matter. AGU Fall Meeting. December 13–17, 2010. San Francisco, CA.

Christenson E.A. and **J. Schijf** (2010) Stability of the cadmium complex with the bacterial trihydroxamate siderophore desferrioxamine B at seawater ionic strength. AGU Fall Meeting. December 13–17, 2010. San Francisco, CA.

**Schijf J.** and R.H. Byrne (2010) Co-precipitation of double carbonates of yttrium and the rare earth elements, Na<sub>2x</sub>M<sub>2</sub>(CO<sub>3</sub>)<sub>3+x</sub>, from seawater-like electrolyte solutions. AGU Fall Meeting. December 13–17, 2010. San Francisco, CA.

Marshall K.S. and **J. Schijf** (2010) YREE sorption on HFO in 0.5 M NaCl. *Geochimica et Cosmochimica Acta* **74(12 Suppl.)** [Goldschmidt 2010: Earth, Energy, and the Environment. Knoxville Tennessee, USA], A670.

Straka A.M. and **J. Schijf** (2009) Extended X-ray Absorption Fine Structure (EXAFS) Study of REE sorption on a marine macroalga (119-8). *Geological Society of America Abstracts with Programs* **41(7)**, 328.

Short R.T., R.H. Byrne, D. Hollander, **J. Schijf**, S.K. Toler and E.S. VanVleet (2008) Oceanography. In: R. Ekman, J. Silberring, A.M. Westman-Brinkmalm and A. Kraj (eds.) *Mass Spectrometry. Instrumentation, Interpretation, and Applications*. Chapter 9, pp. 235-242. ISBN 978-0-471-71395-1. Wiley-Interscience, New York, NY.

Ebling A.M. and **J. Schijf** (2008) Characterization of sea lettuce surface functional groups by potentiometric titrations. *EOS Transactions of the American Geophysical Union* **89(53)**, Fall Meeting Supplement, Abstract OS41E-1267.

Straka A.M. and **J. Schijf** (2008) Sorption of yttrium and the rare earth elements on a marine macroalga. ASLO/AGU/TOS Ocean Sciences Meeting. March 2–7, 2008. Orlando, FL.

**Schijf J.**, A. Heyes and M.T. Suzuki (2008) Evidence for bacterial mercury methylation at the oxic/anoxic interface of the hypersaline Orca Basin. ASLO/AGU/TOS Ocean Sciences Meeting. March 2–7, 2008. Orlando, FL.

**Schijf J.** and A.M. Straka (2007) Sorption of yttrium and the rare earth elements on non-living macroalgal tissue. *EOS Transactions of the American Geophysical Union* **88(52)**, Fall Meeting Supplement, Abstract B12A-04.

**Schijf J.** (2007) Rubidium, strontium, bromide, and total iodine concentrations consolidate evidence for seawater dissolution of the Jurassic Louann Salt as the source of the Orca Basin brine. *EOS Transactions of the American Geophysical Union* **88(23)**, Joint Assembly Supplement, Abstract OS53B-03.

**Schijf J.** and R.H. Byrne (2005) Systematic spatial variations of Ba and Sr enrichments over ambient seawater values in saline, geothermal, submarine springs on the West Florida Shelf. *Geochimica et Cosmochimica Acta* **69(10 Suppl.)**; Abstracts of the 15th Annual V.M. Goldschmidt Conference. Moscow, Idaho. May, 2005), A133.

Quinn K.A., R.H. Byrne and **J. Schijf** (2004) Yttrium and rare earth element adsorption onto freshly precipitated hydroxides of Fe(III), Al, Ga, and In (4.1.22). *Geochimica et Cosmochimica Acta* **68(11 Suppl.)**; Abstracts of the 14th Annual V.M. Goldschmidt Conference. Copenhagen, Denmark. June, 2004), A328.

Byrne R.H. and **J. Schijf** (2003) Scavenging in seawater: Use of rare earths, yttrium and platinum group elements to model the sorptive behavior of natural particles. *Geophysical Research Abstracts* **5**, 13,723.

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**Schijf J.** and H.J.W. de Baar (1989) First reliable observations of rare earth elements in the Black Sea (OS32A-11). *EOS Transactions of the American Geophysical Union* **70(15)**, 370.

## **Contracts and Grants**

### 1. Research grants.

Bailey Wildlife Foundation “A Global Defense for Underwater Wildlife.” E.W. North and G.M. Silsbe (PIs); J.C. Cornwell, G. Franchi (Salisbury University), M. Gonsior, M.W. Gray, A. Heyes, R. Hoover (Maryland Institute College of Art), K.H. Kilbourne, Y.-Y. Lee, Y. Li, W. Nardin, A.R. Place and **J. Schijf** (Co-PIs); S. Hunsicker (industry liaison); J.A. Blair (Facilitated Solutions, LLC). \$400,000 (Schijf subcontract \$19,636). Period covered 01/01/22–12/31/22.

Bailey Wildlife Foundation “A Global Defense for Coral Reef Wildlife.” E.W. North and G.M. Silsbe (PIs); J.C. Cornwell, G. Franchi (Salisbury University), M. Gonsior, M.W. Gray, A. Heyes, R. Hoover (Maryland Institute College of Art), K.H. Kilbourne, Y. Li, W. Nardin, M. Owens, A.R. Place, **J. Schijf** and J.E. Trommatter (Co-PIs); D. Sterling, S. Hunsicker and K.S. Vijayaragavan (industry liaisons); J.A. Blair (Facilitated Solutions, LLC). \$500,000 (Schijf subcontract \$21,101). Period covered 01/01/21–12/31/21.

Bailey Wildlife Foundation “A Global Defense for Underwater Wildlife: Creating Carbon-Negative Habitat.” E.W. North and G.M. Silsbe (PIs); J.C. Cornwell, G. Franchi (Salisbury University), M. Gonsior, M.W. Gray, A. Heyes, R. Hoover (Maryland Institute College of Art), K.H. Kilbourne, Y. Li, M. Owens, A.R. Place, **J. Schijf** and J.E. Trommatter (Co-PIs); D. Sterling, S. Hunsicker and K.S. Vijayaragavan (industry liaisons). \$400,000 (Schijf subcontract \$15,916). Period covered 01/01/20–12/31/20.

Bailey Wildlife Foundation “A Global Defense for Underwater Wildlife: Creating Habitats that Protect Against Ocean Acidification.” E.W. North and G.M. Silsbe (PIs); J.C. Cornwell, G. Franchi (Salisbury University), M. Gonsior, M.W. Gray, A. Heyes, K.H. Kilbourne, Y. Li, J.M. O’Neil, M. Owens, A.R. Place, **J. Schijf** and J.E. Trommatter (Co-PIs); S. Hunsicker and K.S. Vijayaragavan (industry liaisons). \$300,000 (Schijf subcontract \$17,634). Period covered 01/01/19–12/31/19.

National Science Foundation (Marine Geology & Geochemistry) OCE-1459636 “Assessing the Extent and Causes of Fluctuations in the Seawater Sr/Ca Ratio to Improve Coral Paleothermometry Calibrations.” K.H. Kilbourne (PI) and **J. Schijf** (co-PI). \$569,935 (including supplementary funding). Period covered 09/01/15–08/31/20 (including two 1-year no-cost extensions).

Maryland Sea Grant “Abundance and Variety of Microplastics in Surface Waters, Sediments, and Oysters: Relationship to Point-Sources and Land Use Practices.” L.T. Yonkos, UMCP/ENST (PI); C.L. Mitchelmore and **J. Schijf** (co-PIs). \$126,484 (CBL subcontract \$47,231). Period covered 02/01/18–01/31/20.

National Science Foundation (Division of Biological Infrastructure) DBI-1723203 “Acquisition of a Coupled BioInert LC/Triple-Quad ICP-MS System for Critical Equipment Upgrades, Innovative Marine Biochemical Research, and Graduate Training.” **J. Schijf** (PI); M. Gonsior and A. Heyes (co-PIs). \$386,876. Period covered 06/01/17–05/31/18.

National Institutes for Water Resources (Maryland Water Resources Research Center) “Potential Use of Duckweed (*Lemna minor*) in Bioremediation of Rare Earth Element-Containing Effluents.” **J. Schijf** (PI) and E.R. Landa, UMCP/ENST (co-PI). \$3,000 (plus \$7,436 CBL matching funds). Period covered 04/01/15–03/31/16.

Maryland Department of the Environment “2014–2015 Maryland Department of the Environment Baltimore Harbor Sediment and Water Column Project—Trace Metal Analytical Support.” A. Heyes (PI) and **J. Schijf** (co-PI). \$152,900. Period covered 06/01/14–03/31/15.

Cove Point Natural Heritage Trust “Monitoring Methane and Carbon Dioxide Gases in the Chesapeake Bay Watershed.” Laura L. Lapham (PI); **J. Schijf** and L.W. Cooper (co-PI). \$7,500 (plus \$7,500 CBL matching funds). Period covered 02/01/13–01/31/14.

Cornell Douglas Foundation. “Assessment of Environmental Impacts of Fracking in Maryland.” **J. Schijf** (PI) and Laura L. Lapham (co-PI). \$7,500. Period covered 09/26/12–09/25/13.

National Science Foundation (Chemical Oceanography) OCE-1039768 “MRI: Acquisition of a High Resolution Hybrid Mass Spectrometry System for the Next Generation of Multidisciplinary Environmental Research, Graduate Education and Student Training.” A. Heyes (PI) (replaced J. Liu); L.W. Cooper (replaced H.R. Harvey), R.T. Hill, A.R. Place, **J. Schijf** (Co-PIs); and L.A. Harris (Senior Person). **\$585,098**. Period covered 10/01/10–09/30/13.

National Science Foundation (Arctic Sciences) ARC-1019069 “Acquisition of Stable Isotope Mass Spectrometry Instrumentation for High Latitude and Marine Applications at the University of Maryland Center for Environmental Science.” L.W. Cooper (PI); L.A. Harris, H.R. Harvey, D.H. Secor (Co-PIs); and J.M. Grebmeier, A. Heyes, K.H. Kilbourne, **J. Schijf** (Senior Persons). **\$466,958**. Period covered 08/01/10–07/31/13.

National Science Foundation (Chemical Oceanography) OCE-0963414 “ARRA – Sustaining Coastal Experimentation and Observing Systems in Support of Marine Ecosystem and Climate Science.” M.A. Palmer (PI); L.A. Harris, E.D. Houde, **J. Schijf**, D.H. Secor (Co-PIs); and L.W. Cooper, T.J. Miller, C.L. Mitchelmore, E.A. Salvador, M.N. Tamburri (Senior Persons). **\$1,702,622**. Period covered 09/15/10–08/31/13.

National Science Foundation (Division of Biological Infrastructure) DBI-0934254 “Increasing Seawater Filtration Capabilities to Enhance Coastal Mesocosm-Scale Research.” D.H. Secor (PI); T.J. Miller, C.L. Mitchelmore, M.A. Palmer (Co-PIs); and L.A. Harris, C.L. Rowe, **J. Schijf** (Senior Persons). **\$114,155**. Period covered 02/01/10–01/31/12.

National Science Foundation (Chemical Oceanography) OCE-0928450 “ARRA –

Investigating YREE Co-Precipitation with Phosphate and Biogenic Aragonite as Possible Indicators of Ocean Acidification.” **J. Schijf** (PI). **\$403,536**. Period covered 09/01/09–08/31/13 (including 1-year no-cost extension).

Maryland Environmental Service 07-07-63, Subtask 18.2.5 “UMCES Technical Support for pH and Metal Issues in Dredge Sediment Disposal.” J.C. Cornwell (PI) and **J. Schijf** (Co-PI). \$29,327 (CBL share: **\$12,860**). Period covered 01/30/09–12/31/13 (including four 1-year no-cost extensions).

American Chemical Society Petroleum Research Fund (Doctoral New Investigator Award) 49028-DNI2 “A New Hypothesis for Interpreting the Sedimentary Cerium Anomaly Paleo-Redox Proxy in Oil Shale Depositional Environments: The Influence of Particulate Carrier Fluxes (Mn, Fe, Algal Tissue).” **J. Schijf** (PI). **\$100,000**. Period covered 01/01/09–08/31/12 (including 1-year no-cost extension).

National Science Foundation (Chemical Oceanography) OCE-0745881 “A Comprehensive Combined ICP-MS/XAFS Study of Transition Metal Sorption on a Natural Organic Substrate.” **J. Schijf** (PI). **\$327,463**. Period covered 03/15/08–02/28/12 (including 1-year no-cost extension).

Maryland Sea Grant Program Development Funds Rp/TX-197 “Preliminary Investigation of Growth-Related Effects on Trace Metal Uptake by a Marine Macroalga, Induced by Changes in Nutrient Loads, Turbidity, and Temperature.” **J. Schijf** (PI). **\$8,000**. Period covered 02/01/08–01/31/09.

National Science Foundation (Chemical Oceanography) OCE-0551726/676/790 “Collaborative Research: RUI – Dissolution Kinetics of Biogenic Calcium Carbonate in the Upper Water Column of the North Pacific.” V.J. Fabry (PI; California State University San Marcos); R.H. Byrne (PI; University of South Florida) and **J. Schijf** (Co-PI); A.G. Dickson (PI; UCSD/Scripps Institution of Oceanography). **\$728,729**. Period covered 03/01/06–02/28/11 (second 1-year no-cost extension awarded to CSUSM only). Salary transfer from USF to CBL awarded as subcontract 2500-1195-00-A. **\$16,327**.

University of South Florida New Researcher Grant. “Particulate Speciation of Trace Metals in the Anoxic, Hypersaline Orca Basin (Gulf of Mexico).” **J. Schijf** (PI). **\$9,850**. Period covered 05/01/05–04/30/06.

National Science Foundation (Chemical Oceanography) OCE-0136333 “Investigations of the Influence of Solution Chemistry on YREE Interactions with Particle Surfaces.” R.H. Byrne (PI) and **J. Schijf** (Co-PI). **\$450,000**. Period covered 03/15/02–02/28/06.

Performance bonus for service to the State of Florida with a commendation from the office of Governor Jeb Bush. 06/28/02.

University of South Florida/United States Geological Survey Cooperative Research Center for Coastal Geology 1434-94-A-1185 “Retrospective Analysis of Florida Bay Salinity Using the Geochemistry of Calcium Carbonate Organisms.” R.H. Byrne (PI); **J. Schijf** (Co-PI); R.B. Halley (USGS contact). **\$10,000**. Period covered 10/96–09/97.

Netherlands Organization for Scientific Research (NWO) Postdoctoral Fellowship S 70-335.

Research conducted at the Woods Hole Oceanographic Institution under the supervision of Dr. E.R. Sholkovitz). **J. Schijf** (PI). **\$22,500** plus round-trip airfare from Amsterdam to Boston, MA. Period covered 06/92–06/93.

## 2. Non-monetary awards.

Donation of 1 gram of desferrioxamine E by Dr. Maite Maldonado of the University of British Columbia via Novartis, valued at about \$80,000.

GUP-8463. “An XAFS Study of Yttrium and Rare Earth Element Sorption on Hydrated Organic and Inorganic Surfaces.” **J. Schijf** (PI) and A.M. Straka (Co-PI), CBL; R.H. Byrne (PI) and K.A. Quinn (Co-PI), University of South Florida. Time awarded: six 8-hour shifts during APS runs 2009-1 – 2010-3.

GUP-7984. “Photosynthetic Effects on the Uptake and Intercellular Deposition of Iron and Manganese by Sea Lettuce.” **J. Schijf** (PI) and K.E. Davis (Co-PI), CBL. Time awarded: twelve 8-hour shifts during APS runs 2008-1 – 2009-3.

GUP-7112. “An XAFS Study of Yttrium and Rare Earth Element Sorption on Hydrated Organic and Inorganic Surfaces.” R.H. Byrne (PI) and K.A. Quinn (Co-PI), University of South Florida; **J. Schijf** (PI), CBL; J.G. Catalano (Co-PI), Washington University of Saint Louis. Time awarded: twenty-four 8-hour shifts during APS runs 2007-1 – 2008-3.

## Seminars and Presentations

### 1. Invited lectures.

University of Maryland Baltimore County, Department of Biological Sciences. “How to use scleractinian corals and Sr/Ca ratios for seawater paleothermometry”, 09/25/19. Invited by Dr. Kathleen D. Cusick.

UMCES Executive Council. " Using tree rings to create an historical record of soil pollution near a childhood cancer cluster in Ohio", 04/09/18. Invited by Dr. Thomas J. Miller.

CBL Science for Citizens Seminar. "Can seaweed clean up the mess left by your cell phone?", 10/02/18. Invited by Ms. Sarah Brzezinski.

University of Maryland Eastern Shore, Department of Natural Science. “Assessing the extent and causes of variations in the seawater Sr/Ca ratio to improve coral paleothermometry”, 11/02/17. Invited by Dr. Ahmed Elnabawi.

Masuda Symposium keynote address. "YREE scavenging in seawater: A physical chemist's perspective" 06/26/16 Goldschmidt Conference, Yokohama, Japan. Invited by Dr. Yoshio Takahashi.

University of Maryland Eastern Shore, Department of Natural Science. “How I became Lord of the Rings (or: If only all trees were Ents)”, 04/16/15. Invited by Dr. Meng Xia.

University of Maryland, Department of Atmospheric & Oceanic Science. “The role of strong

organic ligands in the marine biogeochemistry of trace metals”, 03/26/15. Invited by Dr. Derrick J. Lampkin.

University of Maryland, Department of Environmental Science & Technology. “How I became Lord of the Rings (or: If only all trees were Ents)”, 02/25/15. Invited by Dr. Edward R. Landa.

University of South Florida, College of Marine Science. "Metal uptake in small and large plants: From curiosity to cancer", 06/03/13. Invited by Dr. Robert H. Byrne.

UMCES/Institute for Marine & Environmental Technology. Chesapeake Bay, Human Health and Eco-Toxicology Symposium. “Surveying the distribution and bioavailability of selenium in Chesapeake Bay: The importance of chemical speciation.” 05/14/12. Invited by Dr. Allen R. Place

University of Maryland, Department of Geology. “Chemistry on the edge: How particles control the solubility of trace metals in natural waters.” 02/29/12. Invited by Dr. Joost Hoek.

UMCES/Institute of Marine and Environmental Technology. “Chemistry on the edge: How particles control the solubility of trace metals in natural waters.” 01/25/12. Invited by Dr. Feng Chen.

UMCES/Chesapeake Biological Laboratory. “Chemistry on the edge: How particles control the solubility of trace metals in natural waters.” 01/18/12. Invited by Dr. Lora A. Harris.

UMCES/Horn Point Laboratory. “Chemistry on the edge: How particles control the solubility of trace metals in natural waters.” 01/11/12. Invited by Dr. Judy M. O’Neil.

UMCES/Appalachian Laboratory. “Chemistry on the edge: How particles control the solubility of trace metals in natural waters.” 12/01/11. Invited by Dr. Mark S. Castro.

Florida State University, Department of Oceanography. “Using multiple analytical approaches to study metal sorption on organic and inorganic surfaces: From minerals to macroalgae.” 03/18/10. Invited by Dr. William M. Landing.

Tulane University, Department of Earth & Environmental Sciences. “Multiple approaches to characterizing metal sorption on the surface of the marine macroalga *Ulva lactuca*.” 05/01/09. Invited by Dr. Karen H. Johannesson.

Institute of Ocean Sciences, Sidney, BC, Canada. “How to catch pteropods and what we hope to learn from them regarding ocean acidification.” 03/03/09. Invited by Dr. Marie Robert.

Saint Mary’s College of Maryland, Department of Chemistry and Biochemistry. “Multiple approaches to characterizing metal sorption on the surface of the marine macroalga *Ulva lactuca*.” 02/11/09. Invited by Dr. Danielle M. Cass.

Saint Mary’s College of Maryland, Department of Biology. “Snails, whales, and waves: Ocean acidification research at Station Papa.” 11/20/08. Invited by Dr. Sarah E. Kolesar.

University of Maryland, Department of Chemistry and Biochemistry. “Multiple approaches to characterizing metal sorption on the surface of the marine macroalga *Ulva lactuca*.”

11/07/08. Invited by Dr. Neil V. Blough.

Notre Dame University, Department of Civil Engineering and Geological Sciences. "Bacteria like it salty: Evidence for Hg methylation by halophilic sulfate reducers in the anoxic, hypersaline Orca Basin." 04/14/08. Invited by Dr. Jeremy B. Fein.

McDaniel College, Department of Environmental Policy and Science. "Bacteria like it salty: Strange things are happening 2300 meters below the surface of the Gulf of Mexico." 03/31/08. Invited by Dr. Kelly H. Kilbourne.

AL Faculty Seminar Series. "Metal sorption on marine macroalgae: seaweed, synchrotron, and surface chemistry." 02/21/08. Invited by Dr. Robert H. Hilderbrand.

CBL Science Social. "Aquatic indigestion – Tiny snails fight gas." 09/19/07. Invited by Dr. Jacqueline U. Takacs.

HPL Spring Seminar Series. "A chemical perspective on the origin and evolution of the brine in the anoxic Orca Basin, northern Gulf of Mexico." 05/09/07. Invited by Dr. Jeffrey C. Cornwell.

IAN Annapolis Seminar Series. "Macroalgae: Pest, protein snack, or pollution monitor?" 04/12/07. Invited by Dr. Tim J.B. Carruthers ([MP3 audio file](#)).

Twenty-First Rare Earth Research Conference, Duluth. July 7–12, 1996. Duluth, MN. "Marine geochemistry of the rare earth elements (REE)." Invited by Dr. G.R. Choppin.

2. Contributed lectures and posters. *Person presenting is underlined. Does not include presentations published in conference proceedings (see above).*

12<sup>th</sup> International Conference on Paleoceanography (ICP12). August 29–September 2, 2016. Utrecht, The Netherlands. "Assessing the extent and causes of fluctuations in the seawater Sr/Ca ratio to improve coral paleothermometry calibrations." (poster) K.H. Kilbourne, A. Khare and J. Schijf.

Maryland Water Monitoring Council 21<sup>st</sup> Annual Conference. November 13, 2015. Linthicum Heights, MD. "Use of Ba/Sr ratios as a potential indicator of surface water contamination from fracking fluid spills." (poster) J. Schijf and C.G. Coulter.

SCOR WG 139 Workshop and Symposium: Organic Ligands – A Key Control on Trace Metal Biogeochemistry in the Ocean. April 7–11, 2015. Šibenik, Croatia. "On the side-reaction coefficient of desferrioxamine B in metal-free seawater." (poster) J. Schijf.

Maryland Water Monitoring Council 20<sup>th</sup> Annual Conference. November 21, 2014. Linthicum Heights, MD. "Methane and metals in Maryland streams overlying the Marcellus Shale." (poster) C.G. Coulter, J. Schijf and L.L. Lapham.

Maryland Water Monitoring Council 19<sup>th</sup> Annual Conference. December 5, 2015. "Chemistry of western Maryland stream water: A baseline assessment before possible hydraulic fracturing." (poster) A. Heyes, J. Schijf, L.L. Lapham, M. Gonsior, J.L. Luek, C.G. Coulter and C. Clark.



Gordon Research Conference on Chemical Oceanography. August 14–19, 2011. Andover, NH. “Stability of YREE complexes with the trihydroxamate siderophore desferrioxamine B at seawater ionic strength.” (poster) J. Schijf and E.A. Christenson.

CBL Distinguished Scholar Lecture Series. “Snails, whales, and waves: Ocean acidification research at Station Papa.” 09/24/08.

CBL Distinguished Scholar Lecture Series. “Underwater Jacuzzis and limescale – What we can learn from the chemistry of Florida submarine geothermal springs.” 10/05/06.

ACS Meeting in Miniature. April 22, 2006. Saint Petersburg, FL. “Trace metal accumulation in the Tampa Bay estuary: Preliminary results.” L.M. Boehme-Terrana, R.H. Byrne and J. Schijf.

AquaChem04: Mediterranean Conference on Chemistry of Aquatic Systems in Honor of Professor Frank J. Millero. September 4–8, 2004. Reggio Calabria, Italy. “Yttrium and rare earth element patterns in the environment: Imprints of solution, surface and solid state chemistries.” R.H. Byrne, J. Schijf, K.A. Quinn and Y.-R. Luo.

Gulf Coast Geochemistry Group Conference (GC<sup>3</sup>). January 22–24, 1999. Cocodrie, LA. “Co-precipitation of mixed rare earth element phosphates: Its potential influence on rare earth element distributions in the deep ocean.” X. Liu, R.H. Byrne and J. Schijf.

Gulf Coast Geochemistry Group Conference (GC<sup>3</sup>). January 22–24, 1999. Cocodrie, LA. “Ba/Sr ratios in acantharians: Implications for Ba and Ra cycling in the open ocean.” R.E. Bernstein, R.H. Byrne and J. Schijf.

Gulf Coast Geochemistry Group Conference (GC<sup>3</sup>). January 22–24, 1999. Cocodrie, LA. “Determination of the first and second formation constants for rare earth element fluoride complexes by means of a batch method with cation-exchange resin and ICP-MS.” J. Schijf and R.H. Byrne.

Gulf Coast Geochemistry Group Conference (GC<sup>3</sup>), October 22–23, 1994. Dauphin Island, AL. “Rare earth element cycling in the suboxic zone of the Black Sea: resolving a controversy.” J. Schijf and W.M. Landing.

EPOS Symposium (European Polarstern Study). May 21–24, 1991. Bremerhaven, Germany. “Rare earth element distributions in the Southern Ocean.” A.W.M.G. Souden, J. Schijf and H.J.W. de Baar.

23. Diskussionstagung der Arbeitsgemeinschaft Massenspektrometrie. June 5–8, 1990. Konstanz, Germany. “Verwendung von CCl<sub>2</sub>F<sub>2</sub> zur Unterdrückung von Oxidionen während einer Multi-elementanalyse von seltenen Erdmetallen im Thermionen-massenspektrometer.” (poster) E.H. Hebeda and J. Schijf.

Ocean Sciences Meeting. February 12–16, 1990. New Orleans, LA. “Dissolved Fe, Cu, Zn and Cd in the Weddell and Scotia Seas of the Southern Ocean.” R.F. Nolting and H.J.W. de Baar (presented on behalf of the authors).

Third Conference on Anoxic Basins of the Eastern Mediterranean. December 14–16, 1988. Bergamo, Italy. “Trace metal concentrations in Bacino Bannock.” J. Schijf.

Third Conference on Anoxic Basins of the Eastern Mediterranean. December 14–16, 1988. Bergamo, Italy. “REE-concentrations in Bacino Bannock.” J. Schijf.

### 3. Symposia organized/chaired for professional meetings.

“Understanding Rare Earth Element (REE) Distributions and Isotopic Ratios and the Mechanisms Behind Their Use as Tracers of (Paleo)oceanic Processes.” Special session CT011 co-chaired with Dr. B.A. Haley (Oregon State University), Dr. T. Stichel (Alfred Wegener Institut, Germany) and Dr. V. Hatje (Universidade Federal da Bahia, Brazil). ASLO/AGU/TOS Ocean Sciences Meeting. February 16–21, 2020. San Diego, CA.

“Rare Earth Elements (REEs) as Tracers of Oceanic Processes: New Insights into the Geochemical Mechanisms Behind Their Patterns and Profiles.” Special session OS23E (poster) co-chaired with Dr. B.A. Haley (Oregon State University), Dr. T. Stichel (Alfred Wegener Institut, Germany) and Dr. H. Tazoe (Hirosaki University, Japan). AGU Fall Meeting. December 10–14, 2018. Washington, DC. Ocean Sciences Section.

“REE Marine Geochemistry in the 21<sup>st</sup> Century: A Tribute to the Pioneering Research of Henry Elderfield (1943–2016).” Special session 029 (oral and poster) co-chaired with Dr. K.H. Johannesson (Tulane University). ASLO Aquatic Sciences Meeting. February 26–March 3, 2017. Honolulu, HI.

“Metal Sorption on Organic and Inorganic Surfaces: From Laboratory to Model to Field.” Special sessions B43G (oral) and B51D (poster) co-chaired with Dr. K.H. Johannesson, Tulane University. AGU Fall Meeting. December 13–17, 2010. San Francisco, CA. Biogeosciences Section.

“Trace Metal Interactions with Submerged Aquatic Vegetation (SAV) and Bacterial Biofilms: Current State of Experiment, Theory, and Modeling.” Special sessions B12A (oral) and B13C (poster) co-chaired with Dr. K.H. Johannesson, Tulane University. AGU Fall Meeting, December 10–14, 2007. San Francisco, CA. Biogeosciences Section.

Chair, Environmental Chemistry Session. Meeting in Miniature. American Chemical Society, Tampa Bay Section. November 22, 2006. Saint Petersburg, FL.

## **Teaching**

### 1. Courses taught for the University System of Maryland.

MEES698M “Modeling Chemical Equilibrium in Natural Waters.” IVN-based, 3 credits. Fall 2019, enrollment: 5. Formerly: MEES626 “Environmental Geochemistry I.” Fall 2008, enrollment: 12 + 2 auditors. Fall 2009, enrollment: 9. Fall 2010, enrollment: 10. Fall 2012, enrollment 14 + 1 auditor. Fall 2013, enrollment: 9. Fall 2015, enrollment: 8. Fall 2016, enrollment: 5. Fall 2017, enrollment: 5. Fall 2019, enrollment: 5.

MEES698C (multiple instructors) “Chemical Oceanography.” IVN-based, 3 credits. Fall 2014, enrollment: 9 + 1 auditor. Spring 2018, enrollment: 5.

MEES608W (seminar, multiple instructors) “Environmental Forensics.” IVN-based, 2 credits. Fall 2013, enrollment: 5.

MEES608T (seminar) “Applications of State-of-the-Art Analytical Techniques in the Environmental Sciences.” IVN-based, 2 credits. Spring 2008, enrollment: 9. Spring 2009, enrollment: 5. Spring 2012, enrollment: 8.

MEES627 “Environmental Geochemistry II.” Guest lecturer: 2007, 2009 (for R.H. Harvey) and 2011 (for K.H. Kilbourne).

## 2. Courses taught elsewhere.

OCE6934-615 “Basic Clean Room Techniques.” 1 credit, 600-level. Laboratory course with lectures. University of South Florida. Fall 1997–2003.

OCE6934-612 “Chemical Field Studies.” 3 credits, 600-level. Field course with laboratory and lectures. Co-instructor with R.H. Byrne. University of South Florida. Spring 1997–2000.

## **Student Supervision and Mentoring**

### 1. Graduate students advised.

Hunter P. Hughes (M.Sc. 08/07/20) Thesis title: "Effects of Seawater Sr/Ca Variability on Coral Paleothermometry in the Florida Keys and Virgin Islands Revealed by Multi-Year Continuous Monitoring." (co-advised with K.H. Kilbourne).

Agraj Khare (M.Sc. 04/27/18) Thesis title: "Potential Impact of Variation in the Seawater Strontium to Calcium Ratio on Coral Paleothermometry in the Florida Keys, USA." (co-advised with K.H. Kilbourne).

Caroline G. Coulter (M.Sc. 07/20/15) Thesis title: “Monitoring Levels of Dissolved Methane and Metals in Maryland Streams Overlying the Marcellus Shale Prior to Hydraulic Fracturing.”

Emily A. Christenson (M.Sc. 07/22/13) Thesis title: “Effects of Complexation with the Siderophore Desferrioxamine B on Transition Metal Removal from Seawater.”

Kathleen S. Marshall (M.Sc. 11/18/11) Thesis title: “The Influence of Iron and Manganese Oxides on the Production of Marine Sedimentary Cerium Anomalies.” Now employed at CSC Science and Engineering, Analytics and Scientific Program Support.

Alison M. Straka-Zoll (M.Sc. 04/14/11) Thesis title: “Sorption of Yttrium and the Rare Earth Elements on the Marine Macroalga *Ulva lactuca*.” Now employed at Golder Associates, Inc.

## 2. Graduate student committee memberships. Advisor at CBL unless indicated otherwise.

Hao-Ran Liu (Ph.D. expected 2023) Advisor: Meng Xia (University of Maryland Eastern Shore). Project: A hydrodynamic and biogeochemical model of water quality in the Maryland Coastal Bays.

Qian-Ru Niu (Ph.D. 11/02/17) Advisor: Meng Xia (University of Maryland Eastern Shore). Dissertation title: "Impact of Wave-Current Interaction on the Sediment Plume Dynamics and Particle Transports in the Western Basin of Lake Erie."

Hillary A. Lane-Glandon (Ph.D. 07/11/17) Advisors: T.J. Miller and K.T. Paynter (University of Maryland, MEES). Dissertation title: "The Organismal and Population Effects of Climate Change on Juvenile Blue Crab (*Callinectes sapidus*) in the Patuxent River, Chesapeake Bay."

Miao-Hua Mao (M.Sc. 11/06/15) Advisor: Meng Xia (University of Maryland Eastern Shore). Thesis title: "Modeling of Wave Dynamics, Storm Surges, and Wave-Current-Surge Interactions in Lake Michigan Using Unstructured Models."

Yuan-Yuan Xu (M.Sc. 08/18/14) Advisor: K.H. Kilbourne. Thesis title: "Late Medieval Climate Changes in Tropical Atlantic Temperature and Interannual Variability Documented in Northeastern Caribbean Corals."

Jessica F. Faux (Ph.D. 03/21/14) Advisor: H.R. Harvey. Dissertation title: "A Proteomics Approach to the Examination of Proteins in Marine Systems."

Regina A. Easley (Ph.D. 06/04/13) Advisor: R.H. Byrne (University of South Florida). Dissertation title: "The Spectrophotometric Analysis of Lead Carbonate Complexation and Carbonate Saturation States in Seawater."

Katherine E. Davis-Ziombra (M.Sc. 12/14/11) Advisor: L.A. Harris. Thesis title: "Primary Production, Respiration and Nutrient Cycling in the Potomac River Estuary."

Eli K. Moore (Ph.D. 10/07/11) Advisor: H.R. Harvey. Dissertation title: "Tracking Protein from Primary Production to Sediments Using Marine Proteomics."

Linæ M. Boehme-Terrana (Ph.D. 07/09/07) Advisor: R.H. Byrne (University of South Florida). Dissertation title: "Trace Metals and Stable Isotopes as Tracers of Life History and Trophic Connections in Estuarine-Dependent Fish from Tampa Bay, Florida."

Douglas C. Hilderbrand (M.Sc. 04/09/98) Advisor: T.M. Quinn (University of South Florida). Thesis title: "Elemental Ratio Determination via ICP-MS and DCP-AES: Methodology to Extract Climate Records from Coral Aragonite."

## 3. Other students and volunteers mentored.

Jessica L. Ditillo (2011) St. Mary's College of Maryland, biology major. Senior Project: Uptake of heavy metals from fly ash by hydroponically grown duckweed (*Lemna minor*) and water velvet (*Azolla pinnata*).

REU (Research Experiences for Undergraduates) students:

- Joshua W. Dalo (2019) University of New England, Biddeford, ME, chemistry and marine science major.
- Katherine M. Mitchell (2018) Flagler College, Saint Augustine, FL, coastal environmental science major.
- Isabel J. Christy (2016) Whitman College, Walla Walla, WA, chemistry major.
- Shannon M. Burns (2015) University of Georgia Athens, biology and environmental chemistry major.
- Joshua E. Condon (2014) University of Maryland College Park, chemical and biomolecular engineering major.
- Kailee J. Potter (2012) Adams State College, Alamosa, CO, chemistry major.
- Emily J. Gravens (2011) Montana State University Bozeman, chemistry major.
- Lauren M. Hunker (2009) University of Minnesota Morris, chemistry major.
- Alina M. Ebling (2008) Kutztown University of Pennsylvania, environmental chemistry major.
- Alison M. Straka (2007) Catholic University of Washington, chemistry major.

Student volunteers:

- Katherine M. Hoffman (2013, 2014) Chopticon High School, Morganza, MD, senior; and University of North Carolina Wilmington, marine biology major.
- Alison Worth (2013) Northern High School, Owings, MD, 10<sup>th</sup> grade.
- Anne E. Nigra (2013) Oberlin College, Oberlin OH, biology major.
- Sonya R. Kaufman (2012) Oberlin College, Oberlin OH, biology major.
- Emily G. Carroll (2010) Calvert High School, AP chemistry student.
- Laura L. Russell (2008) University of Maryland College Park (UMCP), biology major.

Students at international scientific meetings. Mentees were enrolled in the Minorities Striving and Pursuing Higher Degrees of Success (MS PHD'S) initiative at the AGU Fall Meeting, unless indicated otherwise:

- Rafael Gonçalves-Araujo (2016) Alfred Wegener Institut, Bremerhaven, Germany, Ph.D. candidate. ASLO Ocean Sciences Meeting, first-time attendee.
- Tracey A. Conrad (2014) University of California Santa Cruz, Ph.D. candidate. Goldschmidt Conference, first-time attendee.
- Jill M. Arriola (2013) University of North Carolina Chapel Hill, research technician. ASLO Aquatic Sciences Meeting, first-time attendee.
- Timothy Pattyson (2012) Interamerican University of Puerto Rico, San German. M.Sc. student, environmental chemistry.
- Verónica E. Aponte Morales (2008) Interamerican University of Puerto Rico, San German. M.Sc. student, environmental chemistry.
- Marta Rodríguez-López (2008) University of South Florida, Saint Petersburg. Ph.D. candidate, biological oceanography.
- Ryann A. Williams (2008) University of South Florida, Saint Petersburg. M.Sc. student, biological oceanography.
- Yaika Echevarría Román (2007) Universidad Metropolitana, San Juan, PR. Undergraduate student, environmental chemistry.

## **Professional Service and Educational Outreach**

### 1. University System of Maryland.

Member, University of Maryland AAUS Diving Control Board (2020–present).  
Vice-chair, MEES Earth & Ocean Sciences Foundation (2017–2020).  
Member, MEES Program Committee (2009–2020).  
Chair, MEES Environmental Chemistry AOS (2010–2016).  
Member, MEES Curriculum Committee (2013–2015).  
Member, MEES Oceanography AOS Curriculum Committee (2012).  
Member, Maryland Sea Grant REU Selection Committee (2008, 2009, 2011, 2012, 2022).  
Co-chair, MEES Environmental Chemistry AOS (2009).  
Member, Student Recruitment Committee, Environmental Chemistry AOS (2008–2009).  
Member, Student Recruitment Committee, Oceanography AOS (2007–2008).

### 2. University of Maryland Center for Environmental Science and CBL.

Member, UMCES Re-accreditation Self Study Working Group 3 (2019–2020).  
Chair, CBL Library Renovation Committee (2017–2018).  
Chair, Faculty promotion & tenure committee (2017–2018).  
Member, Graduate Education Committee (2008–2018, Chair 2011–2014).  
Chair, Faculty promotion & tenure committee (2016–2017).  
Member, GFC Subcommittee on UMCES Presidential Fellowship Review (2015–2016).  
Member, GFC Subcommittee on Educational Data, Data Flow, and Data Management (2015–2016).  
Member, UMCES Graduate Faculty Council (2013–2016).  
Chair, Faculty Research Assistant promotion committee (2014–2015).  
Member, UMCES Accreditation Self Study Workgroup 3 (2014–2015).  
Member, UMCES Accreditation Committee (2013–2015).  
Chair, UMCES Accreditation Readiness Report Workgroup 2 (2013–2014).  
External member, IMET/UMB faculty search committee (2013).  
Member, MEES Task Force (2013).  
Chair, Assistant Research Scientist promotion committee (2012–2013).  
Member, CBL faculty search committee (2010).  
Co-chair, CBL faculty search committee (2009).  
Co-coordinator, Distinguished Scholar Seminar Series (2008, 2013, 2015, 2019).  
Co-coordinator, Student Brown Bag Seminar Series (2007).

### 3. Educational outreach and other service.

Guest Associate Editor (with Marta Plavšić and Sotirios Karavoltsos), *Frontiers in Marine Science* Research Topic "Metal-organic Interactions in Seawater Under Changing Anthropogenic and Climate Conditions" 2 papers published, >2,500 views (2021–present).  
<https://www.frontiersin.org/research-topics/17727/metal-organic-interactions-in-seawater-under-changing-anthropogenic-and-climate-conditions>

Associate Editor, *Frontiers in Marine Science* (2019–present).

Guest Associate Editor (with C. Jeandel, K.H. Johannesson and A.H. Osborne), *Frontiers in Marine Science* Research Topic "REE Marine Geochemistry in the 21<sup>st</sup> Century: A Tribute to the Pioneering Research of Henry Elderfield (1943–2016)" 11 papers published, >55,000 views, e-book published.

<https://www.frontiersin.org/research-topics/5915/ree-marine-geochemistry-in-the-21st-century-a-tribute-to-the-pioneering-research-of-henry-elderfield>

Chemistry demonstrations, CBL Open House. September 7, 2019.

Member, National Science Foundation, Division of Biological Infrastructure, Improvements in Facilities, Communications, and Equipment at Biological Field Stations & Marine Laboratories (FSML) Review Panel. June 28, 2019. Remote access.

Speaker, CBL Research Experiences for Undergraduates Seminar. "Using tree rings to create an historical record of soil pollution near a childhood cancer cluster in Ohio." June 27, 2019.

Invited participant, Renewable Natural Resources Foundation – Congress on Ocean Policy. December 6, 2018. Washington, DC.

Speaker, CBL Research Experiences for Undergraduates Orientation. "Understanding journal articles." May 23, 2018.

Member, National Science Foundation, Division of Biological Infrastructure, Improvements in Facilities, Communications, and Equipment at Biological Field Stations & Marine Laboratories (FSML) Review Panel. February 14–16, 2018. Alexandria, VA.

Judge, Outstanding Student Poster Awards, AGU Fall Meeting (2010, 2018); Best Poster and Oral Presentations, Goldschmidt Conference (2012).

Judge, Patuxent HS Science Fair (2007, 2009) and Calvert County Public Schools Science Fair (2007, 2010, 2011, 2013, 2014, 2016, 2018).

Member, Scientific Committee on Oceanic Research (SCOR) Working Group 145 "Modeling Chemical Speciation in Seawater to Meet 21<sup>st</sup> Century Needs (MARCHEMSPEC)" (2016). <http://neon.otago.ac.nz/research/scor/index.html>

Speaker, CBL Research Experiences for Undergraduates Orientation. "Understanding journal articles." May 24, 2016.

Member, Scientific Committee on Oceanic Research (SCOR) Working Group 139 "Organic Ligands – A Key Control on Trace Metal Biogeochemistry in the Ocean" (2015). <http://neon.otago.ac.nz/research/scor/index.html>

Speaker, CBL Research Experiences for Undergraduates Orientation. "Understanding journal articles." May 19, 2015.

Exhibitor at "Baltimore Rocks!", a STEM educational event opening the 2015 Geological Society of America Annual Meeting in Baltimore, MD.

Speaker, CBL Docent Continuing Education Series. "Fracking in western Maryland." May

12, 2014.

Speaker, CBL Docent Continuing Education Series. "Trace metals in trees." May 20, 2013.

Maintained an online journal during fieldwork in Anegada, British Virgin Islands. "Coral reveals climate in the Middle Ages." March 13–23, 2013.

<http://www.umces.edu/cbl/story/2013/mar/15/coral-reveals-climate-middle-ages>

"Christmas in April". Calvert County community service (2011–2013).

Speaker, CBL Research Experiences for Undergraduates Seminar. "Trace metal chemistry and the composition of seawater." June 20, 2012.

Speaker, CBL Docent Continuing Education Series. "Bacteria need iron too! How microbes extract essential trace metals from their environment." March 17, 2011.

Member, National Science Foundation, Polar Programs/Geosciences/Biological Sciences Ocean Acidification Joint Review Panel. June 1–4, 2010.

Speaker, CBL Docent Continuing Education Series. "Trace metal chemistry and the composition of seawater." May 3, 2010.

Reviewer, MS PHD'S initiative student applications (2009).

Maintained an interactive educational blog for Maryland teachers during Mission No. 2008-27 (Station Papa Repeat Hydrography) CCGS *John P. Tully*, August 2008.

Contributor to Solomons Sketches:

- "Hunting little snails." (2010, Vol. 12 No. 1).
- "What causes my well water to turn yellow?" (2007, Vol. 10 No. 2).

Volunteer, CBL Open House (2006, 2007).

Mentor, Oceanography Camp for Girls. University of South Florida, Department of Marine Science (1995–1996).

Manuscript and book reviewer:

- Aquatic Geochemistry
- Cambridge University Press
- Chemical Geology
- Deep-Sea Research II
- Economic Geology
- Environmental Science & Technology
- Estuarine, Coastal, and Shelf Science
- Frontiers in Marine Science
- Geochemical Journal
- Geochemistry: Exploration, Environment, Analysis
- Geochimica et Cosmochimica Acta
- Geology
- ICES Journal of Marine Science
- Inorganic Chemistry



- Journal of Agricultural and Food Chemistry
- Journal of Colloid & Interface Science
- Journal of Hazardous Materials
- Journal of Hydrology
- Journal of Marine Systems
- Journal of Molecular Liquids
- Limnology and Oceanography: Methods
- Marine Chemistry
- Marine Geology
- Microchemical Journal
- Minerals
- Nature Scientific Reports
- Talanta
- Water, Air, & Soil Pollution
- Water Research

Proposal reviewer:

- American Chemical Society, Petroleum Research Fund .
- California Department of Fish and Wildlife.
- Canada Foundation for Innovation, John R. Evans Leaders Fund.
- National Science Foundation. Geobiology & Low-Temperature Geochemistry (EAR).
- National Science Foundation. Instrumentation & Facilities (EAR).
- National Science Foundation. Major Research Instrumentation (EAR).
- National Science Foundation. Processes, Structures & Integrity (IOS).
- National Science Foundation. Biological Oceanography (OCE).
- National Science Foundation. Chemical Oceanography (OCE).
- National Science Foundation. Climate Research Investment - OA (OCE).
- National Science Foundation. Arctic Natural Sciences (PLR).
- Oregon Sea Grant.
- Stanford Synchrotron Radiation Lightsource.
- US Army Corps of Engineers, ERDC Program.

## **Miscellaneous Information**

Fluent in English and Dutch; proficient in German and French; some knowledge of Italian and Russian.

NAUI-certified advanced SCUBA diver.

IANTD-certified enriched air nitrox diver.

AAUS-certified scientific diver.

Active membership in professional societies:

- American Association for the Advancement of Science (AAAS), since 1995.
- American Chemical Society (ACS), Chemical Society of Washington Section, since 1997.
- American Geophysical Union (AGU), life member.
- Association for the Sciences of Limnology and Oceanography (ASLO), life member.
- Geochemical Society, since 2014.

- Sigma Xi, University of Maryland Chapter, since 2005.

Professional training courses completed and tutorial meetings attended:

- American Chemical Society C&EN webinar "Why ICP-MS/MS? How Tandem MS Solves Analytical Problems and Improves Data Quality in a Commercial Metals Laboratory" (sponsored by Agilent Technologies). May 3, 2018 (invited participant).
- Agilent Technologies – 2018 Science and Development (Sci-Dev) Day. April 19, 2018. Richmond, VA (invited participant).
- G-Suite Training. February 28, 2018. Prince Frederick, MD.
- Geochemical Society/Mineralogical Society of America Short Course “Applications of Synchrotron Radiation in Low-Temperature Geochemistry and Environmental Sciences”. December 4–5, 2002. Monterey, CA.
- Synchrotron Environmental Science-II (SES-II). Argonne National Laboratory, Advanced Photon Source. May 6–8, 2002. Argonne, IL.
- Customer Training Course H4035A-15 for the HP 4500 inductively coupled plasma mass spectrometer at Hewlett Packard. October 2–5, 1999. Bellevue, WA.
- "VG PlasmaQuad Basic Training Course" for the Fisons PlasmaQuad PQS inductively coupled plasma mass spectrometer at the University of South Florida, Department of Marine Science. June 13–15, 1995. St. Petersburg, FL.
- Customer Training Course for the Finnigan MAT 261 thermal ionization mass spectrometer at Finnigan MAT. February 8–12, 1988. Bremen, Germany.