

# CURRICULUM VITAE

**Jeffrey C. Cornwell**

## **Horn Point Laboratory**

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## **I Education**

1976 B.S., Hobart College, Chemistry with Honors

1983 Ph.D., University of Alaska, Oceanography

## **II Professional Background**

1984-1985 Post-Doctoral Research Associate, Texas A&M University

1985-1986 Assistant Research Scientist, Texas A&M University

1986-1989 Research Associate, Horn Point Laboratory

1989-1996 Research Assistant Professor Horn Point Laboratory

1996-present Research Associate Professor Horn Point Laboratory

## **III Research**

### A. Areas of professional expertise

Biogeochemistry of nutrients and metals in aquatic sediments; estuarine chemistry and water quality; metals, nutrients and stable isotopes in tidal and non-tidal wetlands; freshwater chemistry and ecology

### B. Peer-Reviewed Publications (last 5 years)

#### 1. Papers in Peer-Reviewed Publications

Hartzell, J.L., T.E. Jordan and **J.C. Cornwell**. 2010. Phosphorus burial in sediments along the salinity gradient of the Patuxent River, a subestuary of the Chesapeake Bay (USA). *Estuaries and Coasts*. 33:92-106.

Cai, W.J., G. W. Luther III, **J.C. Cornwell** and A.E. Giblin. 2010. Carbon cycling and the coupling between proton and electron transfer reactions in aquatic sediments in Lake Champlain. *Aquatic Geochemistry* 16:421-446.

**Cornwell, J.C.** and M.S. Owens. 2011. Quantifying sediment nitrogen releases associated with estuarine dredging. *Aquatic Geochemistry* 17:499-517.

- Velinsky, D.J., G.F. Riedel, J.T.F. Ashley and **J.C. Cornwell**. 2011. Historical contamination of the Anacostia River, Washington, D.C. *Environmental Monitoring and Assessment*. 183:307-328
- Glibert, P.M., D. Fullerton, J. Burkholder, **J.C. Cornwell** and T.M Kana. 2011. Ecological stoichiometry, biogeochemical cycling, invasive species and aquatic food webs: San Francisco Estuary and comparative systems. *Reviews in Fisheries Science* 19:368-417.
- Kellogg M.L., **J.C. Cornwell**, M.S. Owens and K.T. Paynter KT. 2013. Denitrification and nutrient assimilation on a restored oyster reef. *Marine Ecology Progress Series* 480:1-19.
- Cornwell, J.C.** 2013. Measurement of sulfate reduction in wetland soils. Chapter 39 in DeLaune, R.D., K.R. Reddy, C.J. Richardson and J.P. Megonigal (eds), *Methods in Biogeochemistry of Wetlands*. Soils Science Society of America, Madison, WI.
- Testa, J.M., D.C Brady, D.M. Di Toro, W.R. Boynton, **J.C. Cornwell**, and W. M. Kemp. 2013. Sediment Flux Modeling: Simulating nitrogen, phosphorus, and silica cycles. *Estuarine Coastal and Shelf Science*. 131:245-263.
- Hewson, I. , E. Eggleston, M. Doherty, D.Y. Lee, M. Owens, J.P. Shapleigh, **J.C. Cornwell** and B.C. Crump. 2014. Metatranscriptomic analyses of plankton communities inhabiting surface and sub-pycnocline waters of the Chesapeake Bay during oxic-anoxic-oxic transitions. *Applied and Environmental Microbiology*. 80:328-338
- Gao, Y, **J.C. Cornwell**, D.K. Stoecker and M.S. Owens. 2014. Sediment nutrient regeneration during tidal freshwater cyanobacterial blooms: Control by oxygen, pH, and organic matter inputs. *Limnology and Oceanography* 59:959-971
- Cornwell, J.C.**, P.M. Glibert and M.S. Owens. 2014. Nutrient fluxes from sediments in the San Francisco Bay Delta. *Estuaries and Coasts*. 37:1120-1133.
- Gao, Y., J.M. O'Neil, D.K. Stoecker and **J.C. Cornwell**. 2014. Photosynthesis and nitrogen fixation during cyanobacterial blooms in an oligohaline / tidal fresh estuary. *Aquatic Microbial Ecology* 72:127-142
- Kellogg, M.L., A. R. Smyth, M.W. Luckenbach, B.L. Brown, R.H. Carmichael, J. C. Cornwell, M. F. Piehler, Michael S. Owens, D. J. Dalrymple and C. B. Higgins. 2014. Use of oysters to mitigate eutrophication in coastal waters. *Estuarine Coastal and Shelf Science* 151:156-168
- Lee, D.Y., M.S. Owens, M. Doherty, E.M. Eggleston, I. Hewson, B.C. Crump and **J.C. Cornwell**. The effects of oxygen transition on community respiration and potential chemotrophic production in a seasonally stratified anoxic estuary. *Estuaries and Coasts*, On Website.
- Eggleston, E., M., D.Y. Lee, M.S. Owens, **J.C. Cornwell**, B.C. Crump and I. Hewson. On Website. Key respiratory genes elucidate bacterial community respiration in a seasonally anoxic bay. *Environmental Microbiology*, On Website

## 2. Technical Reports

Cornwell, J.C., M.S. Owens, T. Kana, E. Bailey, J. Barnes and W.R. Boynton. 2008. An assessment of processes controlling benthic nutrient fluxes in the Caloosahatchee River and Estuary and the St. Lucie Estuary River and Estuary. Final Report to South Florida Water Management District. UMCES Technical Series Contribution TS-552-08.

Cornwell, J.C., L. Staver, M. Owens and J.C. Stevenson. 2009. Sediment and plant monitoring at the South Cell of Hart Miller Island. UMCES Technical Series Contribution TS-574-09.

Independent Technical Review Team (including Cornwell). 2009. Sediment in Baltimore Harbor. Quality and Suitability of Innovative Reuse. Maryland Sea Grant Publication UM-SG-TS-2009-04.

Stevenson, J.C., J.C. Cornwell, L.W. Staver and M.S. Owens. 2010. 2008 Poplar Island Cell 3D & 4D Plant and Geochemical Monitoring. MCES Final Report to Maryland Environmental Services on behalf of the Maryland Port Administration.

Cornwell, Jeffrey C. and M.S. Owens. 2010. Time Course of Acid Generation During Crust Management of Dredged Sediment. UMCES Final Report to Maryland Environmental Services on behalf of the Maryland Port Administration. UMCES Technical Report Number TS-594-10

Kellogg, M. L., J. C. Cornwell, K. T. Paynter, and M. S. Owens. 2011. Nitrogen removal and sequestration capacity of a restored oyster reef: Chesapeake Bay experimental studies. Final Report to the Oyster Recovery Partnership. . UMCES TS-623-11.

## 3. Contracts and Grants (Last 5 years)

### 1. Awarded

Cyanobacterial Blooms: A Roadblock to Estuarine Restoration? MD Sea Grant. 2/2009-1/2011. 1.5 mo./yr. (co-PI)

UMCES Technical Support For pH and Metal Issues in Dredge Sediment Disposal Maryland Port Administration/ Maryland Environmental Service. 2/2009-3/2010. \$29,327. 1.0 mo./yr. (co-PI with Schijf)

Nitrogen removal capacity in a restored oyster reef: the relative roles of oysters and the associated reef community. Mirant Corporation / Oyster Recovery Program. \$180,000. 2009-2010. Kellogg/Cornwell.

Forecasting the responses of tidal freshwater wetlands to sea level rise: biogeochemical responses to saltwater intrusion. DOE-National Institute for Climatic Change Research. \$30,083. 2010-2011. Baldwin/Cornwell.

How Does Shellfish Aquaculture Change Nutrient Balances in Maryland's Coastal Bays? Maryland Coastal Bays Program. \$25,000. 2010. Cornwell/Kellogg

Collaborative Research: Life in the Dead Zone: Microbial respiration, production, diversity and gene expression in seasonally anoxic estuarine waters. National Science Foundation. \$836,774. 2010-2013. Crump/Cornwell.

Poplar Island Cell 3D and 1A Monitoring program – sediment chemistry. Cornwell. Maryland Port Administration/ Maryland Environmental Service. \$158,820. 2009-2011.

Field campaign to improve water quality model parameterization in the Potomac River. Harris/Cornwell/Boynton/Kaushal. District of Columbia Water and Sewer Authority. HPL: \$29,145. 2010-2011

National Sea Grant Program. Predicting Spatial Impacts of Bivalve Aquaculture on Nutrient Cycling and Benthic Habitat Quality. Newell/Cornwell/Sanford. 2010-2012.

Nutrient fluxes from San Francisco Bay Delta sediments. SFWCA. \$132,538. 2011-2012. Glibert/Cornwell.

Nitrogen Sources in the Coastal Bays Land-Sea Margin: Flux From Tidal Wetland Creeks and Bottom Sediments. Maryland Coastal Bays Program. \$20,000. 2011-2012.

Scaling ecological function to reef development: effects of oyster density on nitrogen removal and biodiversity. NOAA/VIMS Subcontract. \$20,000. 2011-2012.

Poplar Island Vegetation and Sediment Monitoring: Marsh Die Back, Sea-Level Rise and Nitrogen, Phosphorus, Silica Issues – Biogeochemical Component. MES/MPA. \$100,707. 2013-2014.

Sediment Nutrient Fluxes in the San Francisco Bay Delta. SFWCA. \$132,538. 2012-2014.

Linking Structural and Functional Features in Restored Oyster Reefs: A Restoration Project in the Virginia Coast Reserve. NOAA/VIMS Subcontract. \$20,699. 2011-2012.

Cornwell. Benthic Nutrient Cycling at the Coastal Bays Land-Sea Interface. Maryland Coastal Bays Program. \$25,000. 2012-2013.

Environmental controls of sediment-water nitrogen and phosphorus exchange across the Delta-Suisun salinity gradient. Interagency Ecological Program. 2013-2014.

Pond issues and potential for biologically-assisted acid neutralization. MES/MPA. \$250,981.

2014-2015. Cornwell/Stevenson/Staver

Integrating Stakeholder Objectives with Natural System Models to Promote Sustainable Natural Resource Policy. NSF. \$1,405,033. 2015-2019. North/Hood/Wainger/Cornwell.

Integrated Assessment of Oyster Reef System Services: Quantifying Denitrification Rates and Nutrient Fluxes. NOAA-NCBO. 2014-2015. \$115,959. Cornwell/Kellogg.

UMCES Comprehensive Program to Address The Impacts of Conowingo Particulates on the Chesapeake Bay. Exelon Co. \$1,233,314. Cornwell/Sanford/Palinkas/Kemp/Testa/Li 2015-2016. (final contract pending).

Integrated Assessment Of Ecosystem Services Provided By Restored Reefs In Harris Creek, MD: Quantifying Denitrification Rates And Nutrient Fluxes. NOAA-NCBO. \$327,833. 2015-2018. (notified of award for 1<sup>st</sup> two years). Cornwell/Kellogg.

#### 4. Seminars and Presentations (Last 5 Years, Lead Author or Presenter only)

Cornwell, J.C., 2009. Remediation of Chesapeake Bay nitrogen pollution: microbes, marshes and bivalves. Public seminar, VIMS Wachapreague Laboratory.

Cornwell, J.C., and M.S. Owens. 2009. Aquatic Denitrification using MIMS N<sub>2</sub>:Ar. Presentation, CERF Portland OR, Denitrification Workshop.

Cornwell, J.C., R.I.E. Newell and M.S. Owens. 2009. The influence of geoduck clam culture and harvest in Puget Sound on sediment nutrient biogeochemistry. CERF Meeting, Portland OR.

Cornwell, J.C., 2010, Shellfish restoration and aquaculture: nutrient sequestration, remineralization and denitrification. National Shellfisheries Association, Baltimore, MD

Cornwell, J.C., 2010. Biogeochemical processes in natural and constructed tidal wetlands. Seminar, UMCES Appalachian Laboratory.

Cornwell, J.C., 2010. Oysters and water quality. Cambridge MD Rotary Club presentation.

Cornwell, J.C., 2010. Estuarine denitrification: environmental gradients and biogeochemical controls. Faculty seminar, UMCES Chesapeake Biological Laboratory.

Cornwell, J.C., 2010. Aquatic denitrification. Presentation to Choptank Tributary team.

Cornwell, J.C., 2010, Sediment Focusing In Estuarine And Lacustrine Environments: Development of Chesapeake Bay And Lake Champlain Sediment and Biogeochemical Budgets Using <sup>210</sup>Pb. AGU/ASLO Meeting, Portland OR.

Cornwell, J.C., 2010, Denitrification in estuarine sediments. Departmental seminar, University of Puerto Rico Ria Piedras.

- Cornwell, J.C., 2010, Beneficial use of Chesapeake Bay dredged materials: restoration and biogeochemistry. HPL Seminar.
- Cornwell, J.C. 2011, Sedimentary phosphorus and nitrogen fluxes with seasonal changes in estuarine salinity. ASLO Meeting, San Juan PR.
- Cornwell, J.C. and M.S. Owens, 2011, Denitrification in Delaware Bay tidal marshes and creeks. Delaware Estuary Science and Environmental Summit.
- Cornwell, J.C., M.S. Owens, M.L. Kellogg and K. Paynter. 2011. Shellfish restoration and aquaculture: nutrient sequestration, remineralization and denitrification. National Shellfish Association Nat'l Meeting, Baltimore MD.
- Cornwell, J.C., M.S. Owens, M.L. Kellogg. 2011. How does shellfish aquaculture change nutrient balances in Maryland's coastal bays? Presentation, Coastal Bays 2011 STAC Meeting.
- Cornwell, J.C., M.S. Owens, M.L. Kellogg and K. Paynter. 2011. Mitigation of estuarine eutrophication by aquatic habitat restoration. CERF 2011 Daytona Beach (1 of 6 co-authored presentations).
- Cornwell, J.C., M.S. Owens, M.L. Kellogg and K. Paynter. 2011. Mitigation of estuarine eutrophication by aquatic habitat restoration? Oyster Advisory Commission, Stevensville MD.
- Cornwell, J.C., Y. Gao, D. Stoecker and J. O'Neill. 2011. Biogeochemical controls of cyanobacterial blooms in the Sassafra River, Maryland. Maryland HAB Taskforce, Baltimore MD.
- Cornwell, J.C., 2011. Nitrogen transformation processes in estuaries: can we enhance nitrogen removal via estuarine restoration? HPL Faculty Seminar.
- Cornwell, J.C., 2012. Nitrogen transformation processes in estuaries: can we enhance nitrogen removal via estuarine restoration? CBL Faculty Seminar.
- Cornwell, J.C., 2012. Benthic nitrogen transformation processes in Chesapeake Bay. IMET Faculty Seminar.
- Cornwell, J.C., 2012. Benthic nitrogen transformation processes in Chesapeake Bay. AL Faculty Seminar.
- Cornwell, J.C. , M.S. Owens, M.L. Kellogg, Y. Gao and D. Stoecker. 2013. Anthropogenic Influences On Nutrient and Gas Exchange at the Sediment-Water Interface. Invited talk, ASLO Meeting, New Orleans.
- Cornwell, J.C. 2013. Fine-scale nutrient and oxygen gradients in estuaries. Departmental seminar, University of Wisconsin-Milwaukee.

Cornwell, J.C., P.M. Glibert, M.S. Owens. 2013. Nutrient exchange in northern San Francisco Bay sediments: rates, environmental controls and impacts of invasive bivalves. State of the Estuary Conference, Oakland CA.

Cornwell, J.C., M.S. Owens and M.L. Kellogg. 2013. Chesapeake oyster biogeochemistry. Quantifying nitrogen removal by oysters workshop, Wachapreague VA Jan 9-10.

Cornwell, J.C. 2013. Denitrification in Chesapeake Bay sediments/communities and The Conowingo is full: game over? Presentations to the Chesapeake Bay Commission.

Cornwell, J.C. Nitrogen removal by oysters: science and management. UMCES Board of Visitors, June 2013.

Cornwell, J.C. Oyster restoration, aquaculture and nitrogen removal – a biogeochemist's perspective. MD DNR MANTA presentation, February 2014.

#### 5. Symposia Organized/Chaired for Professional Meetings

Advancing Methods for Measuring Denitrification in Terrestrial and Aquatic Systems. Workshop, Horn Point Laboratory 2008. (denitrification.org)

CERF 2011 Daytona Beach. Living Resource - Water Quality Feedbacks: A Win-Win with Biotic Restoration? (co-chaired with C. Cerco).

#### 6. Active Memberships in Professional Societies

American Chemical Society; American Geophysical Union; American Society for Limnology and Oceanography; Coastal and Estuarine Research Federation; The Wetlands Society

### **IV Teaching and Training**

#### 1. University System of Maryland Courses Taught (Last 5 years)

Spring 1996-8, 2000-2, 2005, 2007, 2009, 2011 MEES 698H. Environmental Geochemistry II. (Harvey/Cornwell)

#### A. Graduate Students Supervised as Major Advisor (last 5 years)

#### 2. Degrees Completed (Last 5 years)

Rebecca Holyoke, Ph.D. MEES Program Environmental Science. 2008. “Biodeposition and Biogeochemical Processes in Shallow, Mesohaline Sediments of Chesapeake Bay”

Jennifer O’Keefe, M.S. MEES Program, Environmental Science. 2008. “Sediment Biogeochemistry Across the Patuxent River Estuarine Gradient: Geochronology and Fe-S-P Interactions”

Chris Chick, M.S., MEES Program, UMCP, Environmental Science. 2009. “Benthic oxygen production in the Choptank River estuary”

Emily Seldomridge. MEES Program, UMCP Environmental Science. 2009. “Importance of channel networks in freshwater tidal wetlands, Patuxent River, Maryland”. Co-advisor with Karen Prestegaard.

Owens, Michael, M.S., MEES Program, UMCP, Environmental Geochemistry. Nitrogen Cycling and Controls on Denitrification in Mesohaline Sediments of Chesapeake Bay

Seldomridge, Emily, M.S. MEES Program, Environmental Science. Co-Advised. Graduated 2009. “Importance of channel networks on nitrate retention in freshwater tidal wetlands, Patuxent River, Maryland”.

Chick, Christopher, M.S. MEES Program, Environmental Science. Graduated 2009. Benthic oxygen production in the Choptank River estuary.

Yonghui Gao, Ph.D. MEES Program, Environmental Chemistry. Graduated 2011. High pH effects on nutrient inputs from sediment and cyanobacterial N<sub>2</sub> fixation in a shallow water ecosystem . Co-advisor.

Doon-Yoon Lee (Daniel), Ph.D. Program, Oceanography. Graduated 2014.

3. Students Currently Supervised - none

4. Graduate Student Committee Memberships (85 prior USM committees + 3 non USM)

Allen, J. (Baldwin), UMCP

Clark, B. (Hood), HPL

Day, M. (Harris), CBL

Fine, L. (Santoro), HPL

Gurbisz, Cassie (Kemp), HPL

Jackson, M. (Glibert), HPL

Kesler, K. (Paynter), CBL/UMCP

Laperierre, S. (Santoro), HPL

Markin, E. (Lazur), HPL

Newcomer, Tammy (Kaushal), UMCP

Parker, M. (Lipton/Harrell), UMCP



Shangguan, Yinni (Glibert), HPL  
Staver, L. (Stevenson), HPL  
Young, Dana (Fisher), HPL

#### Research Internships Supervised (out of 14 since 1989)

Zsolt Kormendy	Sea Grant REU 2009
Jessica Hopkins	Sea Grant REU 2011
Molly George	HPL Intern 2011
Zach Nickerson	Sea Grant REU 2014

#### **V Outreach and Service**

##### 1. Editorships

##### 2. Public Service

Advice Sassafras River Association (2008-present)

##### 3. Federal/State/Local Government

Poplar Island Environmental Restoration Program Habit Committee (2004-)  
Model Evaluation Group, Florida Bay SFWMD (2007)  
Little Blackwater Advisory Group, Biological Subchair (2007)  
Steering Committee, Potomac Monitoring Forum, MWCOG (2008)

##### 4. International

December 2008 – Served as “opponent” in Ph.D. defense of Hanna Silvennoinen, University of Kuopio, Finland

##### 5. University System of Maryland

Presentation to National Sea Grant Review Panel for MD Sea Grant, UMCES (2005)  
REU Selection Committee, Maryland Sea Grant  
Environmental Science Applicant Review  
Sea Grant REU Meeting – Puerto Rico Feb 2012

##### 6. UMCES and Laboratory

Analytical Services Committee (1987-1995, 1997; Chair 2002-4)  
Boat Committee (Chair; 1998-1999, 2000-2002; 2004-2005, 2011. Member 1999-2000, 2006-7, 2010-2012)  
Education Committee (2008)  
Faculty Senator (2002-2005)

## 7. Other Professional Service

Recent Journal Reviews: Biogeochemistry, Deep Sea Research, Ecosystems, Environmental Science and Technology, Estuaries and Coasts, Estuarine and Coastal Research, Hydrobiologia, Limnology and Oceanography, Journal of Environmental Quality, Journal of Freshwater Ecology, Journal of Marine Systems, Marine Chemistry, Science of the Total Environment

Steering Committee and Local Chair for NSF RCN Workshop: Advancing Methods for Measuring Denitrification in Terrestrial and Aquatic Systems. This hands-on workshop was held at Horn Point Laboratory in May 2008. (<http://www.denitrification.org/>)

2011 Sea Grant Proposal Panels: New York, New Jersey, Delaware

2013 Sea Grant Proposal Panel: Delaware