# CURRICULUM VITAE

**Jeffrey C. Cornwell**

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## I Education

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|---|---|
| 1976 | B.S., Hobart College, Chemistry with Honors |
| 1983 | Ph.D., University of Alaska, Oceanography |

## II Professional Background

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|---|---|
| 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

Newell, R.I.E., M.S. Owens and J.C. Cornwell. 2002. Influence of simulated bivalve biodeposition and microphytobenthos on sediment nitrogen dynamics: a laboratory study. Limnology and Oceanography 47:1367-1369. [UMCES Contribution No.3595-HPL].

Rooth, J.E., J. C. Stevenson and J.C. Cornwell. 2003. Increased sediment accretion rates following invasion by Phragmites australis: the role of litter. Estuaries 26:475-483. [UMCES Contribution No.3658-HPL]

Petersen, J.E., W. Michael Kemp, R. Bartleson, W.R. Boynton, C.C. Chen, J.C. Cornwell, R.H. Gardner, D.C. Hinkle, E.D. Houde, T.C. Malone, W.P. Mowitt, L. Murray, L.P. Sanford, J.C. Stevenson, K.L. Sundberg and S.E. Suttles. 2003. Multiscale experiments in coastal ecology: improving realism and advancing theory. Bioscience 53:1181-1197.. [UMCES Contribution No.3727-HPL].

Porter, E.T., J. C. Cornwell, L. P. Sanford and R.I.E. Newell. 2004. Effect of Oysters (*Crassostrea virginica*) and Bottom Shear Velocity on Benthic-Pelagic Coupling and Estuarine Water Quality. Marine Ecology Progress Series 271:61-75.

Lomas, M.W., T.M. Kana, H.L. Macintyre, J.C. Cornwell, R. Nuzzi and R. Waters. 2004. Interannual variability of *Aureococcus anophagefferens* in Quantuck Bay, Long Island: natural test of the DON hypothesis. Harmful Algae 3:389-402.

Kana, T.M., M.W. Lomas, H.L. MacIntyre, J.C. Cornwell and C.J. Gobler. 2004. Stimulation of brown tide organism, *Aureococcus anophagefferens*, by selective nutrient additions to *in situ* mesocosms. Harmful Algae 3:377-388.

MacIntyre, H.L., M.W. Lomas, J.C. Cornwell, D.J. Suggett, C.J. Gobler, E.W. Koch and T.M. Kana. 2004. Mediation of benthic pelagic coupling by microphytobenthos: an energy- and material-based model for initiation of blooms of *Aureococcus anophagefferens*. Harmful Algae 3:403-437.

Mason, R.P., E.-H. Kim, and J.C. Cornwell. 2004. Metal Accumulation in Baltimore Harbor: Current and Past Inputs. Applied Geochemistry 19:1801-1825.

Newell, R.I.E., T.R. Fisher, R.R. Holyoke and J.C. Cornwell. 2005. Influence of eastern oysters on N and P regeneration in Chesapeake Bay, USA. Pp 93-120 In: R. Dame and S. Olenin (eds.) The Comparative Roles of Suspension-Feeders in Ecosystems. NATO Science Series IV – Earth and Environmental Sciences.

Kemp, W.M., W.R. Boynton, J.E. Adolf, D.F. Boesch, W.C. Boicourt, G. Brush, J.C. Cornwell, T.R. Fisher, P.M. Glibert, J.D. Hagy, L.W. Harding, E.D. Houde, D.G. Kimmel1, W.D. Miller, R.I.E. Newell, M. R. Roman, E.M. Smith, J.C. Stevenson. 2005. Eutrophication of Chesapeake Bay: Historical trends and ecological interactions. Marine Ecology Progress Series. 303:1-29.

Stribling, J.M., O.A. Glahn, X. Mara Chen and J.C. Cornwell. 2006. Microtopographic variability in plant distribution and biogeochemistry in a brackish marsh system. Marine Ecology Progress Series320:121-129.

Kana, T.M., J.C. Cornwell and L. Zhong. 2006. Determination of denitrification in the Chesapeake Bay from N2 accumulation in bottom water. Estuaries and Coasts 29:222-231.

Mason, R.P., E.H. Kim, J.C. Cornwell and D. Heyes. 2006. An examination of the factors

influencing the flux of mercury, methylmercury and other constitutents from estuarine sediment. Marine Chemistry 102:96-110.

Cook, P., F. Wenzhöfer, R. N Glud, O. Galaktionov, B. Eyre, S. Rysgaard, J.C. Cornwell and M. Huettel. 2006. Measuring denitrification in permeable sediments: Insights from a 2 dimensional simulation analysis and experimental data. L&O Methods 4:294-307.

Porter, E.T., M.S. Owens and J.C. Cornwell. 2006. Effect of manipulation on the biogeochemistry of experimental sediment systems. Journal of Coastal Research 22:1539-1551.

Stribling, J.M., J.C. Cornwell and A. Glahn. 2007. Microtopography in tidal marshes: ecosystem engineering by vegetation? Estuaries and Coasts 30:1007-1015.

Crump, B.C. , C. Peranteau, B. Beckingham, and J. C. Cornwell. 2007. Respiratory succession and community succession of bacterioplankton in seasonally anoxic estuarine waters. Applied and Environmental Microbiology 73:6802-6810

Jordan, T.E. J.C. Cornwell, W.R. Boynton and J.T. Anderson. 2008. Changes in phosphorus biogeochemistry along an estuarine salinity gradient: The iron conveyer belt Limnology and Oceanography, 53:172-184.

2. Technical Reports

Kemp, W.M. and J.C. Cornwell. 2001. Role of benthic communities in the cycling and balance on nitrogen in Florida Bay. Final Report, USEPA. TS-351-03

Cornwell, J.C. and M. Owens. 2002. Triadelphia Sediment-Water Exchange Study. Final report to WSSC. TS-364-02.

Malone, T.C., W.C. Boicourt, J.C. Cornwell, L.W. Harding, Jr., and J. C. Stevenson. 2003. The Choptank River: a mid-Chesapeake Bay index site for evaluationg ecosystem reponses to nutrient management. Final Report to USEPA Contract R826941-01-0

J. C. Cornwell, J. C. Stevenson, L.W. Staver, K. Mielcarek and E. Kiss. 2005. Wetland plant viability and wetland sediment monitoring 2003-2004. Final Report to Maryland Port Administration. TS-484-05

Cornwell, J.C., E. Kiss and M.S. Owens. 2005. Hart-Miller South Cell Pond Chemistry 2004. Final Report to Maryland Port Administration. TS-485-05.

Cornwell, J.C. 2006. Characterization of Bed Sediment Behind the Lower Three Dams on the Susquehanna River: Activities of Anthropogenic Gamma Emitting Isotopes. Final Report to Susquehanna River Basin Commission. TS-507-06

Bailey, E.M., M.S. Owens, W.R Boynton, J.C. Cornwell, E. Kiss, P.W. Smail, H. Soulen, E.

Buck, and M. Ceballos. 2006. Sediment phosphorus flux: pH interactions in the tidal freshwater Potomac River estuary. UMCES Final Report to the Interstate Commission on the Potomac River Basin. TS-505-06

Cornwell, J.C., E. Kiss and M.S. Owens. 2006. Hart-Miller South Cell Chemistry 2005. UMCES Report TS-513-06. UMCES Final Report to Maryland Environmental Services on behalf of the Maryland Port Administration. TS-513-06

Cornwell, J.C. and M.S. Owens. 2007. Development of an estuarine phosphorus sub-model for incorporation into the new-generation Potomac River Environment model: phosphorus data and laboratory experiments. UMCES final report to Limno-Tech Inc. on behalf of the Metropolitan Washington Council of Governments. TS-563-07.

Poplar Report

3. Contracts and Grants (Last 5 years)

1. Awarded

Biocomplexity of Aquatic Systems: Relating Diversity of Microorganisms to Ecosystem Function. National Science Foundation. 8/00-7/05. $257,133. (Co-Investigator, 8% time).

Experimental Pond Biogeochemistry at Hart Miller Island. MES/MD Port Administration. 12/01-3/05. $128,146. (Principal Investigator, 15% time).

Quantifying the Magnitude of Nitrogen and Phosphorus Removal of Oysters in Chesapeake Bay. MD Sea Grant. 02/02 – 01-04. $130,668. (Co-Principal Investigator, 8% time)

Bottom Sediment Erodability in Northern Chesapeake Bay. MD Sea Grant. 02/02 – 09/03. $95,000. (Co-Principal Investigator, 8% time).

SFP2002: Nitrogen and Phosphorus Mass Balance Models and Nutrient Biogeochemistry in Florida Bay. 9/02-8/04. $250,000. NOAA. (Principal Investigator, 8% time)

Scales of Sediment Biogeochemistry in Seagrass Beds: Implications for Restoration and Sustainability. 2/2003 – 7/2005. MD Sea Grant. $128,011. (Co-Investigator, 4% time)

Collaborative Research: Origin of N Limitation in Estuarine Waters. NSF Ecosystems. 2002-2005. $191,924. (Investigator, 8% Time)

Biogeochemical Analysis of Poplar Island dredge sediments. 2003-4. MPA/MES.

$159,556. (Principal Investigator, 10% time)

Anacostia River Geochronology. NOAA/ANSERC. $27,000 (Principal Investigator, 8% time)

Sediment Phosphorus Flux- pH Interactions in the Tidal Freshwater Potomac River Estuary. ICPRB/USEPA. $84,478 (Co-PI, 8% time).

Reactivity of Particulate Phosphorus in the Potomac River. ICPRB/USEPA. 2005-2006. $135,000. (Prinicipal Investigator, 8% time).

Predicting the Restoration Trajectory and Water Quality Value of Benthic Microalgae in Shallow Water Chesapeake Sediments. $138,000. Maryland Sea Grant, 02/2005 - 01/2007. 12% Effort.

Cornwell. Poplar Island Cell 3D Sediment and Plant Monitoring Program; Chemistry. $208, 259. Maryland Port Administration, 07/2005-02/2007.

Cornwell. HMI Interior Sediment Chemistry and Plant Composition. $45,392. Maryland Port Administration. 07/2005-03/2006.

Cornwell. Sediment and Plant Monitoring at the South Cell of Hart Miller Island. Updated Contract. $38,862. 08/2006 – 08/2008.

Stevenson/Cornwell. UMCES Poplar Cell 3D Monitoring Program: Sediment and Plant Dynamics 3rd Year. Maryland Port Administration/ Maryland Environmental Service. $102,345. 2007-2008

Cornwell/Owens. Sediment and Chemistry Technical Support: pH mapping. Maryland Port Administration/ Maryland Environmental Service. $65,832. 2007-2010.

Cornwell/Owens. Sediment and Chemistry Technical Support: Time Course of Acid Generation During Crust Management of Dredge Sediment. Maryland Port Administration/ Maryland Environmental Service. $65,935. 2007-2008

Cornwell/Palinkas. Nutrient Balance in Corsica River Sediments: Improved Estimates of Nutrient Burial and Denitrification. Maryland Department of Natural Resources. $20,000. 07/2007-06/2008.

Cornwell/Kana/Boynton. An Assessement of Processes Controlling Benthic Nutrient Fluxes in the Caloosahatchee River and Estuary and the St. Lucie River and Estuary. South Florida Water Management District. $109,603. 12/2007-5/2008

Cornwell/Newell. Geoduck Biogeochemistry. Washington Sea Grant (to be funded)

4. Seminars and Presentations (Last 5 Years, Lead Author Only)

Cornwell, J.C. 2003. Marsh and sediment influences on estuarine nutrient cycling. Invited seminar, Biogeochemistry Program, Cornwell University.

Cornwell, J.C. 2003. Direct $N_2$ Gas Fluxes in Microphytobenthic Estuarine Sediments: Observations and Challenges in Temperate and Sub-Tropical Systems. Poster Presentation, Microphytobenthos Symposium, Amsterdam.

Cornwell, J.C. and M.S. Owens. 2003. Denitrification and Benthic Nutrient Fluxes in Coastal Sediments: How Do We Scale Up From Individual Core Measurements to Whole System Flux Estimates? ERF Meeting, Seattle, WA.

Cornwell, J.C. Nitrogen Sinks in the Chesapeake Bay: Denitrification and Sediment Burial. 2004. Departmental Seminar, University of Virginia Department of Environmental Science.

Cornwell, J.C., M S. Owens, E. Kiss, and J. C. Stevenson. Pyrite Oxidation in Dredged Estuarine Sediments: Challenges for Beneficial Use. 2004. First International Conference on Ecosystem Restoration, Orlando, Florida.

Cornwell, J.C. and M.S. Owens. The Geochemistry of Dredging in the Chesapeake Bay: Rapidly Accreting Channel Deposits. 2004. Poster, International Estuarine Biogeochemistry Symposium, Solomons, MD

Cornwell, J.C. The Role of Tidal Marshes in Chesapeake Bay Water Quality. 2004. AERS Meeting, Salisbury MD.

Cornwell, J.C. and M.S. Owens. Sediment Chemistry: UMCES/HPL value to Environmental Studies and Innovative Field and Laboratory Gear. 2004. Poster/Presentation at TEDCO Meeting, Salisbury, Maryland.

Cornwell, J. C.; Owens, M. S.; Boynton, W. R., Refining the estimates of denitrification, N burial and P burial in Chesapeake Bay sediments. Invited presentation, ERF 2005

Cornwell, J. C.; Owens, M. S.; Holyoke, R. R., The influence of benthic microalgae on nutrient fluxes and denitrification in nutrient-enriched coastal ecosystems. Invited presentation, ERF 2005

Cornwell, J.C. Environmental Controls on Denitrification in Estuarine Sediments. 2006. Departmental Seminar, University of South Carolina.

Cornwell, J.C. Are Shallow Water Sediments Important To Chesapeake Bay Carbon, Nitrogen And Phosphorus Cycling? Panel Presentation, AERS meeting, UMBC 2006

Cornwell, J.C., M.S. Owens and W.M. Kemp. Nitrogen Biogeochemistry in Florida Bay Sediments. ERF 07

Cornwell, J.C., M.S. Owens and T.M. Kana. Application of the N2:Ar technique to the measurement of denitrification in estuary, reservoir and stream sediments: methodological consideration. ASLO 2007

Cornwell, J.C., M.S. Owens, L. Staver, and J.C. Stevenson. 2007. From bay bottom to marsh creation: the biogeochemistry of Cheaspeake Bay shipping channel sediment used in marsh restoration. Chesapeake Marshlands Research Conference, Cambridge MD

Cornwell, J.C. 2007 .Nitrogen and phosphorus retention: examples from three Chesapeake tidal wetlands. International Wetland Biogeochemical Symposium, Annapolis MD.

5. Symposia Organized/Chaired for Professional Meetings

ASLO 2002, Victoria BC

6. Active Memberships in Professional Societies

American Society for Limnology and Oceanography;
Estuarine Research Federation; American Chemical Society;
Sigma Xi

IV Teaching and Training

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

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

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

1. Degrees Completed (out of 3 Ph.D., 7 M.S.)

Coley, Teresa; M.S..; MEES Program/UMCP); 2003, "Effects of Flow on Sediment Biogeochemical Processes".

Nagel, Eric; M.S., MEES Program UMCP, Environmental Science. 2004. "Nitrogen fixation in benthic microalgal mats: an important internal source of new nitrogen to the benthic communities of Florida Bay".

Burton, Jessica, M.S., MEES Program, UMCP, Environmental Science. 2005. "The effect of benthic microalgal photosynthetic production on nitrogen fluxes across the sediment-water interface in a shallow, sub-tropical estuary".

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”

2. Students Currently Supervised

Owens, Michael, M.S., MEES Program, UMCP, Environmental Geochemistry. Topic: Salinity and oxygen effects on sediment N cycling.

Chick, Chris, M.S., MEES Program, UMCP, Environmental Science. Topic: Benthic microalgae.

Yonghui Gao, Ph.D., Mees Program, UMCP Environmental Chemistry. Topic: TBA

Seldomridge, Emily. MEES Program, UMCP Environmental Science. Topic: TBA.

1. Current Graduate Student Committee Memberships (out of 76 total)

| | | | |
|---|---|---|---|
| Jennifer O’Keefe | M.S. | HPL | MEES |
| Mike Owens | M.S. | HPL | MEES |
| Chris Chick | M.S. | HPL | MEES |
| Emily Seldomridge | M.S. | HPL | MEES |
| Laura Belicka | Ph.D. | CBL | MEES |
| Rebecca Fox | Ph.D. | HPL | MEES |
| Yonghui Gao | Ph.D. | HPL | MEES |

2. Research Internships Supervised

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|---|---|
| Krenn, Janet. | Sea Grant REU 2003. |
| Beckingham, Barb | ara. Sea Grant REU 2004 |
| Hunt, Joe | Sea Grant REU 2005 |
| Halvorson, Rebecca | Sea Grant REU 2006 |
| Maynard-Ford, Miriam | Sea Grant REU 2007 |

5. Outreach and Service

1. Editorships

Biogeochemistry

2. Public Service

Presentation to Cambridge Coast Guard Auxiliary.
EE Center Teacher Group (2006)
Presentation to visiting CBL Docents
Public presentation on Hart Miller Island (2)

3. Federal/State/Local Government

Model Evaluation Group, Boston Harbor/Massachusetts Bay (1999-2002)
New Jersey Sea Grant Science Advisory Committee (2000-2001)
Baltimore Harbor TMDL Advisory Group (2001-2002)
Bay Enhancement Working Group (Dredging-Related) (2001-2003)
USEPA Peer Review Panel: Fellowships - Oceanography and Coastal Processes (03/02)
Poplar Island Environmental Restoration Program Habit Committee (2004-)
Gulf Hypoxia Symposium, New Orleans 2006, Invited Panelist
Model Evaluation Group, Florida Bay SFWMD (2007)
Little Blackwater Advisory Group, Biological Subchair (2007-)

4. International

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

6. UMCES and Laboratory

Analytical Services Committee (1987-1995, 1997; Chair 2002-4)
Boat Committee (Chair; 1998-1999, 2000-2002; 2004-2005, Member 1999-2000, 2006-7)
Discussion Leader, Faculty Colloquium (2002)
Faculty Senator (2002-2005)
Geologist Search Committee (2005)
CBL Chemist Search Committee (2005)
Presentation on research to HPL Office Staff (2006)

7. Other Professional Service

Recent Proposal Reviews: DOE, NSF, Sea Grant Programs (numerous)

Recent Journal Reviews: Biogeochemistry, Deep Sea Research, Estuaries, Estuarine and Coastal Research, Hydrobiologia, Limnology and Oceanography, Marine Chemistry