

Stephen E. MacAvoy

Department of Environmental Science
312 Beeghly Hall, American University
Washington, DC 20016
macavoy@american.edu
Office (202) 558-3003

EDUCATION:

- 2000 Ph.D. Environmental Sciences, concentration in Ecology/Geochemistry
University of Virginia, Charlottesville, VA
Advisor: Dr. Stephen Macko
Dissertation: The exploitation of variable nutrient pools by aquatic predators in tidal freshwater and chemosynthetic communities: a multiple stable isotope and compound specific approach
- 1996 M.S. Environmental Sciences, concentration in Ecology
University of Virginia, Charlottesville, VA
Advisor: Dr. Arthur Bulger
Thesis: Susceptibility of the early life stages of brook trout (*Salvelinus fontinalis*) and adult blacknose dace (*Rhinichthys atratulus*) to acidification in Shenandoah National Park
- 1992 B.S. Biology
Fairfield University, Fairfield, CT
Advisor: Dr. Diane Brousseau
Senior project: Comparison of bivalve hemocytes using the feuglen picromethyl blue staining method

EMPLOYMENT HISTORY/AFFILIATIONS

- current- **Assistant Professor:** Department of Environmental Science,
2003 American University
Chair: Graduate Environmental Studies Program
Developed and directed course structure and lecture material
Directed and co-directed M.S. students and undergraduate research projects
Supervised Undergraduate Teaching and Research Assistants
- current- **Adjunct Doctoral Graduate Faculty:** Department of Biology
2010 State University of Texas, San Marcos
PhD candidate committee member
- 2004 **Visiting Rice Professor:** Center for Environmental Studies, Virginia Commonwealth University
Appointed to encourage collaboration between American University and Virginia Commonwealth University (VCU).
VCU Rice Center: tidal-freshwater biogeochemical research: investigating the influence of anadromous fish in nutrient availability/usage in oligotrophic -tidal freshwater ecosystems
- 2003- **Assistant Professor, full-time temporary:** Department of Biology, American

S.E. MacAvoy PhD, CV

- 2001 University
Developed and directed course structure and lecture material
Co-directed M.S. students and undergraduate research projects
Supervised Undergraduate Teaching and Research Assistants
- 2001- **Postdoctoral Associate:** Department of Marine Sciences, University of Georgia
2000 Coastal biogeochemistry
Organized multiple PI long-term geochemistry projects
Integrated research results to address project goals
Directed field and laboratory research efforts with graduate students and technicians
- 1999- **Teaching Assistant:** Organismal Biology BIO 204, University of Virginia
1997
- 1997 **Instructor:** Department of Biology, University of Virginia
Taught Organismal Biology, BIO 204 (summer course)
Developed lesson plans and supervised Teaching Assistant
- 1996 **Environmental Consulting:** The Environmental Company Inc. Charlottesville, VA.
Contracted for land use surveys to predict costs of United States Air Force training missions. Deployments to: Alabama, Idaho, Kansas, Oklahoma, Mississippi, Nevada, North Carolina, South Carolina and Utah for independent GPS survey work
- 1995 **Teaching Assistant:** Plants and Insects EVSC 425, University of Virginia

Technical skills: stable isotope mass spectrometry (including GC/C/IRMS), gas chromatography/mass spectrometry, ion chromatography, organic geochemical extraction methods, total/dissolved organic carbon analysis, various color chromatography methods for dissolved nutrients and reduction/oxidation species

HONORS AND AWARDS

Outstanding Teaching Award: Biology Department, American University (ENVS 581 Environmental Science II), Fall 2008 (for Spring 2008 term)

Outstanding Teaching Award: Biology Department, American University (BIO 240 Oceanography), Fall 2008 (for Spring 2008 term)

Outstanding Teaching Award: Biology Department, American University (BIO 396/696; Environmental Geology), Spring 2008 (for Fall 2007 term)

Outstanding Teaching Award: Biology Department, American University (BIO 499; Senior Seminar, Fall 2005 (for Spring 2005 term)

Outstanding Teaching Award: Biology Department, American University (CHEM 220; Environmental Resources and Energy), spring 2003 (for Fall 2002 term)

Outstanding Teaching Award: Biology Department, American University (BIO 396; Marine Mammals), Fall 2002 (for Spring 2002 term)

Trout Unlimited Award: For outstanding contributions to cold water fisheries research, May 2000
Award amount \$1,000

PUBLICATIONS

REFEREED ARTICLES

27. MacAvoy SE, V. Bacalan, M. Kazantseva, J. Rhodes, K. Kim. in preparation for Marine Mammal Science. Freshwater habitat for South Florida, USA manatee populations: patterns from sulfur isotopes.
28. Connor NC, Sarraino S, Frantz D, Bushaw-Newton K, MacAvoy SE. in review. Geochemical characteristics of an urban river: influences of an urban landscape. *Applied Geochemistry*.
26. Kraeer K, L Arneson, SE MacAvoy. in review. The intraspecies relationship between tissue turnover and metabolic rate in rats. *Ecological Research*.
25. **MacAvoy** SE, S. Lazarov, K Kraeer and L Arneson. (2012). Sex and strain differences in isotope turnover rates and metabolism in mice (*Mus musculus*). *Canadian Journal of Zoology* 90(8): 984-990.
24. Bushaw-Newton KL, Ewers E, Fortunato CS, Ashley JT, Velinsky DJ, SE **MacAvoy**. (2012). Bacterial community profiles from sediments of the Anacostia River using metabolic and molecular analyses. *Environmental Science and Pollution Research* 19 (4): 1271-1279. Appeared in electronic format, Nov 2011: DOI: 10.1007/s11356-011-0656-4
23. Hanson N, M. Fogel, D Fong, SE **MacAvoy**. (2010). Marine nutrient transport: anadromous fish migration linked to the freshwater amphipod (*Gammarus fasciatus*). *Canadian Journal of Zoology* 88:546-552.
22. **MacAvoy** SE, Ewers E, Bushaw-Newton K. (2009). Nutrients, oxygen dynamics, stable isotopes and fatty acid concentrations of a freshwater tidal system, Washington, D.C. *Journal of Environmental Monitoring* 11:1622-1629.
21. **MacAvoy** SE, Garman GC, Macko SA. (2009). Anadromous fish as marine nutrient vectors. *Fish. Bull.* 107:165-174.
20. **MacAvoy** SE, Carney RS, Morgan E, Macko SA. (2008). Stable isotope variation among the mussel *Bathymodiolus childressi* and associated heterotrophic fauna at four cold-seep communities in the Gulf of Mexico. *Journal of Shellfish Research* 27(1), 147-151.
19. **MacAvoy** SE, Morgan E, Carney RS, Macko SA. (2008). Chemoautolithotrophic production as a fuel for heterotrophs in hydrocarbon seeps: an examination of mobile benthic fauna and seep residents. *Journal of Shellfish Research* 27(1), 153-161.
18. Baker DM, **MacAvoy** SE, Kim K. (2007). Relationship between water quality, $\delta^{15}\text{N}$, and aspergillosis of Caribbean sea fan corals. *Marine Ecology Progress Series*, 343, 123-130.

S.E. MacAvoy PhD, CV

17. Tarboush, R. A., **MacAvoy**, S. E., Macko, S. A., Connaughton V. (2006). Contribution of catabolic tissue replacement to the turnover of stable isotopes in *Danio rerio*. *Canadian Journal of Zoology*, *84*, 1453-1460.
16. **MacAvoy**, S. E., Arneson, L. S., & Bassett, E. (2006). Correlation of metabolism with tissue carbon and nitrogen turnover rate in small mammals. *Oecologia*, *150*, 190-201.
15. Arneson, L. S., **MacAvoy**, S., & Basset, E. (2006). Metabolic protein replacement drives tissue turnover in adult mice. *Canadian Journal of Zoology*, *84*, 983-993.
14. Weston, N. B., Porubsky, W. P., Samarkin, V. A., Erickson, M., **MacAvoy**, S. E., & Joye, S. B. (2006). Porewater stoichiometry of terminal metabolic products, sulfate, and dissolved organic carbon and nitrogen in estuarine intertidal creek-bank sediments. *Biogeochemistry*, *77*, 375-408.
13. Arneson, L. S. & **MacAvoy**, S. E. (2005). Carbon, nitrogen, and sulfur diet-tissue discrimination in mouse tissues. *Canadian Journal of Zoology*, *83*, 989-995.
12. **MacAvoy**, S. E., Macko, S. A., & Arneson, L. S. (2005). Growth versus metabolic tissue replacement in mouse tissues determined by stable carbon and nitrogen isotope analysis. *Canadian Journal of Zoology*, *83*, 631-641.
11. **MacAvoy**, S. E., Fisher, C. R., Carney, R. S., & Macko, S. A. (2005). Nutritional associations among fauna at hydrocarbon seep communities in the Gulf of Mexico. *Marine Ecology Progress Series*, *292*, 51-60.
10. **MacAvoy**, S. E. & Bulger, A. J. (2004). Sensitivity of blacknose dace (*Rhinichthys atratulus*) to moderate acidification events in Shenandoah National Park, USA. *Water Air and Soil Pollution*, *153*, 125-134.
9. **MacAvoy**, S. E., Macko, S. A., & Carney, R. S. (2003). Links between chemosynthetic production and mobile predators on the Louisiana continental slope: stable carbon isotopes of specific fatty acids. *Chemical Geology*, *201*, 229-237. **Selected paper** for inclusion in Elsevier's *Journal of Geobiology* 2003.
8. **MacAvoy**, S. E., Macko, S. A., & Joye, S. B. (2002). Fatty acid carbon isotope signatures in chemosynthetic mussels and tube worms from Gulf of Mexico hydrocarbon seep communities. *Chemical Geology*, *185*, 1-8.
7. **MacAvoy**, S. E., Carney, R. S., Fisher, C. R., & Macko, S. A. (2002). Use of chemosynthetic biomass by large, mobile, benthic predators in the Gulf of Mexico. *Marine Ecology-Progress Series*, *225*, 65-78.
6. **MacAvoy**, S. E., Macko, S. A., & Garman, G. C. (2001). Isotopic turnover in aquatic predators: Quantifying the exploitation of migratory prey. *Canadian Journal of Fisheries and Aquatic Sciences*, *58*, 923.
5. **MacAvoy**, S. E., Macko, S. A., McIninch, S. P., & Garman, G. C. (2000). Marine nutrient contributions to freshwater apex predators. *Oecologia*, *122*, 568-573.
4. **MacAvoy**, S. E., Macko, S. A., & Garman, G. C. (1998). Tracing marine biomass into tidal freshwater ecosystems using stable sulfur isotopes. *Naturwissenschaften*, *85*, 544-546.

S.E. MacAvoy PhD, CV

3. **MacAvoy**, S. E. & Zaepfel, R. C. (1997). Effects of tricaine methanesulfonate (MS-222) on hematocrit: First field measurements on blacknose dace. *Transactions of the American Fisheries Society*, 126, 500-503.
2. **MacAvoy**, S. E. & Bulger, A. J. (1995). Survival of brook trout (*Salvelinus fontinalis*) embryos and fry in streams of different acid sensitivity in Shenandoah National Park, USA. *Water Air and Soil Pollution*, 85, 445-450.
1. Dennis, T. E., **MacAvoy**, S. E., Steg, M. B., & Bulger, A. J. (1995). The association of water chemistry variables and fish condition in streams of Shenandoah National Park (USA). *Water Air and Soil Pollution*, 85, 365-370.

ABSTRACTS IN CONFERENCE PROCEEDINGS

SE **MacAvoy**, E Ewers, and KL Bushaw-Newton. 2007. Biogeochemical snapshot of an urban water system: The Anacostia River, Washington DC. EOS Transactions of the American Geophysical Union 88 (52) B51D-03

SE **MacAvoy**, E Morgan, Fisher CR, Carney RS, Macko SA. 2006. Chemoautolithotrophic Primary Production as a Fuel for Heterotrophs in Hydrocarbon Seeps: an Examination of Mobile Benthic Fauna and Seep Residents. EOS Transactions of the American Geophysical Union 87(36) B43A

E Morgan, S **MacAvoy**, R Carney. 2005. Importance of Chemolithoautotrophic Production to Mobile Benthic Predators in the Gulf of Mexico. EOS Transactions of the American Geophysical Union 85(18) H51E-01

SE **MacAvoy**, CR Fisher, RS Carney, SA Macko. 2004. Nutritional associations among fauna at hydrocarbon seep communities in the Gulf of Mexico. EOS Transactions of the American Geophysical Union 85(17) B51A-01

S.E. **MacAvoy**, T. Jamil, S.A. Macko and L. Arneson. 2003 "Effects of metabolic rate and diet quality upon tissue carbon, sulfur and nitrogen stable isotope turnover rate in small mammals" EOS Transactions of the American Geophysical Union 84: 46 (B31E-0366)

L. Arneson, S.A. Macko and S.E. **MacAvoy**. 2003 " Effects of metabolic rate and diet quality upon tissue sulfur stable isotope turnover rate in small mammals". 2003. EOS Transactions of the American Geophysical Union 84: 46 (B31D-0343)

Tarboush R, SE **MacAvoy**, SA Macko and VP Connaughton. 2002. Turnover of stable isotopes due to growth and metabolism in zebrafish, *Danio rerio*. EOS Transactions of the American Geophysical Union 83: 19 (AGU B31A-11)

OTHER: PEER REVIEWED "GRAY" LITERATURE (final research reports)

MacAvoy SE and Bulger AJ: **1999**. Susceptibility of the early life stages of brook trout, *Salvelinus fontinalis*, and adult blacknose dace, *Rhinichthys atratulus*, to acidification in Shenandoah National Park. Chapter 6A, in: Bulger AJ, BJ Cosby, AC Dolloff, KN Eshleman, JR Webb, JN Galloway. 1999. The "Shenandoah National Park: Fish in Sensitive Habitats (SNP:FISH) " Final Report. An Integrated Assessment of Fish Community Responses to Stream Acidification. 570 pp. and interactive computer model.

S.E. MacAvoy PhD, CV

Bulger AJ, Steg M, Dennis TE, **MacAvoy** SE: **1999**. Stream chemistry and fish species richness in Shenandoah National Park. Chapter 6C, in: Bulger AJ, BJ Cosby, AC Dolloff, KN Eshleman, JR Webb, JN Galloway. 1999. The "Shenandoah National Park: Fish in Sensitive Habitats (SNP:FISH) " Final Report. An Integrated Assessment of Fish Community Responses to Stream Acidification. 570 pp. and interactive computer model.

Fisher CR, Bergquist DC, Freytag JR, Ward RT, Andras JP, Begly B, Schaeffer S, Nelson K, McMullin E, Carney RC, **MacAvoy** SE, Macko SA, Van Horn M: **2000**. Long lives and deep roots: Tubeworms in Gulf of Mexico chemosynthetic communities. Mineral Management Service ITM abstracts

MacAvoy SE and Bushaw-Newton K. **2007**. Nutrient flow and biological dynamics in the Anacostia River. Final Report Water Resources Research Institute, Washington, DC

Bushaw-Newton, K and **MacAvoy** SE. **2009**. Assessing the distribution of synthetic organics and the degradation of polyaromatic hydrocarbons in the Anacostia River through microbial and stable isotope studies. Final Report Water Resources Research Institute, Washington, DC.

MacAvoy SE. 2013. Hormone disruption and environmental pollutants in Anacostia and Potomac River fish, Washington DC. Final Report Water Resources Research Institute, Washington, DC.

LECTURES: PAPERS PRESENTED AT PROFESSIONAL MEETINGS (ORAL). *indicates presenter

12/14/07 American Geophysical Union Annual Meeting, San Francisco, CA
"Biogeochemical snapshot of an urban water system: The Anacostia River, Washington DC"
S.E. **MacAvoy***, E. Ewers, and KL Bushaw-Newton

8/28/03 10th Deep-sea Biology Symposium, Coos Bay, OR
"Isotopically traced scenarios of background/foreground trophic interaction at Gulf of Mexico hydrocarbon seeps: Exporting or Importing?"
Carney* R.S., S.E. **MacAvoy**, S.A. Macko, C.R. Fisher

3/27/03 Marine Benthological Society Annual Meeting, Mystic, CT
"Anadromous fish as marine nutrient vectors to the tidal freshwater fish communities of Virginia: bulk and compound specific isotope analysis"
S.E. **MacAvoy***, S.P. McIninch, G.C. Garman, S.A. Macko

8/20/02 American Fisheries Society Annual Meeting, Baltimore, MD
"Anadromous fish are marine nutrient vectors to the tidal freshwater fish communities of Virginia: Evidence from bulk and compound specific isotope analysis"
S.E. **MacAvoy***, S.P. McIninch, G.C. Garman, S.A. Macko

11/5/01 Estuarine Research Federation, Fall Meeting, St. Pete Beach FL
"Groundwater inputs and sediment biogeochemical processes in Georgia and South Carolina coastal ecosystems" S.B. Joye, S.E. **MacAvoy**, W. Porubsky, N. Weston*

5/29/01 American Geophysical Union, Spring Meeting, Boston, MA
"Groundwater-derived nutrients and microbial community processes in pristine and developed coastal areas in the southeast USA" S.E. **MacAvoy**, N. Weston, W. Porubsky, S.B. Joye*

S.E. MacAvoy PhD, CV

1/27/00 American Society of Limnology and Oceanography/American Geophysical Union, Annual Meeting, San Antonio, TX
"Stable isotope analysis of chemosynthetic and heterotrophic animals associated with hydrocarbon seeps in the Gulf of Mexico" S.A. Macko, S.E. **MacAvoy***, R.S. Carney, C.R. Fisher

5/16/97 Chesapeake Regional Association of Biogeochemists, Gloucester Point, VA
"Determination of freshwater vs. marine contributions to exotic aquatic predators in tidal river ecosystems of Virginia" S.E. **MacAvoy***, S. A. Macko and G.C. Garman

2/4/99 American Society of Limnology and Oceanography, Annual Meeting, Santa Fe, NM
"Quantifying the contribution of anadromous clupeid fish to the diet of an introduced, apex predator (blue catfish, *Ictalurus furcatus*) in tidal freshwater using stable isotopes" S.E. **MacAvoy***, S. A. Macko, S.P. McIninch, G.C. Garman

6/2/95 East Coast Trout Culture and Management Workshop II, American Fisheries Society, State College, PA
"Acidification effects on survival of brook trout (*Salvelinus fontinalis*) embryos and fry in Shenandoah National Park" S.E. **MacAvoy*** and A.J. Bulger

4/22/94 American Fisheries Society Meeting of the Virginia and Potomac Chapters, Luray, VA
"Coincidence of low pH, high aluminum stream flow and high mortality of brook trout sac fry in Shenandoah National Park" S.E. **MacAvoy*** and A.J. Bulger

LECTURES: PAPERS PRESENTED AT PROFESSIONAL MEETINGS (POSTERS)

*indicates presenter

12/11/13 American Geophysical Union, Annual Meeting (H31H-1282). San Francisco CA.
"Geochemical characteristics of an urban river: Geochemical contamination and urban stream syndrome" Nicholas P. Connor, Stephanie L. Sarraino, Deborah E. Frantz, Karen Bushaw-Newton, Stephen E. **MacAvoy***

12/7/12 American Geophysical Union, Annual Meeting. San Francisco CA. "Patterns of mortality among South Florida Manatees: Evidence from oxygen and sulfur and isotopes"
Stephen E. **MacAvoy***, Vince Bacalan, Mary Kazantseva, Jon Rhodes, Kiho Kim

12/5/11 American Geophysical Union, Annual Meeting. San Francisco CA. " Biogeochemical characteristics of a polluted urban stream (Anacostia River, Washington DC, USA): inorganic minerals, nutrients and allochthonous vs. autochthonous production"
S.L. Sarraino, D.E. Frantz, K Bushaw-Newton and S.E. **MacAvoy***

12/16/10 American Geophysical Union, Annual Meeting. San Francisco CA. "Seasonal nutrient dynamics in the Anacostia River (D.C., USA): geochemistry and hydrocarbon biomarkers"
S.L. Sarraino, D.E. Frantz and S.E. **MacAvoy***

12/14/09 American Geophysical Union, Annual Meeting. San Francisco CA. "Ecosystem connectivity: anadromous fish migration linked to freshwater amphipods"
S.E. **MacAvoy***, ML Fogel, D Fong, N Hanson.

S.E. MacAvoy PhD, CV

5/23-26/06 American Geophysical Union. Joint assembly with NABS and others. Baltimore MD.
"Chemoautolithotrophic Primary Production as a Fuel for Heterotrophs in Hydrocarbon Seeps: an Examination of Mobile Benthic Fauna and Seep Residents"
S.E. **MacAvoy***, E. Morgan, C.R. Fisher, R.S. Carney, S.A. Macko

5/27/05 American Geophysical Union, Joint assembly with NABS and others, New Orleans, LA
"Importance of Chemolithoautotrophic Production to Mobile Benthic Predators in the Gulf of Mexico"
E. Morgan*, S.E. **MacAvoy**, R.S. Carney

5/21/04 American Geophysical Union, International meeting, Montreal CANADA
Nutritional associations among fauna at hydrocarbon seep communities in the Gulf of Mexico
S.E. **MacAvoy***, C.R. Fisher, R.S. Carney, S.A. Macko

4//04 International conference on use of isotopes in ecological studies, Wellington, NZ
"Effects of metabolic rate and diet quality upon tissue sulfur stable isotope turnover rate in small mammals"
L. Arneson*, S.E. **MacAvoy**, S.A. Macko

12/10/03 American Geophysical Union, Annual Meeting, San Francisco, CA
"Effects of metabolic rate and diet quality upon tissue carbon, sulfur and nitrogen stable isotope turnover rate in small mammals"
S.E. **MacAvoy***, T. Jamil, S.A. Macko and L. Arneson

"Effects of metabolic rate and diet quality upon tissue sulfur stable isotope turnover rate in small mammals"
L. Arneson, S.A. Macko and S.E. **MacAvoy***

3/27/03 Marine Benthological Society Annual Meeting, Mystic, CT
"Assessing pollution in gorgonians using stable isotope analysis"
D.M. Baker*, S.E. **MacAvoy**, S.A. Macko, K. Kim

5/29/02 American Geophysical Union, Spring Meeting, Washington, DC
"Turnover of stable isotopes due to growth and metabolism in Zebrafish, *Danio rerio*" R. Tarboush*, S.E. **MacAvoy**, S.A. Macko, V. Connaughton

10/01 2nd International Symposium on Hydrothermal Vent Biology, Brest, France. "Change in tissue stable isotope composition in transplanted hydrocarbon seep mussels. S. Dattagupta, E.B. Smith, S.A. Macko, S.E. **MacAvoy**, C.R. Fisher*

8/4/00 LTER all scientist meeting, Snowbird UT
"Insights into trophic dynamics and organic matter preservation through compound specific isotope analysis" S.A. Macko*, S.E. **MacAvoy**, M.J. Geyer

12/13/00 American Geophysical Union, Fall Meeting, San Francisco, CA
"Chemosynthetic production utilized by Gulf of Mexico heterotrophs: carbon isotope compositions of specific fatty acids" S.E. **MacAvoy***, S.A. Macko, S.B. Joye, C.R. Fisher, R.C. Carney

1/23-25/00 American Society of Limnology and Oceanography/American Geophysical Union, Annual Meeting, San Antonio, TX
"Quantifying the contribution of anadromous fish to the diet of an introduced predator (blue catfish) in tidal freshwater using stable isotopes." S.E. **MacAvoy***, S.A. Macko, S.P. McIninch, G.C. Garman

S.E. MacAvoy PhD, CV

8/29-9/2/99 American Fisheries Society, Annual Meeting, Charlotte, NC

"Stream chemistry and fish species richness in Shenandoah National Park (Virginia, U.S.A.)" A.J. Bulger*, M.B. Steg, T.E. Dennis, S.E. **MacAvoy**

6/26-30/95 Acid Reign '95? Goteborg, Sweden.

"Survival of brook trout (*Salvelinus fontinalis*) embryos and fry in streams of different acid sensitivity in Shenandoah National Park, USA." S.E. **MacAvoy** and A.J. Bulger*

"Water chemistry variables as predictors of fish condition factor in Shenandoah National Park (U.S.A.)" T.E. Dennis, S.E. **MacAvoy**, M.B. Steg, and A. J. Bulger*

8/13-19/95 Gordon Conference, NH

"Bioassays with brook trout (*Salvelinus fontinalis*) embryos and fry in streams of different acid sensitivity in Shenandoah National Park, USA" S.E. **MacAvoy** and A.J. Bulger*

"Water chemistry variables as predictors of blacknose dace (*Rhinichthys atratulus*) condition factor in Shenandoah National Park (U.S.A.)" T.E. Dennis*, S.E. **MacAvoy**, M.B. Steg, and A.J. Bulger

LECTURES: INVITED

1/28/14 George Mason University, Biology Department

"Life without light: chemosynthesis versus photosynthesis in the deep Gulf of Mexico"

3/22/10 George Mason University, Department of Environmental Science and Policy

"Hydrocarbon seep communities in the Gulf of Mexico: photosynthesis vs. chemosynthesis in the deep ocean".

5/8/09 Virginia Commonwealth University, Center for Environmental Studies, First Annual Rice Research Symposium

"Ecosystem connectivity: anadromous fish migration linked to freshwater amphipods"

9/5/06 University of Virginia, Department of Environmental Science

"Exploring the Deep-sea communities of the Gulf of Mexico"

4/21/06 Virginia Commonwealth University, Center for Environmental Studies

"Anadromous fish as nutrient vectors to tidal freshwater: seasonal pulse utilized by primary producers and consumers"

10/5/04 Fairfield University, Environmental Studies Program, Seminar Series (honorary).

"Mysteries of the Deep Ocean: Life Without Light"

2/5/02 University of Virginia, Department of Environmental Sciences

"Life without light: Exploring the deep-sea communities in the Gulf of Mexico"

10/12/01 Georgetown University, Biology Department (honorary)

"Life without light: Exploring the trophic interactions among chemosynthetic and heterotrophic fauna in the Gulf of Mexico"

S.E. MacAvoy PhD, CV

11/23/98 Fairfield University, Marine Science Program and Department of Biology (honorary)
"Life without light: Exploring the deep-sea communities in the Gulf of Mexico"

10/18/98 Virginia Commonwealth University, Center for Environmental Studies
"Investigations of hydrocarbon seep communities using stable isotopes"

RESEARCH

SPONSORED RESEARCH: EXTERNAL GRANTS RECEIVED: Approximately \$142,000 in external funding since 2006.

USGS Water Resources Research Institute (WRII). 2014/15. "Geochemical characteristics of an urban river: detecting the influences of an urban landscape"

- Award amount; \$15,000

National Fish and Wildlife Service, through Washington DC Fire Department. 2012-2014. "Nutrient, TSS and Organic Carbon Reduction Associated with Aqualok".

- Award amount; \$42,215 total. Year 1 (2012/13) \$25,902; Year 2 (2013/14) \$16,313.

USGS Water Resources Research Institute. 2012/13 "Episodic changes in water chemical composition and nutrient loading in the Anacostia River".

- Award amount; \$15,000

USGS Water Resources Research Institute. 2011/12. "Hormone disruption and environmental pollutants in Anacostia and Potomac River fish, Washington DC".

- Award amount; \$15,000

USGS Water Resources Research Institute 2010/11. "Determination of Seasonal Source Variation of Hydrocarbons, Fatty Acids, Organics and Nutrients in the Anacostia River: stable isotope ratios of individual compounds"

- Award amount; \$15,000

USGS Water Resources Research Institute 2008/09. "Assessing the distribution of synthetic organics and the degradation of polyaromatic hydrocarbons in the Anacostia river through microbial and stable isotope studies" (co-PI with Prof. Bushaw-Newton)

- Award amount; \$15,000

Cave Conservancy of Virginia: 2007/08. "Metabolic Differences between Surface and Cave Amphipods: The Evolution of Life Style Differences".

- Award amount; \$10,000

USGS Water Resources Research Institute 2006/07. "Nutrient flow and biological dynamics in the Anacostia River (CO-PI with Karen Bushaw Newton)".

- Award amount; \$15,000 total

University of Virginia Moore Research Grant: 1998. "The contribution of anadromous fish to the diets of introduced piscivores in the tidal freshwater regions of Virginia."

- Award amount; \$2,500

SPONSORED RESEARCH: INTERNAL GRANTS RECEIVED

S.E. MacAvoy PhD, CV

American University Mellon Grant: 2013. Evaluation of “green roof” effectiveness for nitrogen, organic carbon and suspended solid reduction in runoff from precipitation events: The American University test case

- Award amount; \$2,500

American University Faculty Research Support Grant: 2011. Relationships between geographic distribution, trophic structure and toxins in Southwest FL manatees

- Award amount; \$9,851

American University Mellon Grant: 2007. Correlations between metabolic rate and protein/carbohydrate uptake in tissues

- Award amount; \$2,053

American University Mellon Grant: 2006. Marine nutrient contributions to two tidal creeks in Virginia: spawning marine fish as nutrient vectors to freshwater ecosystems

- Award amount; \$2,000

American University, Dean's Undergraduate Research Award . 2004. \$2000 for Eric Morgan (undergraduate Environmental Science major).

- \$500 for SE MacAvoy and \$500 for supplies. \$3000 total

American University Awards for Faculty Creative Activity and Research: 2003. Marine primary production fueling freshwater ecosystems: Declining river herring as marine nutrient vectors for eastern coastal freshwater rivers

- Award amount; \$2,000

American University Mellon Grant: 2003. The importance of Gulf of Mexico hydrocarbon seepage as an energy source for mobile benthic fauna

- Award amount; \$2,000

American University Mellon Grant: 2003. Analysis of growth and tissue replacement rates by stable sulfur isotope turnover. Co-principal investigator with Dr. Lynn Arneson, American University

- Award amount; \$2,000

American University Mellon Grant: 2002. Metabolic turnover rate and nutrient allocation as assessed by multiple stable isotope analysis. Co-principal investigator with Dr. Lynn Arneson, American University

- Award amount; \$1,800

American University Senate Grant: 2002. Links between anthropogenic nutrient loading and gorgonid aspergillosis disease in the Florida Keys. Co-principal investigator with Dr. Kiho Kim, American University

- Award amount; \$10,000

American University Mellon Grant: 2002. Quantification of nutrient allocation in mice: metabolic rates of turnover in different tissues. Co-principal investigator with Dr. Lynn Arneson, American University

- Award amount; \$2,000

SPONSORED RESEARCH: GRANTS PENDING

SPONSORED RESEARCH: GRANTS DENIED (external only)

USGS Water Resources Research Institute (WRII). 2014. Evaluation of “green roof” effectiveness for nitrogen, phosphorus and suspended solid reduction in runoff from precipitation events: The American University test case

- Award sought; \$15,000

NSF Governing for Sustainability in Coastal Communities: Conceptual Foundations and Field Testing in the Mid-Atlantic and Great Lakes

- Award sought; \$440,000 (approx)

EPA STAR Grant. 2012-2015. Sustainable Chesapeake: A Community-Based Approach to Stormwater Management using Green Infrastructure.

- Award sought; \$688,601

National Science Foundation. Submitted July 2010. Nutrient quality and incorporation rate: Effects of metabolic rate and nutrient source on tissue carbon, nitrogen and sulfur stable isotope turnover rate in small mammals.

- Award sought; \$431,000 (approx)

Maryland Sea Grant (NOAA). Submitted 2010. Impact of combined sewage outflows on the biogeochemistry of an urban stream: hydrocarbon, fatty acid and nutrient distribution in the Anacostia River

- Award sought; \$31,083

National Science Foundation NSF GPG 1-2008. 12/2008. Ecology of avian diseases: the influence of migration on diversity, population dynamics, and geospatial genetic structure of host-pathogen-vector interactions.

- Award sought \$94,815

Cave Conservancy of Virginia: 2/07. Metabolic differences between surface and cave amphipods: The evolution of life style differences.

- Award sought; \$10,000

National Science Foundation: 2/05. The importance of chemosynthetic production to benthic crustaceans and gastropods in Gulf of Mexico hydrocarbon seepage areas

- Award sought; \$118,000 per year for 3 years

National Science Foundation: 7/04. Effects of Metabolic Rate and Nutrient Source on Tissue Carbon, Nitrogen and Sulfur Stable Isotope Turnover Rate in Small Mammals. Co-principal investigator with Dr. Lynn Arneson, American University

- Award sought; \$249,000 over two years

National Science Foundation: 7/03. Effects of metabolic rate and diet quality upon tissue carbon, sulfur and nitrogen stable isotope turnover rate in small mammals. Co-principle investigator with Dr. Lynne Arneson, American University

- Award sought; \$277,000 (over two years)

National Science Foundation: 7/03. Investigations of the role of small dams on the organic matter biogeochemistry of small stream systems. Co-principle investigator with Dr. Bushaw-Newton, American University

S.E. MacAvoy PhD, CV

- Award sought; \$265,000 (over two years)

EarthWatch Institute: pre-proposal submitted November 2002. Marine primary production fueling freshwater ecosystems: River herring as nutrient vectors for Eastern coastal freshwater river ecosystems in Virginia. Co-principal investigator with Drs. Stephen Macko, University of Virginia and Greg Garman, Virginia Commonwealth University

- Award sought; \$27,000 renewed yearly

National Institute of Health: submitted October, 2002. Metabolic turnover rate and nutrient allocation as assessed by multiple stable isotope analysis. Co-principal investigator with Dr. Lynne Arneson, American University

- Award sought; \$783,000 (over 5 years)

SPONSORED RESEARCH: GRANTS IN PREPARATION

NSF Division of Integrative Organismal Systems Preliminary Proposal 1/17/2014. "Nutrient quality and incorporation rate: Effects of Metabolic Rate and Nutrient Source on Tissue Carbon, Nitrogen and Sulfur Stable Isotope Turnover Rate in Small Mammals"

NSF Water Sustainability and Climate. Effectiveness of green roof substrates for reducing nitrogen and suspended solids in storm water runoff.

OTHER RESEARCH:

RECENT STUDENT GRANTS

Hemlinich Award. 2011. Kimmy Kraeer (MS Biology)

COSMOS Foundation. 2010. Graduate student Stephanie Sarriano. "Seasonal nutrient dynamics in the Anacostia as shown by stable isotopes and fatty acid biomarkers"

- Award received; \$2,000

Dean's undergraduate research award. 2010. Deborah Frantz (BS Marine Science)

Hemlinich Award. 2009 Stephen Lazeroff (MS Biology)

Grebe Award, 2008. American University Biology Department undergraduate student Andrew Frank. "Surface versus cave Amphipods: metabolic adaptation to the cave environment"

- Award received; \$1,500

COSMOS Foundation. 2008. Surface versus Cave Amphipods: metabolic adaptation to the cave environment

- Award received; \$2,000

Cave Conservancy Foundation of Virginia, Fellowship 2007/08. graduate student Natalie Hanson. "Quantifying Metabolic Adaptation to the Cave Environment: a Stable Isotope Approach"

- Awarded received; \$5,000

RESEARCH CRUISES

S.E. MacAvoy PhD, CV

2002 June. RV Seward Johnson II/Johnson Sea-Link Submersible (Harbor Branch Oceanographic). Ocean Exploration Cruise to Gulf of Mexico Hydrocarbon Seeps

2002 March. RV Seward Johnson II/Johnson Sea-Link Submersible (Harbor Branch Oceanographic). Role of nutrient availability on reproduction of mixotrophic mussels (*Bathymodiolus childressi*) in Gulf of Mexico chemosynthetic communities

1998 July. RV Edwin Link/Johnson Sea-Link Submersible (Harbor Branch Oceanographic), Dives 4029-4054. Stability and Change: chemosynthetic communities in the Gulf of Mexico

MEDIA APPEARANCES

Al Arabiya News Channel. 6/7/2012. Views on state shift in earth's biosphere. To air on 6/9/12 <http://www.youtube.com/watch?v=rqH-ilG08jA>

PressTV (English language Iran). 3/5/2012. BP faces heavy fines in Gulf oil spill settlement. <http://www.presstv.ir/detail/230178.html>

TV Globo / Globo News (Brazil). 1/18/2011. Climate change and extreme weather events. <http://globonews.globo.com/Jornalismo/GN/0,,MUL1642294-17665-310,00.html>

National Public Radio, Morning edition. 10/2/2006. Interview about snakehead catfish in the DC area.

FOX NEWS CHANNEL 5, WTTG TV. 9/18/2006. Fish used to detect attacks on water supply.

TEACHING RESPONSIBILITIES

Courses taught between F2001 and S2003 by semester

Fall 2001	BIO 110 General Biology I (two sections) BIO 220 General Biology II
Spring 2002	BIO 100 Great Experiments in Biology (two sections of 75) BIO 396 Marine Mammals
Summer 2002	BIO 100 Great Experiments in Biology (session 1) BIO 100 Great Experiments in Biology (session 2)
Fall 2002	BIO 100 Great Experiments in Biology CHEM 220 Environmental Resources and Energy ENVS-102 Seminar in Environmental Issues
Spring 2003	BIO 100 Great Experiments in Biology CHEM 100 Molecular World ENVS-102 Seminar in Environmental Issues

Courses taught since 2003 by semester

S.E. MacAvoy PhD, CV

Fall 2003	BIO 100 Great Experiments in Biology
Spring 2004	CHEM 400 Geology CHEM 100 Molecular World ENVS 581 Environmental Science II
Fall 2004	BIO 100 Great Experiments in Biology (two sections of 75 each)
Spring 2005	ENVS 581 Environmental Science II BIO 499 Senior Seminar BIO 100 Great Experiments in Biology
Summer 2005	BIO 100 Great Experiments in Biology
Fall 2005	BIO 100 Great Experiments in Biology ENVS 581 Environmental Science II ENVS 696 Environmental Geology
Spring 2006	Junior Leave
Summer 2006	BIO 100 Great Experiments in Biology
Fall 2006	BIO 240 Oceanography ENVS 696 Environmental Problem Solving
Spring 2007	BIO 240 Oceanography (two sections of 45) ENVS 581 Environmental Science II
Summer 2007	BIO 240 Oceanography
Fall 2007	BIO 240 Oceanography ENVS 696 Environmental Geology
Spring 2008	BIO 240 Oceanography (two sections of 45) ENVS 581 Environmental Science II
Summer 2008	BIO 240 Oceanography
Fall 2008	ENVS 396/696 Science and Policy of Energy and Climate BIO 240 Oceanography
Spring 2009	ENVS 581 Environmental Science II BIO 240 Oceanography
Summer 2009	BIO 240 Oceanography
Fall 2009	ENVS 581 Environmental Science II ENVS 396/696 Environmental Geology
Summer 2010	BIO 240 Oceanography
Fall 2010	ENVS 520 Biogeochemistry

S.E. MacAvoy PhD, CV

	ENVS 360 Atmosphere and the Environment
Spring 2011	ENVS 220 Environmental Resources and Energy ENVS 581 Environmental Science II
Summer 2011	BIO 240 Oceanography
Fall 2011	ENVS 492 Senior Capstone ENVS 350 Environmental Geology
Spring 2012	ENVS 360 Atmosphere and the Environment ENVS 581 Environmental Science II
Summer 2012	BIO 240 Oceanography
Fall 2012	ENVS 492 Senior Capstone ENVS 150 Lab Coordinator Sustainable Earth
Spring 2013	ENVS 360 Atmosphere and the Environment ENVS 150 Lab Coordinator Sustainable Earth
Summer 2013	BIO 240 Oceanography
Fall 2013	ENVS 491 Internship Coordinator ENVS 196 Environmental Science for Majors
Spring 2014	ENVS 581 Environmental Science II ENVS 150 Sustainable Earth ENVS 491 Internship Coordinator

GRADUATE/UNDERGRADUATE PROJECTS SUPERVISED

MS Chair

1. Ethan Bassett, MS advisor. Measuring turnover rates and nutrient allocation to various tissues in mice (*Mus musculus*) using stable isotope analysis. completed 2005
This work has been published in Oecologia.
2. Natalie Hansen, MS advisor. Seasonal trends in nutrient flow in a tidal freshwater stream. Arrived Fall 2006, graduated summer 2008.
This work has been submitted to Can. J. Zoology
3. Stephen Lazaroff, MS advisor. Effect of metabolic rate on nutrient incorporation in male and female mice (*Mus musculus*). Start 2008
4. Wahida Akberzie, MS advisor. Effects of diet nutrient composition on metabolism and tissue replacement in zebra fish (*Danio rerio*). Start 2009
5. Dina Lloyd, MS advisor. Divergent evolution: cave vs. surface fishes metabolism and tissue replacement rates. Start 2009-2010
6. Kimmy Kraeer, MS advisor. Metabolic tissue turnover and rate in two strains of Rat. Start 2009, Completed Summer 2011

MS Committee Member

1. Rania Tarboush MS thesis co-advised. Growth and metabolism contribute to the turnover of stable isotopes in the zebrafish, *Danio rerio*. completed 2003
This work has been accepted for publication in Canadian Journal of Zoology

S.E. MacAvoy PhD, CV

2. David Baker MS thesis co-advised . Assessing pollution in gorgonians using a d¹⁵N isotope analysis. completed 2004
Portions of this work are in review at Marine Ecology Progress Series
3. Kirby Webster. Octocorals as indicators of anthropogenic nutrients. Completed Spring 2006.
4. Ken Jenson. Detection of Tetracycline resistant bacteria in ecologically disturbed environments. Completed Fall 2007.
5. Evan Ewers. Polycyclic Aromatic Hydrocarbon-degrading Bacteria in the Anacostia River, Washington, DC: Presence and Metabolic Capabilities. Completed 2009.
6. Marco Pelli, Zebra fish retina development. 2010-2011
7. Vince Bacalan, Nitrogen pollution over time in Florida as revealed by stable isotope analysis of manatee bones. 2010-2011
8. Stephanie Sarraino. Nutrient sources and geochemical condition of the Anacostia River, Washington DC.

Capstone Project advised or co-advised

1. Ethan Bassett BS Honors thesis co-advised. Nutrient usage and carbon/nitrogen turnover rates of small mammals . completed 2004. WINNER: College of Arts and Sciences, Capstone Honors Thesis Award
This work has been published in Canadian Journal of Zoology 84(7):983-993.
2. Jeremy Silver BA ENVS Honors thesis. Diet nutrient content and tissue turnover in *Mus musculus*. Completed May 2008
3. Carrie Johnson BA SPA Political attitudes towards wind energy in South Dakota

Independent Studies (partial list)

1. Mansfield, Jason. BIO 490. Carbon turnover of mouse blood. 2002
2. Pascual, Roberto. Environmental degradation in Panama Bay. 2002
3. Jamil, Tahir. BIO 490. Nitrogen and carbon turnover in different mouse tissues. 2003
4. Andita Caesar . BIO 490. Growth versus metabolic tissue replacement in mouse tissues determined by stable sulfur analysis . Spring 2005.
5. Jake Sirkin. BIO 490. Seasonal changes in nutrient flow in a VA tidal freshwater stream. 2005
6. Brandy Wells. Preliminary Report on the Phylogeny of Fossil Crinoid Genus *Gilbertsocrinus*. 2006
7. Emily Snyder Carnegie Geophysical Laboratory intern. 2007
8. Kristen Manusco, Carnegie Geophysical Laboratory intern. 2007
9. Jennifer Ross, ENVS 691. Deep-sea mussel fatty acid extraction. 2008
10. Cristina Cordona , ENVS 690. Climate variables influence the distribution of Lyme Disease. 2009
11. Kisei Tanaka. ENVS 691. 2010.
12. Jon Rhodes. ENVS 691. Isotope Geography of manatees. 2011
13. Nicholas Conner, ENVS 691. Anacostia Geochemistry. 2011
14. Jen Jones, ENVS 490. Organic contaminants in Anacostia clams. 2011
15. Hitesh Pant, ENVS 490. Anacostia Geochemistry. 2011
16. Stephanie Buglione, ENVS 490. Anacostia Geochemistry. 2011
17. Eric Teng, ENVS 490. Amphipod trophic dynamics. 2012
18. Alice Clifford, ENVS 490. Green roof effectiveness. 2013
19. Kim Lindegren, ENVS 490. Episodic geochemistry of Anacostia. 2013

Other

1. Shoal Roj, Research project for a class. Chemosynthetic production contributions to predators in Gulf of Mexico. 2003

S.E. MacAvoy PhD, CV

2. Eric Morgan, deans award for summer research, 2004. \$3000. Dependence of invertebrate predators on chemosynthetic primary production in the Gulf of Mexico. Completed Spring 2005, Presented at CAS Research Forum 2005
Portions of the work appeared in peer-reviewed The Journal of Shellfish Research in 2008
3. Tim McCune, SRP. 2005. Suggestions for how to make Belize's protected areas more effective.
4. Vanessa McKinney, SRP. 2006. What are the effects of ocean acidification upon stratospheric ozone and the resultant consequences for human health?
5. Marysia Szymkowiak, SRP. 2008. Conserving the cod fishery on the Baltic Sea.
6. Andrew Frank, Grebe Award for summer research. Metabolic tissue turnover in surface and cave amphipods from West Virginia.

CURRICULUM DEVELOPMENT

New course development:

ENVS 260/160 Laboratories and Lectures Environmental Science I and II for majors
ENVS 396/696 Environmental Geology
ENVS 396 Environmental Problem Solving
ENVS 396/696 Science and Policy of Climate and Energy
ENVS 492 Senior Capstone in Environmental Science
ENVS 520 Biogeochemistry

Development of PhD curriculum in Environmental Science (as part of a committee).
Revamp of BIO 100 Great Experiments in Biology. Integration of laboratories and lecture. Re-evaluation of course objectives

UNIVERSITY SERVICE AND OUTREACH:

Benefits and Budget Committee, University Senate 2011-present

MS in Sustainability Management working group 2010-present

Science Rank and Tenure 2010-present

American University Institutional Animal Care and Use Committee, 2009-2012

Search committee Ecohydrology American University, 2010-11

White Oak Middle School, Science Outreach, 2009

EPC Curriculum Committee, American University, 2007-2009 (Co-Chair 2008-09)

EPC Steering Committee, American University, 2007-2009 (appointed co-chair 08/09)

Environmental Science PhD Curriculum Development Committee, American University, 2007-present

Search committee Cell Biology American University, 2007-8

S.E. MacAvoy PhD, CV

Environmental Coordinator Search Committee. American University, 2007

Science Building renovation committee, American University, 2006-2009

Environmental Issues Project Team, American University, 2003-2009? Co-Chair 2005-2009?

Chair of Graduate Program in Environmental Studies: Biology Department, American University, 2003-present

Undergraduate Program in Environmental Studies Committee: Biology Department, American University, 2003-2004, 2006-present

Dean's Ad-hoc committee for Merit evaluation: 2004

Rank and Tenure Committee: Biology Department, American University 2003-2004

Graduate Program in Environmental Studies Committee: Biology Department, American University, 2001-2002

Judge; Edmund Burke Middle School Science Fair, Feb 12, 2003

Judiciary Committee Service: Honor trial judge. American University, 2002

Web Page Coordinator. Biology Department, American University, 2001-2003.

Graduate Arts and Science Spotlight: 2000. Research presentation video clip sent on CD to prospective graduate students in Arts and Sciences, 2000-2001

- Copies of the 8 megabyte movie are available upon request

Judge: Envirodays judiciary board member, University of Virginia, 1995 and 1998

- Evaluated student presentations of original research

President: Student Environmental Association, Fairfield University, 1990-91

PROFESSIONAL AFFILIATIONS (CURRENT)

American Geophysical Union, *Alpha Epsilon Delta* (biology honor society)

REVIEWED MANUSCRIPTS FOR FOLLOWING JOURNALS

(1) Fisheries Bulletin (2) Aquatic Geochemistry, (3) Deep-Sea Research, (4) Limnology and Oceanography, (5) Journal of Aquatic Animal Health, (6) Aquaculture, (7) Phytopathology, (8) Marine and Freshwater Research, (9) North American Journal of Fisheries Management, (10) Organic Geochemistry, (11) Oecologia, (12) Marine Ecology, (13) Functional Ecology, (14) Canadian Journal of Zoology, (15) Journal of Experimental Marine Biology and Ecology, (17) Okios, (18) Chemical Geology, (19) Rapid Communications in Mass Spectrometry, (20) Canadian Journal of Fisheries and Aquatic Sciences, (21) Physiological and Biochemical Zoology, (22) Annales de Limnologie International Journal of Limnology, (23) Marine Ecology Progress Series, (24) Ecosystems, (25) Comparative Biochemistry and Physiology, (26) Behavioral Ecology, (27) Journal of the Marine Biological Association of the United Kingdom

REVIEWED CHAPTER(S) IN FOLLOWING TEXTBOOKS

Belk and Borden, 2003. Biology: Science for Life, 1st ed. Pearson Education
Wand, Okin and Macko. 2009. Isoscapes: Understanding movement, pattern, and process on Earth through isotope mapping. Springer
Keller. 2010. Environmental Geology, Pearson

REVIEWED PROPOSALS FOR FOLLOWING ORGANIZATIONS

The Petroleum Research Fund (American Chemical Society)
USGS Maine Water Resources Institute Program
Maine Sea Grant