CURRICULUM VITAE

ROBERT HUMSTON

Department of Biology
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PROFESSIONAL EXPERIENCE

Washington & Lee University	**John Kyle Spencer Director of Environmental Studies** (2017 – present) **Professor,** Biology and Environmental Studies, 2018 – present **Associate Professor,** 2012 – 2018 **Assistant Professor**, 2008 – 2012
Montana State University	**Affiliate Faculty and Researcher,** Ecology Department, 2014 (Sabbatical leave from Washington and Lee).
Virginia Military Institute	**Assistant Professor**, Biology. 2004 – 2008.
Washington & Lee University	**Visiting Assistant Professor**, Biology. 2003 – 2004.
Penn State University	**Adjunct Assistant Professor**, Biology. 2001 – 2003. **Postdoctoral Scholar,** Crop and Soil Sciences (w/ Dr. David A. Mortensen). 2002 – 2003. Research Focus: Dispersal and colonization of invasive species.
Rosenstiel School, University of Miami	**Postdoctoral Research Scientist**, Marine Biology and Fisheries (w/ Dr. Jerald S. Ault). 2001 – 2002. Research Focus: Movement ecology of coastal fish species, management of recreational fisheries.

EDUCATION

Ph.D. (2001) Marine Biology and Fisheries. **Rosenstiel School of Marine and Atmospheric Science, University of Miami.**
Committee: J.S. Ault (Co-chair), D.B. Olson (Co-chair), D.L. DeAngelis, N.M. Ehrhardt, and V. Restrepo

B.A. *magna cum laude* (1994) **Bowdoin College.** Biology (w/ Honors) and English.

SELECTED AWARDS AND HONORS

2014	Lenfest Sabbatical Fellowship, Washington and Lee University
2011	Chairman's Award, Virginia Council of Trout Unlimited; in recognition of fisheries conservation and education efforts in Virginia.
2009	Hess Research Scholar Award, Washington & Lee University
2008	Superintendent's Award for Excellence in Service, Virginia Military Institute
2007	D. Rae Carpenter Research Award, Virginia Military Institute Research Laboratories
2007	Omicron Delta Kappa National Leadership Honor Society.
2006	Outstanding Scientific Paper of the Year, Weed Science Society of America. [Dauer, Mortensen, & Humston 2006; *Weed Sci* **54**(3):484-489)]
2006	D. Rae Carpenter Research Award, Virginia Military Institute Research Laboratories
2000	Research Fellowship, International Light Tackle Tournament Association: *For significant research initiatives in management and conservation of recreational fisheries.*
1999 - 2000	Fritz Koczy Doctoral Fellowship, Rosenstiel School / U.M.: *For excellence in doctoral research in the field of marine science.*
1998	Best Student Paper, American Fisheries Society, Florida Chapter (Title: *Large scale schooling and migration of large pelagics relative to environmental clues*.)
1997	Roger Rottman Memorial Scholarship, Florida Chapter of the American Fisheries Society: *Inaugural recipient of award for achievement in graduate research on fisheries management.*
1997	Reitmeister Graduate Research Award, Rosenstiel School / U.M.
1995 – 1998	Graduate Fellowship, University of Miami

RESEARCH

PUBLICATIONS

Refereed Journals and Book Chapters (*undergraduate co-authors <u>underlined</u>*)

Marcek, B.J., **R. Humston**, M.C. Fabrizio, J. Shen, and R.W. Brill. *In press.* Modeling the distribution of two demersal fishes in a dynamic seascape: Atlantic Croaker and Spot in Chesapeake Bay. *Estuaries and Coasts.*

Stewart, K.P., T.E. McMahon, T.M. Koel, and **R. Humston**. 2023. Current and historical

patterns of recruitment of Yellowstone cutthroat trout in Yellowstone Lake, Wyoming, as revealed by otolith microchemistry. *Hydrobiologia.* doi.org/10.1007/s10750-023-05245-z

Greer L, Curran HA, Wirth K, Humston R, Johnson G, McManus L, Stefanic C, Clark H, Lescinsky H, Forman-Castillo K. 2023. Coral Gardens Reef, Belize: An Acropora spp. refugium under threat in a warming world. *PLoS One* 18(2): e0280852. doi.org/10.1371/journal.pone.0280852

Humston., R, E. Hallerman, S. Smith, J. Sorenson, and G. Muckleroy. 2021. Natal and intergenerational dispersal of riverine smallmouth bass *Micropterus dolomieu*. *Canadian Journal of Fisheries and Aquatic Sciences* **78**(11):1701-1711.

Stewart, K.P., T.E. McMahon, T.M. Koel, and **R. Humston**. 2021. Use of otolith microchemistry to identify subbasin natal origin and use by invasive lake trout in Yellowstone Lake. *Hydrobiologia* 848:2473–2481.

Luo, J, JS Ault, BT Ungar, SG Smith, MG Larking, TN Davidson, DR Bryan, NA Farmer, SA Holt, AS Alford, AJ Adams, **R Humston**, AS Marton, D Mangrum, R Kleppinger, A Requejo, and J. Robertson. 2020. Long distance migrations and movements of Atlantic Tarpon revealed by two decades of satellite tagging. *Fish and Fisheries* 21(2):290-318.

Nettere, O.N., E.W. Hamilton, R.J. Woodland, and **R. Humston**. 2019. Trophic ecology of smallmouth bass in a hierarchical river network. *Managing Centrarchid Fisheries*. M. Siepker and J. Quinn (eds). American Fisheries Society, Bethesda, MD.

Irwin, A., L. Greer, **R. Humston**, M. Devlin-Durante, P. Cabe, H. Lecinsky, K. Wirth, H.A. Curren, I.B. Baums. 2017. Age and intraspecific diversity of resilient *Acropora* communities in Belize. *Coral Reefs* **36**:1111-1120

Humston, R., S.S. Doss, C. Wass, C. Hollenbeck, S. Thorrold, S. Smith, C.P. Bataille. 2017. Isotope geochemistry reveals ontogeny of dispersal and exchange between mainstem and tributary habitats in smallmouth bass. *Journal of Fish Biology* **90**:528-548.

Sousa, R.C.G., **R. Humston**, D. Harbor, and C.E.C. Freitas. 2016. Movement patterns of adult peacock bass *Cichla temensis* between tributaries of the middle Negro River Basin (Amazonas - Brazil): an otolith geochemical analysis. *Fisheries Management and Ecology* **23**:76-87.

Humston, R., M. Moore, C. Wass, S. Doss, and D. Dennis. 2015. Correlations between body length and otolith size with implications for retrospective growth analyses: an example with smallmouth bass *Micropterus dolomieu*. *Journal of Applied Ichthyology* 31:883-887.

Garcez, R.C.S., **R. Humston**, D. Harbor, and C.E.C. Freitas. 2014. Otolith geochemistry in young-of-the-year peacock bass Cichla temensis for investigating natal dispersal in the Rio Negro (Amazon – Brazil) river system. *Ecology of Freshwater Fish* 24:242-251.

Freitas, C.E.C, F.K. Siqueira-Souza, **R. Humston**, L.E. Hurd. 2013. Drought sensitivity of Amazonian fish communities: implications for response to climate change. *Hydrobiologia* 705:159-171.

Humston, R., K.A. Hemminger, N.D. Adkins, R.J. Elsey, J. Huss, B.A. Meekins, P.R. Cabe, and T.L. King. 2012. Put-and-grow stocking of brook trout in Virginia reservoirs: dispersal, naturalization, and interactions with wild populations in tributaries. *North American Journal of Fisheries Management* 32(1):100-108.

Larkin, M.F., J.S. Ault, and **R. Humston**. 2010. Estimates of fishery statistics from a mail survey of south Florida's bonefish charter fleet. *Fisheries Ecology and Management* 17(3): 254 – 261.

Humston, R., B.M. Priest, W.C. Hamilton III, and P. Bugas. 2010. Dispersal between tributary and mainstem rivers by juvenile smallmouth bass evaluated using otolith microchemistry. *Transactions of the American Fisheries Society* 139:171–184.

Humston, R., J.S. Ault, J. Schratweiser, M.F. Larkin, and J. Luo. 2008**.** Incorporating user-group expertise in bonefish and tarpon fishery research to support science-based management decision making. In: *Biology and Management of Tarpon and Bonefish Fisheries.* J.S. Ault (ed). Taylor and Francis.

Ault, J.S., **R. Humston,** and 9 co-authors. 2008**.** Population dynamics and resource ecology of tarpon and bonefish. In: *Biology and Management of Tarpon and Bonefish Fisheries.* J.S. Ault (ed). Taylor and Francis.

Luo, J., J.S. Ault, M.F. Larkin, **R. Humston** and D.B. Olson. 2008**.** Seasonal migratory patterns and vertical habitat utilization of Atlantic Tarpon (*Megalops atlanticus*) from satellite PAT Tags. In: *Biology and Management of Tarpon and Bonefish Fisheries.* J.S. Ault (ed). Taylor and Francis.

Larkin, M.F., J.S. Ault, **R. Humston**, and J. Luo. 2008**.** Tagging of bonefish in south Florida to study population movements and stock dynamics. In: *Biology and Management of Tarpon and Bonefish Fisheries.* J.S. Ault (ed). Taylor and Francis.

Humston, R. and E. Ortiz-Barney**.** 2007. Evaluating course impact on student environmental values in undergraduate ecology with a novel survey instrument. *Teaching Issues and Experiments in Ecology* v. 4.

Humston, R. and D. Harbor. 2006. Geologic analyses for evaluating watershed heterogeneity: implications for otolith microchemistry studies. *Proceedings of the*

Southeastern Association of Fish and Wildlife Agencies **60**:132-139.

Dauer, J.T., D.A. Mortensen, and **R. Humston**. 2006. Controlled environment experiments to predict dispersal distances of horseweed (*Conyza canadensis*) seed. *Weed Science* **54**(3):484-489. [**Outstanding Paper of the Year,** Weed Science Society of America 2006.]

Humston, R., D.A. Mortensen and O.N. Bjørnstad. 2005. Anthropogenic forcing on the spatial dynamics of an agricultural weed: the case of the common sunflower. *Journal of Applied Ecology* **42**:863-872.

Humston, R., J.S. Ault, M.F. Larkin, and J. Luo. 2005. Movement of bonefish (*Albula vulpes*) in Biscayne Bay determined using ultrasonic transmitters and a passive acoustic receiver array. *Marine Ecology Progress Series* **291**:237-248.

Humston, R., D.B. Olson , and J.S. Ault. 2004. Models of behavioral movement and their influence on simulated population dynamics. *Transactions of the American Fisheries Society* **133**:1304-1328.

Humston, R., J. Ault, M. Lutcavage, and D.B. Olson. 2000. Schooling and migration of large pelagics relative to environmental clues. *Fisheries Oceanography* **9**(2):136-146.

Ault, J.S., S.G. Smith, J.E. Serafy, **R. Humston**, and G. Diaz. 1999. A spatial dynamic multistock production model. *Canadian Journal of Fisheries and Aquatic Sciences*, 56:4-25.

EXTRAMURAL RESEARCH GRANTS

2023-2025	USDA Forest Service "Forest Stream Data Analysis and Modeling"	$10,500
2019-2020	Virginia Department of Game and Inland Fisheries. "Assessment of the wild trout fishery in the Jackson River tailwater."	$4,000
2014-2018	Jesse Ball Dupont Foundation; WestRock Foundation. "From the Mountains to the Sea: An innovative water-quality network in the James river, Virginia." Collaborating institution with Randolph Macon College (Lead) and Virginia Commonwealth University.	$360,000
2013-2015	NSF / MRI: "Acquisition of an Isotope Ratio Mass Spec for enhancing undergraduate research and training across the sciences at Washington and Lee University and Virginia Military Institute." (PI Bill Hamilton).	$314,593
2012 – 2014	Jeffress Memorial Trust: "Using genetics and	$45,000

	geochemistry to determine ecological consequences of between-river dispersal for individuals and populations of smallmouth bass."	
2010	NSF-EAR / MRI: "Acquisition of a Variable Pressure Scanning Electron Microscope at Washington and Lee University" (PI Jeff Rahl).	$354,611
2010	Virginia Department of Environmental Quality. Mini-grant: Citizen Monitoring of Water Quality through TMDL Implementation in Hays Creek, VA.	$750
2009	Louis Legacy Foundation. "Chesapeake Bay Interns Program in Environmental Studies."	$32,000
2005 – 2006	NSF / MRI: "Acquisition of an Inductively Coupled Plasma Emission Spectrometer and a Gas Chromatograph (GC-FID/ECD/SCD) for the Virginia Military Institute." Co-PI w/ Charles Bott (VMI).	$180,574
2004 – 2007	Jeffress Memorial Trust: "Reconstructing movement patterns of smallmouth bass (*Micropterus dolomieu*) from elemental chemistry of otoliths."	$50,000
2004	Virginia Department of Game and Inland Fisheries: "Fisheries harvest and economic expenditure on the Maury River, Virginia."	$3,000
2001 – 2002	National Fish and Wildlife Foundation: "Bonefish Conservation in South Florida." PI w/ Jerald Ault.	$105,025

INTRAMURAL RESEARCH AND FACULTY DEVELOPMENT AWARDS

2021 Lenfest Summer Research Grant, Washington and Lee University $6500
2020 Lenfest Summer Research Grant, Washington and Lee University $6500
2019 Sabbatical Fellowship, Washington and Lee University
2017 Lenfest Summer Research Grant, Washington and Lee University $6500
2016 Lenfest Summer Research Grant, Washington and Lee University $6500
2015 Lenfest Summer Research Grant, Washington and Lee University $6500
2014 Lenfest Sabbatical Fellowship, Washington and Lee University
2009 Hess Scholar Research Award, Washington and Lee University $6500
2008 Grant-In-Aid of Research, Virginia Military Institute. $5000
2007 Grant-In-Aid of Research, Virginia Military Institute. $3774
2006 Grant-In-Aid of Research, Virginia Military Institute. $5000

2005 Grant-In-Aid of Research, Virginia Military Institute. $2400
2004 Faculty Development Grants, Virginia Military Institute: $1600

INVITED LECTURES
Invited Presentations in Symposia / Workshops:

Assessing Smallmouth Bass Trophic Position in a Hierarchical River Network Using Stable Isotope Methods. Managing Centrarchid Fisheries in Rivers and Streams. American Fisheries Society annual meeting 2016.

Combining Inference from Otolith Geochemistry and Population Genetics to Determine Scale of Dispersal in a River-Tributary Network. Managing Centrarchid Fisheries in Rivers and Streams. American Fisheries Society annual meeting 2016.

Genetics and geochemistry reveal scale and ontogeny of dispersal in river-tributary networks. Frontiers in Otolith Chemistry. American Fisheries Society annual meeting 2015.

Pair power enhances interdisciplinary research at undergraduate institutions: genetics and geochemistry of smallmouth bass. Pair Power: Developing the Next Generation of Ecologists through Collaboration. Ecological Society of American annual meeting 2015.

Stocking brook trout in headwater impoundments: dispersal and direct genetic effects on native populations. Mountain Stream Symposium, James Madison University, September 2013.

Modeling behavioral movement of fish in "End-to-End" ecosystem models for fisheries management. North Pacific Marine Science Organization (PICES) Annual Meeting, Hiroshima, Japan, October 2012.

Statistical Methods for Fisheries Research. A Continuing Education workshop that I organized and taught (by request, with Vic Dicenzo) for the annual meeting of the Virginia Chapter of the American Fisheries Society in 2012.

Evaluating the impact of TIEE activities on student learning and environmental values in undergraduate ecology. Investigating your own teaching: ecology faculty as research practitioners. Ecological Society of America annual meeting 2008.

Comparing mechanisms for directing movement in spatial models of fish populations. Cognitive Ecology in Bioengineering, American Fisheries Society, San Francisco, CA 2007.

Spatial models of fish distribution and abundance: resolving behavioral responses of fish to changes in the marine environment. Operational Fisheries Oceanography, American Society of Limnology and Oceanography, Honolulu, HI, 2004

Role of weed ecology in designing management strategies. Contributions of Weed Science to

Management of Invasive Species, Invasive Plants in Natural and Managed Systems: Linking Science and Management, 7th International Conference on the Ecology and Management of Alien Plant Invasions, 2003.

The future of marine science education: a student perspective. Oceanography: The Making of a Science, Heinz Center for Science, Economics, and the Environment / Office of Naval Research. Miami, FL, 2000.

Marine Protected Areas: The importance of fish movement behavior in effective management of fisheries. Reefwatch 2000: Science Education and Research Workshop. Key West, FL, 2000.

Modeling swordfish movement in response to local thermal gradients. Modeling Biological and Physical Ocean Processes, Miami, FL, 1994.

Invited lectures at Universities / Labs / etc:

Spatial ecology and the importance of tributaries for mainstem fisheries. Henry's Fork Foundation, 2022.

Geochemistry and genetics to study fish movement ecology. Henry's Fork Foundation, 2020.

Using geochemistry and genetics to determine scale and ontogeny of fish dispersal in a river-tributary network. Fisheries Department, Virginia Institute of Marine Science, 2015.

Using geochemistry and genetics to unravel the spatial ecology of smallmouth bass. Biology Department, Randolph-Macon College, 2015.

Spatial ecology and conservation across taxa. Ecology Department, Montana State University, Bozeman, MT. September 2014.

Ecology and management of smallmouth bass in Virginia Rivers. Department of Biology, Virginia Military Institute. April 2013.

Spatial ecology of fish populations and management of fisheries. Department of Biology Summer Research Symposium Series, Virginia Military Institute. July 2012.

Genetics and otolith chemistry: complementary methods for determining connectivity of populations in river-tributary networks. Fisheries and Wildlife Sciences, Virginia Tech (invited by AFS student chapter). October 2011

Genetic impacts of hatchery supplementation on native brook trout in reservoir tributaries. Silliman Endowed Annual Lecture in Biology. Department of Biology, Bridgewater College. October 2011.

Efficacy of alternative fencing regulations for streamside livestock exclusion to reduce bacterial loading in streams. Virginia Department of Conservation and Recreation, July 2011.

Movement ecology and management of fisheries. Department of Fisheries Science, Virginia Institute of Marine Science. November 2009.

Using chemistry of fish otoliths to track dispersal in river-tributary networks. The Ecosystems

Center, Woods Hole Marine Biological Laboratory, February 2009.

Recruitment exchange at basin scales in lotic fisheries. Washington & Lee University, Biology / Environmental Studies, Lexington, VA. 2008.

Determining natal origins of smallmouth bass in lotic fisheries from elemental chemistry of otoliths. Virginia Tech chapter of American Fisheries Society, 2006.

Studying fish movement to improve fisheries management. Fort Lewis College, Department of Biology, Durango, CO, 2004.

Dispersal ecology of stream fish populations. Penn State University, Intercollege Graduate Program in Ecology / Dispersal Discussions, University Park, PA, 2004.

Studying fish movement to improve fisheries management. Washington and Lee University, Environmental Studies Program, Lexington, VA, 2004.

Spatial ecology of bonefish in south Florida. Washington and Lee University, Biology Department, Lexington, VA, 2004.

Anthropogenic effects on the spatial dynamics of invasive weeds. Penn State University, Department of Crop and Soil Sciences, 2002.

REPRESENTATIVE CONFERENCE ABSTRACTS AND PRESENTATIONS
(Undergraduate co-authors underlined.)

Doherty, J., J. Rocha, R. **Humston**, E.A. Johnson, W.E. Lukens, M. Criscuoli, R. Woodland, B. Murphy. 2023. Identification of Microplastics Extracted from the Stomachs of Largemouth Bass from the Mid-Atlantic Region using Transmission FTIR Microscopy. Geological Society of America NE/SE Spring Conference, Reston, VA.

Humston, R., J. Hallacher, T. Bernard, and A. Barnard. 2022. Assessing smallmouth bass movement following removal of a low-head dam. American Fisheries Society, Annual Conference, Spokane WA.

Humston, R., E. Hallerman, G. Muckleroy, J. Sorenson, and S. Smith. 2020. Combining inference from movement studies and population genetics to determine scale of smallmouth bass dispersal in rivers. American Fisheries Society, Virginia Chapter, Annual Conference, Lexington VA.

Steffen, R.M., D.P. Crear, P.G. Bushnell, **R. Humston**, and K.C. Weng. 2018. The effects of temperature and oxygen saturation on the swimming behavior of juvenile sandbar sharks *(Carcharhinus plumbeus)*. American Fisheries Society, Tidewater Chapter, Annual Conference, Beaufort, NC.

Marcek, B.J., M.C. Fabrizio, **R. Humston**, J. Shen. 2017. Using an individual-based model with physiological constraints to investigate fish distribution in Chesapeake Bay. American Fisheries Society, Annual Conference. Tampa Bay, FL.

Nettere, O.N., E.W. Hamilton, R. Woodland, and **R. Humston**. 2016. Assessing Smallmouth Bass trophic position in a hierarchical river network using stable isotope methods. American Fisheries Society annual meeting 2016.

Humston, R and co-authors. 2015. Genetics and geochemistry reveal scale and ontogeny of dispersal in river-tributary networks. Virginia Chapter American Fisheries Society annual meeting 2015.

Muckleroy, G., J. Sorenson, E. Hallerman, **R. Humston**. 2015. Otolith chemistry and genetics reveal scale of ontogenetic movement of smallmouth bass in the James River basin, Virginia. Southern Division American Fisheries Society, Annual Conference. Savannah, GA.

Stier, A.F., L. Greer, **R. Humston**, E. Elium, C. Stefanic, and H. Curran. 2013. How does parrotfish and urchin bioerosion impact live Staghorn coral cover on a patch reef in Belize? Geological Society of America Annual Meeting, Dencer, CO.

Humston, R., S. Doss, D. Dennis, C. Wass, M. Moore, S. Thorrold. 2012. Inference on movement and growth of smallmouth bass in river-tributary networks from otolith chemistry and microstructural analysis. Annual Conference of the American Fisheries Society, St. Paul, MN.

Greer, L., S. Bunn, **R. Humston**, P.K. Swart, H.A. Curran, L. Rose. 2011. The Suess effect and additional impacts on the carbon isotope composition of a Belizean coral. American Geophysical Union, Fall conference, San Francisco, CA.

O'Donnell, P., T.D. Jenkins, and **R. Humston**. 2011. Efficacy of adaptive streambank fencing for reducing in-stream bacteria loads. Virginia Waters Conference, Richmond, VA.

Jenkins, T.D., P. O'Donnell, **R. Humston**. 2011. Modeling costs and benefits of streamside cattle exclusion for farm management strategies. Virginia Waters Conference, Richmond, VA.

Humston, R., N.D. Adkins, R.J. Elsey, J. Huss, B.A. Meekins, K.A. Hemminger, and T.L. King. 2010. Impacts of put-and-grow stocking in small impoundments on tributary populations of brook trout in Virginia. Wild Trout Symposium X, West Yellowstone, MT.

Humston, R., B.M. Priest, and P. Bugas. 2009. Recruitment exchange between tributary and main-stem river populations of smallmouth bass determined from otolith chemistry. American Fisheries Society annual meeting. Nashville, TN.

Humston, R. and E. Ortiz. 2008. A novel survey instrument for evaluating student environmental values and ecological knowledge. Ecological Society of America annual meeting.

MEDIA COVERAGE RELATED TO RESEARCH

Brook trout genetics research: VA public radio / NPR affiliate (WVTF radio, Charlottesville), *Richmond Dispatch, Staunton News Leader, American Angler*

Stream impairment and restoration research: *Staunton News Leader, Lancaster Farming*

Bonefish and tarpon research: *The Miami Herald*; *Saltwater Fly Fishing*; *Key Islander News; Florida Keys Keynoter.*

TEACHING

COURSES TAUGHT (lab courses*)

Washington and Lee University: Fisheries Management, Applied Environmental Science, Biology of Marine Organisms, Introduction to Environmental Studies, Ecological Modeling & Conservation Strategies*, Aquatic Ecology*, Land Use and Aquatic Ecosystems in the Chesapeake Watershed* (tavel/field course), Environmental Studies Capstone Course, Environmental Service Learning, Stream Restoration Ecology (seminar), Aquatic Invasive Species Ecology and Control (seminar), Biostatistics, Animal Behavior*.

Virginia Military Institute: Biostatistics, Ecology*, Plant Biology*, Biology of Global Climate Change.

Penn State University: Ecology of Freshwater Systems.

RSMAS / University of Miami: Population Modeling and Management (TA).

INVITED LECTURES IN ACADEMIC COURSES

Ecological impacts of dams and their removal. Dam It! An Environmental Exploration of Dams, W&L (2020)

Land use and aquatic ecosystem health in the Chesapeake Bay watershed. Economics of the Chesapeake Bay, W&L (2019).

Ecology of Invasive Fishes in Yellowstone National Park and the Yellowstone River. Fundamentals of Biology: Ecology of Yellowstone National Park, W&L (2017).

Effects of Climate Change on the Ecology of Animal Populations. Global Climate Change, W&L (multiple presentations since 2004)

The importance of the individual in Population Ecology. Foundations of Ecology and Management (graduate program seminar), Ecology Department, Montana State University (2014)

Ecology of Animal Movement. Foundations of Ecology and Management (graduate

program seminar), Ecology Department, Montana State University (2014)

Human Population Growth and Environmental Consequences. Introduction to Environmental Studies, Washington and Lee University (2013)

Ecology of Chesapeake Bay and the Introduction of Non-Native Oysters. Ethics and the Environment, W&L. (2013)

Brook Trout Conservation Genetics. Conservation Genetics, Washington and Lee University. (2012)

Statistical Analysis and Experimental Design in Biosciences. Research Preparation in Biological Sciences, W&L. (2012)

Chesapeake Bay Watershed: Land Use and Aquatic Ecosystem Health. Ethics, Ecology, and Economics in Land-Use Practices, W&L. (2011, 2012)

Patterns in Predator-Prey Dynamics. Disorder and Chaos, W&L. (2010)

Ecology & Management of Watersheds. Introduction to Environmental Studies, W&L. (2010)

Fisheries Ecology and Management. Oceanography, W&L. (2007, 2008, 2010)

Fish Movement and Dispersal Behavior. Animal Behavior, W&L (2004)

Fitting Models to Data. Biostatistics, W&L. (2004)

Smallmouth Bass Spatial Ecology. Ichthyology, Fort Lewis College. (2004)

Explicit Spatial Models of Population Dynamics. Ecological Modeling and Environmental Problem Solving, Penn State University (2001-2003)

Anthropogenic Impacts on Coastal Marine Habitats. Capstone Course of the Environmental Studies Program, WLU. (2003)

Biological Oceanography. Introduction to Oceanography, Florida International University. (1999)

PARTICIPATION IN COURSES AND WORKSHOPS ON TEACHING:

Scientific teaching using TIEE in undergraduate biology. **By invitation**. Annual meeting of the Ecological Society of America, Memphis, TN, 2006.

Developing a successful undergraduate research program: how do we know we're doing it right? Annual meeting of the Ecological Society of America, Savannah, GA, 2003.

The Penn State Course in College Teaching. Pennsylvania State University's Shreyer Institute and Center for Excellence in Learning and Teaching, 2003.

Innovative teaching to achieve active learning in ecology. Annual meeting of the Ecological Society of America, Tucson, AZ, 2002.

Reef Watch 2000: K-12 Science Education and Research Workshop. **By invitation**. Workshop organized by Clarice M. Yentsch et al., Bigelow Laboratory for Ocean

Sciences. Key West, FL, 2000.

Oceanography: The Making of a Science. **By invitation**. National conference on research and education in marine sciences organized by the Heinz Center / Office of Naval Research, Miami, FL, 2000.

RESEARCH ADVISING AND MENTORING:

Student Research Honors:

Jenkins Undergraduate Research Award, Virginia Chapter of American Fisheries Society, to Oliver Nettere (WLU '16)

Best Student Paper Finalist, Southern Division of American Fisheries Society, for Sasha Doss's presentation at 2013 Annual Conference.

Earle Bates Senior Thesis Award in Environmental Studies, to Sasha Doss

Jenkins Undergraduate Research Award, American Fisheries Society (VA Chapter) to Brett Carpenter (VMI '08).

Institute Honors, Virginia Military Institute, to Andrew Zyra (VMI '09).

Graduate Advising

2021-present. Thesis committee member. Meagan Criscuoli, MS candidate in Ecological Systems, Chesapeake Biological Laboratory, University of Maryland.

2014-2018. Dissertation committee member. Benjamin Marcek, PhD candidate in Fisheries, Virginia Institute of Marine Science.

2009-2016. Dissertation committee member. Jane Argentina, PhD candidate in Fisheries and Wildlife, Virginia Polytechnic Institute.

2009. Dissertation reader. Nick Farmer, PhD candidate in Marine Biology and Fisheries, Rosenstiel School / University of Miami.

Undergraduate

Summer 2021: Tyler Bernard (W&L '23), Ethan Casto (W&L '24), and Max Thomas (W&L '23). Passage of smallmouth bass past a remnant site of a low-head dam following demolition and removal.

AY 2018-2019: Zack Azadian (W&L '19), Susie Fields (W&L '19), Drew Barnard (W&L '19), Liz Todd (W&L '19), and William Borst (W&L '20). Movement of smallmouth bass pre- and post-removal of a low-head dam on the Maury River, VA.

AY 2018-2019: Spencer Alascio (W&L 19) Stable isotope inference on trophic ecology of smallmouth bass in sympatry with brook trout at the upstream extent of lotic

populations.

AY 2017-2018: Rachel Steffen (W&L ’18) Behavior and metabolism of sandbar sharks under thermal and hypoxic stress.

AY 2017-2018: Allison Jue (W&L ‘20) Population genetic structure of introduced Smallmouth Bass in the Yellowstone River and major tributaries.

AY 2017-2018: Spencer Alascio and Zack Azadian (W&L ‘19) Trophic ecology of smallmouth bass in sympatry with brook trout at the upstream extent of lotic populations.

AY 2017-2018: Samuel Ross (W&L ’18) Determining the relationship between stage and discharge for a new gage installation on Woods Creek (Lexington, VA).

Summer 2017: Samuel Ross (W&L ’18) Gage design and installation for high resolution water quality monitoring in Woods Creek.

Summer 2017: Kurt Waibel (W&L ’19), Hashim Syed (’19), Taylor Dockery (’19), and Spencer Alascio (’19). Trophic ecology of smallmouth bass in sympatry with brook trout at the upstream extent of lotic populations.

AY 2016-2017: James Willey (W&L ‘18) High resolution water quality monitoring in Woods Creek.

AY 2016-2018: Spencer Alascio (W&L ‘19) Trophic ecology of smallmouth bass in sympatry with brook trout at the upstream extent of lotic populations.

Summer 2016 and AY 2016-2017: Zachary Azadian (W&L ‘19) Ecology of smallmouth bass at the upstream front of population expansion.

Summer 2015: Oliver Nettere (W&L ‘16) Trophic plasticity of smallmouth bass in river networks investigated using stable isotope analyses.

AY 2014-2015: Adele Irwin (W&L ‘15) Clonal genetics of resilient populations of threatened *Acropora* spp. in Belize.

Summer 2013-2014. Garrett Muckleroy (W&L ‘16) Population genetic structure of smallmouth bass in river-tributary networks.

Summer 2012-2013. Matthew Moore (W&L ‘15) A comparison of methods for analyzing otolith microstructure and ultrastructure for reconstructing growth history.

Summer 2012. Juli Sorensen (W&L ‘14) Population genetic structure of smallmouth bass in river-tributary networks.

Summer 2012. Forrest Behne (W&L ‘14) Assessing habitat variation among rivers and tributaries with respect to smallmouth bass movement and habitat selection.

Summer 2012-2013. Caroline Wass (W&L ‘14) Tracking between-river movement of

smallmouth bass from otolith isotopic composition.

Winter 2012. Dan Binder (W&L '12) Statistical decomposition of environmental effects on growth of smallmouth bass.

Winter 2012. David Dennis (W&L '12) Reconstructing growth history from otolith microstructure in smallmouth bass.

Summer 2011. Sasha Doss (W&L '13) Movement of smallmouth bass among connected rivers determined using strontium isotope chemistry of otoliths.

Summer 2011. Ellen Yeatman (W&L '12) Movement of smallmouth bass among connected rivers determined using strontium isotope chemistry of otoliths.

Summer 2011. Zineb Benchekroun (W&L '14) Developing educational materials to support community outreach efforts through the W&L Campus Kitchen and Campus Garden programs. Co-advised with Bill Hamilton (Biology), Jennifer Davidson (W&L Campus Kitchen).

Summer 2011. Gabrielle Passos-Sampaio (U. Amazonas). Choice modeling to determine farmer preferences for conservation subsidy programs to improve water quality. Co-advised with Jim Casey (Economics).

Summer 2011. Guillerme Fernendes (U. Amazonas). Choice modeling to determine farmer preferences for conservation subsidy programs to improve water quality. Co-advised with Jim Casey (Economics).

Summer 2011. Alice Mae Stoner (College of the Atlantic). Mitigation of acid deposition in native brook trout streams in Virginia as a foundation for environmental education programs in grades 7-12.

Summer 2010- May 2011. Thomas Jenkins (W&L '11) Development of a farm-scale bio-economic simulation tool for supporting landowner assessment of streamside livestock exclusion fencing options.

Summer 2010- May 2011. Peter O'Donnell (W&L '11) Assessment of adaptive fencing programs for streamside livestock exclusion and in-stream bacteria load reduction.

Summer 2010 - May 2011. Ellen Valentine (W&L '11) Trophic ecology of juvenile striped bass examined using stable isotopes. Hosted and co-advised by David Secor, Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science.

Summer 2010. Brent Meekins (W&L '11) Analysis of microsatellite data to determine assess introgression between hatchery and wild brook trout strains. R.E. Lee Research Scholar.

Summer 2010. Liz George (W&L '12) Curricular development and teacher training in

K-12 environmental science. Hosted and co-advised by Tamra Willis, Mary Baldwin College.

Summer 2009. Nate Adkins (W&L '10) Dispersal and naturalization of hatchery reared brook trout in headwater impoundments. R.E. Lee Research Scholar.

Summer 2009. Ryan Elsey (W&L '11) Conservation genetics of brook trout in tributaries of stocked reservoirs. R.E. Lee Research Scholar.

AY 2008-2009. Jason Bacaj (W&L '10) Use of spring-fed tributaries by YOY trout as overwinter habitat on the Henry's Fork, ID. Directed independent research.

AY 2008-2009. Andrew Zyra (VMI '09). Basin-scale variation in elemental and isotopic chemistry of rivers and fish otoliths. Institute Honors Thesis, Virginia Military Institute.

Summer 2008. Andrew Zyra (VMI '09), Swope Summer Scholars research program in Biology. Basin-scale variation in elemental and isotopic chemistry of rivers and fish otoliths.

AY 2007-2008. Alex Burpee (WLU '08). Trophic dynamics and sediment production in marine reserves. Senior thesis in Geology (co-advised).

Summer 2007: Megan Brewster (VMI '08). Tracking dispersal of hatchery-reared smallmouth bass in rivers.

Summer 2007: Brett M. Carpenter (VMI '08), Swope Summer Scholars research program in Biology. Ontogeny and otolith chemistry in young-of-year smallmouth bass.

Summer 2006: Brant M. Priest (VMI '07), Summer Undergraduate Research Institute (SURI) scholar. Otolith microchemistry and dispersal of smallmouth bass, *Micropterus dolomieu*.

Summer 2006: Brett M. Carpenter (VMI '08), SURI research scholar. Spatio-temporal variation in otolith trace-element composition and relationship to abiotic factors: implications for discrimination of natal origins.

Summer 2006: Raniere Garçez (Universidad Amazonas, Brazil), WLU-Amazonas exchange, summer research assistant.

AY 2005-2006. Douglas Aloisio (VMI '06), Independent Research. Sampling otoliths of juvenile smallmouth bass (*Micropterus dolomieu*) to analyze core chemistry.

Summer, 2005. Brant M. Priest (VMI '07), SURI research scholar. Otolith microchemistry and dispersal of smallmouth bass, *Micropterus dolomieu*.

Summer, 2005. Elise G. Jones (VMI '07), summer research assistant. Field mapping of stream habitats and spatial distribution of brook trout, *Salvelinus fontinalis*, in an intermittent forest stream.

AY 2004-2005. William C. Hamilton, III (VMI '05) Institute Honors Thesis. Otolith

microchemistry and natal origins of smallmouth bass in the Maury and James rivers..

Summer, 2004. Elizabeth Little (WLU '06) GIS mapping and visualization of data collected at Benson Run and Maury River.

Summer, 2004. Michael Patterson (WLU '06), R.E. Lee Summer Research Fellow. An economic valuation of sport fishing and outdoor recreation on the Maury River, Virginia.

Summer, 2004. William Hamilton, III, (VMI '06) Swope Summer Research Fellow. Otolith microchemistry and natal origins of smallmouth bass in the Maury and James rivers.

Spring, 2004. Cinira Das Chagas (WLU-UENF exchange), independent research / literature review. Potential impacts of fuel oil pollution on freshwater fishes of the Brazilian Amazon.

Fall, 2002. Carrie Gilbert (PSU '03, Schreyer Honors College), independent research / literature review. Effects of highway development on sedimentation and fish assemblages in central Pennsylvania streams.

STUDENT RESEARCH PRESENTATIONS:

Nettere, O.J., E.W. Hamilton, R.J. Woodland, and R. Humston. 2016. Assessing Smallmouth Bass (*Micropterus dolomieu*) Trophic Position in a Hierarchical River Network Using Stable Isotope Methods. Danville, VA. **Awarded best undergraduate research award from Virginia Chapter AFS.**

Muckleroy, G., J. Sorenson, E. Hallerman, R. Humston. 2015. Otolith chemistry and genetics reveal scale of ontogenetic movement of smallmouth bass in the James River basin, Virginia. Southern Division American Fisheries Society, Annual Conference. Savannah, GA.

Peeling, E., Greer, L., Lescinsky, H., Humston, R., Wirth, K. , Baums, I., and Curran, H.A., 2014, Linear extension rates and gross carbonate production of *Acropora cervicornis* at Coral Gardens, Belize, , American Geophysical Union Fall Meeting in San Francisco, California, 15-19 Dec.

Doss, S., C. Wass, S. Smith, S. Thorrold, and R. Humston. 2013. Determining dispersal patterns of smallmouth bass using otolith chemistry. Southern Division American Fisheries Society, Annual Conference. Nashville, TN. **Selected as Finalist for Best Student Presentation Award.**

Doss, S., C. Wass, S. Smith, S. Thorrold, and R. Humston. 2013. Use of otolith chemistry to track smallmouth bass (*Micropterus dolomieu*) movement. American Fisheries Society, VA Chapter, Annual Conference. Lexington, VA.

O'Donnell, P., T.D. Jenkins*, and R. Humston. 2011. Efficacy of adaptive streambank fencing for reducing in-stream bacteria loads. Virginia Waters Conference, Richmond, VA.

Jenkins, T.D., P. O'Donnell*, R. Humston. 2011. Modeling costs and benefits of streamside cattle exclusion for farm management strategies. Virginia Waters Conference, Richmond, VA.

Adkins, N., R. Humston, B.A. Meekins, J. Huss, R.J. Elsey, K.A. Heminger, and T.L. King. 2010. Genetic impacts of put-and-grow brook trout stocking on tributary populations of Virginia impoundments. American Fisheries Society annual meeting. Pittsburgh, PA.

Zyra, A., R. Humston, and S. Thorrold. 2009. Elemental and Isotopic Signatures as a Means of Tracking Natal Dispersal Patterns of Micropterus dolomieu in the James River Basin. Virginia Chapter of the American Fisheries Society annual meeting.

Burpee, A., L. Greer, R. Humston, and D. Hubbard. 2008. The effect of marine protection on carbonate sediment production in St. Croix, USVI. 11th International Coral Reef Symposium.

Burpee, A., R. Humston, L. Greer, and D. Hubbard. 2008. The ecological effects of marine preserves in a grouper-free and Diadema rebounding system in St. Croix, USVI. 11th International Coral Reef Symposium.

Carpenter, B.M., B.M. Priest, and R. Humston. 2007. Temporal variation in trace element chemistry of fish otoliths: implications for identifying natal origins in river systems. Annual Meeting of the Southeastern Association of Fish and Wildlife Agencies.

Priest, B.M., R. Humston, and P. Bugas. 2006. Dispersal of age-1 smallmouth bass determined from elemental chemistry of otoliths. Ecological Society of America annual meeting.

Priest, B.M., R. Humston, and P. Bugas. 2006. Relation of smallmouth bass (*Micropterus dolomieu*) otolith chemistry to natal river: trace element signatures for tracking exchange between rivers." Environment Virginia Conference.

Priest, B.M. and R. Humston. 2006. Relation of smallmouth bass otolith chemistry to natal river. National Conference on Undergraduate Research (NCUR).

Priest, B.M., and R. Humston. 2005. Relating elemental chemistry of smallmouth bass fry otoliths to the chemical signature of their natal river. VMI Summer Undergraduate Research Institute.

Patterson, M., R. Humston, and P. Bugas. 2005. An economic analysis of outdoor recreation on the Maury River. National Conference on Undergraduate Research.

Hamilton, W.C. III, R. Humston, P. Bugas, and E. Knapp. 2005. Dispersal of

smallmouth bass in the Maury and James Rivers. National Conference on Undergraduate Research.

Patterson, M., R. Humston, and P. Bugas. 2004. An economic analysis of outdoor recreation on the Maury River. Science, Society, and the Arts, Washington and Lee University.

Hamilton, W.C. III, and R. Humston. 2004. Dispersal of smallmouth bass in the Maury and James Rivers. Summer Undergraduate Research Institute.

SERVICE: PROFESSIONAL AND OUTREACH

PROFESSIONAL AND UNIVERSITY SERVICE:

Manuscript review for *PLoS One*, *Journal of Applied Ecology, Canadian Journal of Fisheries and Aquatic Sciences*, *Journal of Fish Biology*, *Ecological Modelling, Chemical Geology, Transactions of the American Fisheries Society, Fisheries Oceanography, Journal of Great Lakes Research, Caribbean Journal of Science, North American Journal of Fisheries Management, Marine Ecology Progress Series, Biological Invasions, Progress in Oceanography, Endangered Species Research, Marine and Coastal Fisheries, Environmental Studies and Sciences, Journal of Marine Systems, Teaching Issues and Experiments in Ecology, Animal Biotelemetry, Royal Society Open Science, Fisheries Management and Ecology, Journal of Freshwater Ecology, Movement Ecology, American Fisheries Society Books, Coral Reefs, Ecological Economics.*

Search Committee Chair, Dean of the College, Washington and Lee (2020-2021)

Search Committee, Vice President for University Advancement, Washington and Lee (2019)

Associate Director, Environmental Studies Program, Washington and Lee (2015-2016)

Director, Chesapeake Bay Program in Environmental Studies, Washington & Lee (2008-present)

University Sustainability Committee (appointed), Washington & Lee (two terms; 2010-2013, and 2018 – present)

Faculty Representative to the Board of Trustees (elected), Washington & Lee (2018-2020)

Faculty Review Committee (elected), Washington & Lee (2016-present; Chair, 2017-18)

Faculty Mentor to the Wrestling Team, Washington & Lee (2010-present)

University Athletics Committee, Washington & Lee (2017)

University Writing Program Advisory Committee, Washington & Lee (2012-2015)

Faculty Advisor to the Fly Fishing Club, Washington & Lee (2012-present). *Named "Best Collegiate Fly Fishing Club" by Trout Unlimited / Costa Five Rivers program in 2016.*

Quantitative Habitat Suitability Assessment Team. Ecosystem-Based Fisheries Management for Chesapeake Bay, Maryland Sea Grant. (2009)

Faculty advisor, VMI Circle of Omicron Delta Kappa honor society. 2006-2008.

Secretary, Virginia Chapter of the American Fisheries Society. 2005 to 2009.

Co-organizer, session moderator, and panel chair, First International Bonefish-Tarpon Research Symposium. January 9-11, 2003.

Co-organizer and moderator of invited symposium at annual meeting of the American Fisheries Society entitled, "Spatial movement of fish: field study, modeling, and management perspectives." August, 2002,

Proposal review for National Science Foundation, National Sea Grant College Program, International Game Fish Association, Large Pelagic Research Center (UNH)

COMMUNITY ENGAGEMENT / OUTREACH:

Youth Soccer Coach, Rockbridge United Soccer Club (2014-2021) and Rockbridge County High School (2020-present)

Board Member, Skyline Chapter of Trout Unlimited (2011-2016).

Hays Creek TMDL Collaborative Outreach and Assistance Program (2008-2010). Effort designed to assist landowners in impaired watershed with monitoring water quality, implementing best management practices for reducing agricultural and residential impacts. With agents from VA Department of Game and Inland Fisheries, Department of Conservation and Recreation, Soil and Water Conservation District, National Resources Conservation Service.

Section Instructor, Virginia Master Naturalist Program, Rockbridge County (2006).

Assistance with Trout in the Classroom programs at Maury River Middle School, Rockbridge Middle School.

Invited talks to grades K-8 at Harrington Waddell Elementary School (Lexington), Rockbridge County Middle School.

Steering Committee, Maury River total maximum daily load assessment (2008).

Board of Directors, Carson J. Spencer Foundation. (2005-2011)

Former scientific advisory board member, Bonefish and Tarpon Trust (NPO dedicated to preservation and conservation of *Albula vulpes* and *Megalops atlanticus* recreational fisheries).

Authored articles for publications distributed among recreational anglers including *The Backbone 2000 Chronicles* and the quarterly newsletter of Bonefish and Tarpon Unlimited.

Appeared on youth educational television series, "Newton's Apple," highlighting

marine research activities.

Invited lectures on research topics to Trout Unlimited, Upper James River Roundtable, Nature Camp (VA), Virginia Master Naturalist lecture series, Miami Beach Rod and Reel Club, Backbone Classic Fishing Tournament, South Florida Flats Anglers, Ocean Reef Angling Club, Florida Keys Guides Association.

PROFESSIONAL SOCIETY MEMBERSHIPS:

American Fisheries Society (Secretary, Virginia Chapter, 2005-2009; newsletter editor, 2005-2016.)

Ecological Society of America