

NOMINATION COVER SHEET
2011 Virginia Outstanding Faculty Awards

1. NAME	
Full (Legal): Mark J. Butler IV	Preferred First Name: Mark
2. INSTITUTIONAL INFORMATION	3. PROFESSIONAL INFORMATION
Institution: Old Dominion University	Academic Discipline: Biological Sciences
Rank/Position Title: Professor	Specialization/Field: Marine Biology
Year Rank/Title Attained: 2000	Type of Terminal Degree: Ph.D.
Years at Institution: 21	Year Awarded: 1988
Campus Email Address: mbutler@odu.edu	Awarding Institution: Florida State University
Campus Phone: (757) 683-3609	
Campus Mailing Address: 302-K Mills Godwin Building, Old Dominion University, Norfolk, VA 23529	
Campus Communications Contact:	
-Name: Jennifer Mullen Collins	
-E-mail: jmullen@odu.edu	

Please check only one box:

- RESEARCH/DOCTORAL INSTITUTION NOMINEE:
- MASTERS/COMPREHENSIVE/BACCALAUREATE INSTITUTION NOMINEE:
- TWO-YEAR INSTITUTION NOMINEE:
- RISING STAR NOMINEE:
- TEACHING WITH TECHNOLOGY NOMINEE:

Table of Contents

Cover Sheet	1
Mission Statement	2
Summary of Accomplishments	3
Personal Statement.....	9
Abbreviated Curriculum Vitae	11
Letters of Support (Excerpted).....	13
Additional Documentation	16

Signature (President or Chief Academic Officer): Carol Simpson

Printed Name: Carol Simpson, Provost and Vice President for Academic Affairs

E-mail address: CSimpson@odu.edu Telephone: 757-683-3079

Mission Statement Old Dominion University

The Mission of Old Dominion University is as follows:

“Old Dominion University, located in the City of Norfolk in the metropolitan Hampton Roads region of coastal Virginia, is a dynamic public research institution that serves its students and enriches the Commonwealth of Virginia, the nation and the world through rigorous academic programs, strategic partnerships, and active civic engagement.”

The Mission Support section of the mission statement describes in detail the principles and practices that underlie the University’s undergraduate and graduate teaching, research, and service missions: a sound general educational program; critical thinking; diversity; academic freedom; serving the needs of the local, national, and international communities, including military members and their families; and collaborating with government, industry, and alumni. Finally, the Major Goals of the University are described under the following headings: Students, Faculty, Academic Programs, Teaching, Research, Scholarship and Creativity, Distance learning, Lifelong Learning, Community Service, Student Life, Alumni, and Quality.

A complete statement of the mission and major goals may be found in the Old Dominion University Undergraduate Catalog, 2010-2011 (pp 2-3) and available at the following url: <http://www.collegesource.org/displayinfo/catalink.asp?pid={EB81D78F-3B8B-45A0-AB9F-0BEF026324C5}&oig={B2F671C7-589E-4645-8AEC-2EC460F9F03A}&vt=5>.

Summary of Accomplishments

Teaching

In 2009, Professor Butler was designated an Eminent Scholar at ODU. One year prior, the College of Sciences at ODU honored him with the Hirschfield Award for Faculty Excellence. Both of these awards recognize faculty who have achieved excellence in their balance of teaching, research, and service. Indeed, Professor Butler's exemplary research accomplishments and the respect he has garnered on the international stage are complemented by the high regard that students and faculty at ODU have for his teaching acumen, epitomized in his additional awards for the College of Science's "Most Inspirational Faculty" Award and the Outstanding Teacher in Biological Sciences award. Professor Butler's concern for undergraduate and graduate education in science and his dedication to improving and building that capacity at ODU have also caught the attention of the National Science Foundation. The NSF has appointed him to numerous science education review panels that select the recipients of the nationally competitive IGERT (Integrated Graduate Education and Research Training), REU (Research Experiences for Undergraduates), and IBM (Integrative Biology and Mathematics) institutional programs, as well as the prestigious NSF Graduate Research Fellowship program focused on the top doctoral students across the nation. When he served as graduate program director for his department, Professor Butler also restructured the Masters Program in Biology from the ground up, and he recently revamped the undergraduate concentration program in marine biology at ODU and negotiated off-campus experiences for undergraduates at marine laboratories in Virginia, Florida, and Maine.

Professor Butler teaches two very popular courses at Old Dominion: Marine Ecology to undergraduates and Biostatistics to graduate students. Both courses emphasize instruction on research techniques and include practical experiences that make students better practitioners of science. He connects with students because he treats them as research apprentices, infusing factual information with instruction on practical aspects of science - such as how to publish a paper or obtain grant funding.

Students in his marine ecology classes are in the field with him every week. Concerned that students would otherwise experience only a few marine habitats here in Virginia, he also packs them up and they travel to the Florida Keys every year to study tropical habitats. That trip is the educational highlight for many students, who glowingly report in student course evaluations that Professor Butler is *"...the most amazing teacher ever. Who else would care so much about their students? He really gave us a great opportunity to learn and discover. No other instructor I've had has done that."* While in the field, his students conduct independent field research projects, culminating in written and oral reports - skill sets the students need and appreciate.

In Professor Butler's courses, students cannot succeed by simply being passive recipients of his "pearls of wisdom." A working understanding of important principles is a necessary underpinning in any field of study, but students only advance in those fields by learning to "do." He teaches students how to take an active role in generating knowledge, how to test ideas in a quantitative, powerful manner. Many students arrive in his classes steeped in book knowledge, but without a clue about how it might be generated. They are often too focused on memorization and individual achievement, having had little experience in the practice of science or the skills necessary to work collectively in a group with highly competitive colleagues. Yet, modern science is highly integrative, quantitative, and anything but an individual endeavor. Professor Butler's pedagogical approach in teaching undergraduate students how to "do science" is gradual. First, they work in groups on projects that he designs, and they answer

questions that he poses in their individual reports. Later, those reports become group reports - one report, one grade for all. Finally, his students design, execute, and report on their own group projects. Engaging students in their own research projects and showing them how successful scientists "do science" stimulates their creativity and their desire to learn. With such preparation, his students can springboard into research careers with confidence. As one student in his 2008 marine ecology class put it: *"This experience was amazing. I am so privileged to have this opportunity.... I now understand how to go about setting up real scientific experiments. I can't describe how much I've learned and enjoyed this class. Professor Butler really prepares the student for grad school and/or a job in marine science!"*

Graduate students appreciate his demanding course in Biostatistics, which has one of the largest graduate enrollments in the college and for good reason. The word is out about this practical course on how to design and analyze data from biological studies. Now even the Eastern Virginia Medical School has made his course a requirement in their biomedical doctoral program. As stated by one of the graduate students enrolled in Professor Butler's spring 2009 class: *"Making a statistics lecture interesting has to be one of the most difficult tasks out there, but Dr. Butler makes it look easy. Instead of focusing on statistical theory, Dr. Butler focuses on the practice of using stats in everyday experiments. This helps to make the material interesting, and it gets students thinking about how the knowledge provided in class can be applied to our own work."* As a consequence, Professor Butler's student evaluations are always among the best in the department and college, and he is one of the few faculty members to regularly receive perfect scores in those evaluations.

Professor Butler also spends a great deal of time interacting with students outside of the normal classroom setting: on field trips, in discussion groups, and at departmental socials that he regularly hosts for visiting scholars. Those events are important because they provide Professor Butler and his students the opportunity for informal discussions on everything from the curious mating habits of sea creatures to the determination of authorship on scientific papers. One of the students in his marine ecology class commented: *"Dr. Butler is a very valuable teacher. He helped me in other areas in addition to this class.... I wish I had talked to him a year ago when I started the whole graduate school process since he gave me such valuable advice. He is always willing to discuss anything you need to talk about."* Professor Butler also has been a remarkably productive graduate advisor, producing more doctoral students than any other faculty member in his large department. During his 21 years at ODU, he has mentored 26 graduate students, which have been a diverse group: 16 females and 10 males, two of whom were from Latin America. Nineteen of his graduate students came to ODU from other institutions, and he has served on several overseas graduate committees, evidence of a research program with a strong national and international reputation.

Professor Butler's graduate students have also been among the best and brightest in his department and college. Several have received highly selective College of Sciences Dominion Scholarships; many have garnered their own grants from state and federal sources, while others have been honored with teaching awards at the department, college, and university levels. These students have also published more than 40 scientific papers and made over 50 presentations at scientific conferences, a testament to Professor Butler's mentorship. All who have graduated from his laboratory have found employment in the sciences. Many of his former students now fill positions on the faculties of other universities: University of Florida, Loyola University, Tennessee Tech University, and Northern Kentucky University. Others are now prominent scientists with the National Marine Fisheries Service, the NOAA National Marine Sanctuaries Program, and the International Game Fish Association, among others.

Discovery

Professor Butler excels at teaching research methods because he is an excellent researcher. He is an internationally known marine biologist whose groundbreaking research on lobsters has made him "*one of the world's foremost authorities on lobsters*," as one colleague put it. Professor Butler has published more than 100 scholarly works including 9 book chapters and publications in prominent, peer-reviewed scientific journals in the fields of ecology and marine biology. His co-authored 2006 paper in the prestigious journal *Nature* on "Avoidance of disease in social lobsters," describes the first experiments to demonstrate that healthy lobsters can detect and avoid diseased individuals and do so before the disease becomes transmissible. This is the first known example of quarantine behavior for any animal in the wild. Professor Butler's scholarly productivity has not abated. In the past year alone, he published or has in press over ten more papers and book chapters. His scholarly contributions are clearly appreciated by his scientific colleagues worldwide who have cited his papers over 1500 times.

Professor Butler has an extraordinary track record in grantsmanship. He has been the principal or co-principal investigator on more than 50 grants totaling nearly \$8 million since arriving at ODU. Much of that funding has come from the most prestigious and competitive scientific funding agency in the USA - the National Science Foundation (NSF), which has continuously funded his research since 1995. In the last decade, Professor Butler has spearheaded multi-disciplinary research teams in the study of marine diseases and the roles that host behavior, habitat characteristics, and the long-distance oceanographic transport of larvae play in disease dynamics. He is currently co-principal investigator on a \$2.25M grant from the NSF to investigate the effects of over-fishing and climate change on disease dynamics in blue crabs in Virginia. Last year he was awarded yet another large grant from the NSF, this time as the lead investigator on a \$1.4M grant to study lobster disease dynamics in the Caribbean as a model for understanding the contrasting roles of the local environment versus the influx of pathogens from outside the local area in determining the spread of disease in the sea. He continues to garner significant competitive funding from other state and federal agencies as well, including the National Oceanic and Atmospheric Administration (NOAA), the National Marine Fisheries Service, the National Park Service, the World Bank Global Environment Fund, and Florida Sea Grant, among others. Two other grants awarded to Professor Butler this past year from the Everglades National Park and from a Nature Conservancy-NOAA co-sponsored program will permit him to begin the first-ever attempt to restore sponge communities in Florida that have been decimated by harmful plankton blooms.

Professor Butler is a dynamic speaker, who has been honored by invitations to speak at nearly 30 scientific conferences worldwide. Just this September, he was the keynote speaker at a Sea Grant conference in Rhode Island focused on diseases and their threats to New England's lobster fisheries. Last year he was invited to a joint meeting of the international Crustacean Society and the Japanese Carcinological Society in Tokyo to speak about the influence of humans on the ecology and long-term sustainability of lobster populations. In October 2007, he was invited to an exclusive conference on "Sustaining Coral Reefs During the Coming Century" at the Australian Research Council Center for Excellence, which was attended by the world's best-known coral reef biologists. A series of scientific position papers stemming from that conference (one that he co-authored) appeared in 2010 in the journal *Coral Reefs*. In 2005, Professor Butler gave two keynote addresses, one at the Australian Society of Fish Biologists meeting in Adelaide titled "*Benthic Fisheries Ecology in a Changing Environment: Unraveling Process to Achieve Prediction*." The list of national and international conferences to which he has been invited goes on. In all, he has been author or co-author on nearly 200 presentations at mostly national and international scientific conferences, and is a popular speaker at universities around the country.

Spiny lobsters have long been used by Professor Butler as “model” organisms for studying the ecological processes most critical for sustaining populations of coastal marine animals, particularly those subject to fishing. In recent years, he has also studied marine sponges for much the same reason. The major thrusts of his research over the past two decades has centered on:

- revealing the early life history of spiny lobsters and the ecological processes most critical to their survival to adulthood (a process called “recruitment”);
- discovering how recruitment and thus the sustainability of marine animal populations are affected by fishing and the degradation of coastal environments; and
- exploring the ways in which animal behavior and environmental structure alter the dynamics of disease in natural populations.

Much of his recent research has focused on the practical application of ecology to issues affecting coastal management, including: (1) the application of advanced spatially explicit, individual-based simulation models to integrate data and explore possible management scenarios, and (2) the establishment of long-term monitoring and restoration programs for sponges and hard-bottom habitat in Florida. Serendipity and the research interests of his graduate students have also led Professor Butler to explore a diversity of other topics in marine biology, from the ecology of octopuses to the role of algae-eating crabs on coral reefs.

Professor Butler's research projects are typically interdisciplinary, as he often seeks collaborations with experts in other subdisciplines who complement his own strengths in experimental design, simulation modeling, and the natural history of crustaceans and Caribbean ecosystems. Thus, he and his students collaborate with colleagues at institutions around the commonwealth, the country, and indeed the world. For example, one of his current NSF-funded projects involves students and collaborators from ODU, VIMS, the University of Florida, and the University of Miami and engages local marine resource managers as collaborators at over 20 field sites throughout the Caribbean where he and his students are working to improve the ecological sustainability of coral reefs and lobster fishery resources.

Knowledge Integration

Professor Butler's seamlessly integrates the latest research results with fundamental science in his classroom lectures and in his many public and professional “outreach” activities. This past year, for example, his Marine Ecology class traveled with him to the Florida Keys where together they worked underwater to establish sponge clones for a habitat restoration project funded by NOAA and The Nature Conservancy. Later, he organized an army of volunteers from Virginia, North Carolina, and the local community in Florida who for two weeks helped transplant thousands of those sponge clones to the seafloor at restoration sites throughout the central Florida Keys. This fall, Professor Butler and his colleagues are engaged in a whirlwind series of trips to over 20 Caribbean nations where he is assessing disease prevalence in lobster (THE most important fishery resource in the Caribbean) and meeting with local resource managers to address this ominous problem. Last November, Dr. Butler made his annual trek to Mesoamerica, this time to Belize, to serve as an instructor at another workshop on coral reef sustainability sponsored by the World Bank. These weeklong workshops provide transportation and housing costs for resource managers from underdeveloped countries to participate in discussions and field training in scientific methods used in coral reef conservation.

For years, Professor Butler has involved high school students, college undergraduates, graduate students, and postdoctoral fellows from several colleges and universities (e.g., ODU, Virginia Institute of Marine Science, University of Florida, Florida State University, Goshen College, University of San Diego) directly in his research in Florida and the Caribbean, offering

them training and "real world" experience in marine science, In years past, grants from The Earthwatch Institute allowed him to bring together people of all ages (16 - 75) from across the country and all walks of life-- teachers, students, attorneys, doctors, business people--to spend a few weeks at a marine laboratory in the Florida Keys, assisting in scientific research and experiencing "life as a marine biologist." Each year, he works with fishermen in the Florida Keys, paying them in their off-season to assist him on lobster and sponge research projects whose results directly affect their livelihoods. Whether one-on-one aboard their vessels or at their fisherman cooperative meetings, he is at ease in explaining to them the value of conservation to ensure that the public resources they fish will exist for the benefit of generations to come. This is the integration of scientific knowledge put to the acid test.

Service

To be sure, much of Professor Butler's service to the commonwealth is to extend its impact and renown beyond Virginia's borders to national and international arenas where the range, magnitude, and impact of his service is exemplary and indeed is a model for the service mission of ODU: "serving the needs of the local national, and international communities."

Beyond his extensive international training and advisory activities described above, Professor Butler has served as a scientific advisor for a number of governmental and nonprofit environmental agencies. For example, last year he was appointed to a scientific panel charged by the United Nations to produce a policy brief on how to improve coastal marine management worldwide. That assignment resulted in the publication of a 50-page policy document that was presented at a press conference at the United Nations in New York. Last year, he also worked with the International Union for the Conservation of Nature (IUCN) and the Audubon Society to produce a "coffee table" book ("Adrift: Tales of Ocean Fragility") and technical brochures with marine conservation themes for presentation to the public. In December he traveled to Taiwan to work again with the IUCN on the first international endangered and threatened species assessment for lobsters. In 2007, he was commissioned by the U.S. Agency for International Development to assist the Galapagos National Park and the Darwin Research Center in setting up a lobster recruitment research program for the Galapagos Islands and to speak with local fishermen about marine conservation.

Professor Butler also served on the scientific advisory committee for the Gulf of Mexico Fishery Management Council for eight years, and on the board of directors for the Gulf and Caribbean Fisheries Institute for six years. He frequently acts as an ad hoc scientific advisor to the Florida Keys National Marine Sanctuary and the NOAA National Marine Fishery Service, providing professional advice on marine resource management issues whenever called upon. The Nature Conservancy and the Wildlife Conservation Society have also enlisted Professor Butler's services on scientific panels charged with identifying marine areas and species for inclusion in environmental stewardship plans for south Florida and Mesoamerica (the Caribbean coast of Mexico, Belize, Guatemala, and Honduras). In 1999 and again in 2005, Professor Butler traveled to Tasmania, Victoria, and South Australia as part of an international scientific panel charged with evaluating the next decade of research needed for the successful management of spiny lobster fisheries in those regions. Closer to home, he was appointed by the Virginia secretary of natural resources to a Blue Crab fishery advisory panel in 1999 and last year he was appointed by the Suffolk City Council to the Suffolk Wetlands Board.

For many years, Professor Butler has been an active participant in the organization of scientific meetings, including serving as the organizer and chair for symposia at various national and international conferences. Those activities bring worldwide acclaim and recognition to ODU

and the Commonwealth. In 2000, he was the organizing chairman for the International Lobster Conference and Workshop, which drew more than 200 scientists from more than 30 countries from around the world. It was the only time that this world congress was held in the United States, and it resulted in the publication of a 650 page conference proceeding in the peer-reviewed scientific journal *Marine and Freshwater Research* (Vol. 52: No. 2). He regularly organizes and chairs symposia at other national and international conferences. For example, in September 2007 he organized and chaired a special symposium on lobster behavior held at the International Lobster Conference at Prince Edward Island, Canada, and, in 2005, another symposium, "The Effect of Human Exploitation on Crustacean Mating Systems," at the International Crustacean Congress in Glasgow, Scotland.

Professor Butler's success in garnering funding from the National Science Foundation is unparalleled at ODU, and he returns his services to the NSF on a regular basis when invited to participate on scientific panels charged with selecting grant proposals for funding. He has served on the NSF Doctoral Research Fellowship Program panel five times and also on interdisciplinary program panels overseeing the selection of proposals for the Integrated Graduate Education and Research Training Program and the Ecology of Infectious Diseases Program. Rounding out his panelist activities, Professor Butler has served on several review panels for the NOAA National Undersea Research Program, which funds marine biological research that requires the application of specialized undersea equipment such as: submersibles, remotely operated underwater vehicles, and manned undersea habitats.

For 11 years, Professor Butler was the senior editor for *The Lobster Newsletter*, an international publication now in its 24th year of production, which he shepherded into the digital age. As a staff editor for *Marine Ecology Progress Series* for six years, he reviewed and edited manuscripts for one of the most respected peer-reviewed journals in marine science. Before that (1989-92), he was the Senior Editor for the *Proceedings of the Gulf and Caribbean Fisheries Institute*, an international scientific journal now in its 60th year of publication.

Professor Butler has also contributed greatly in his service to Old Dominion University on innumerable departmental, college, and university committees. As noted by the Chair of the Department of Biological Sciences, Professor Butler: "... *has always been willing to step forward and go the extra step.*" He has been both the Graduate Program Director and the Assistant Chair of the Department of Biological Sciences, and in both positions strived to enhance the research capacity and reputation of his department. He has also served on every possible committee within his department, and chaired important committees including the Executive Committee and the Promotion, Tenure, and Continuance Committee. He also spearheaded development of the ODU College of Sciences Academic Diving Program and serves as the Chair of the Dive Control Board for the program, part of a network of institutions belonging to the American Academy of Undersea Scientists, a national body with jurisdiction over research diving activities and safety. He also initiated and oversees new off-campus programs for undergraduates and graduate students in marine biology in collaboration with Goshen College (Indiana) and Cornell University, whose marine biology facilities in the Florida Keys and Maine provide educational and research opportunities for ODU students.

Personal Statement

As we bobbed on the surface of a tropical sea off the Florida Keys, peering down through our masks at the kaleidoscope of life on the coral reef below us, the two anxious students snorkeling with me finally loosened their grip on my outstretched hands. I could feel - literally - their apprehension fading as they became accustomed to the pulse of the sea and lost in the underwaterworld that swayed and darted beneath us. Neither of these young women from rural southside Virginia had ever traveled outside the commonwealth. They had never donned a mask and snorkel before our training session the previous day. Heck, one of them couldn't even swim! And then it happened. Two shadowy apparitions materialized at the edge of our vision and glided past just a few feet below us - grey reef sharks on the prowl. The grips of the two students clamped tight again, and I saw that wide-eyed, heart-pounding look of astonishment in their masks. It's a look with which I am familiar. It's the same giddy look I've witnessed for two decades in the eyes of my marine ecology students when they accompany me into the field... and I mean into the field.

Later that night at dinner around the long table at the marine lab, we recounted in turn our "best-worst" moments of the day - it's a tradition of mine on these multi-day field trips. The table was abuzz with tales told by excited students, who saw for the first time many of the natural phenomena that they had studied in class. Some saw fish "cleaning stations" where trusting, candy-striped shrimps ventured into the maw of massive groupers to rid the goliaths of parasites. Others debated the possible cause of the patchy, bleaching of corals that we had observed on the reef--an all too common sight these days in the planet's warming seas. Then, the two young women who swam by my side earlier in the day retold the story of their snorkeling adventure. Today, my lectures on coral reef ecology came alive for these students. It happened because my students and I get wet and dirty when studying marine ecology and I wouldn't have it any other way.

I know that few of my students will become marine biologists. Most will find themselves in other careers far from the sea, but I hope that they will bring to those careers a fuller knowledge of the complex ecological processes at play in the sea, a truer understanding of what it means to "do science," and a genuine appreciation of the importance of responsible stewardship by all citizens for our watery, blue planet. Perhaps they will remember that sunny, tropical day when learning about the ecology of coral reefs meant gliding over one. They'll think of the shoe that they lost in the deep mud of a Virginia salt marsh where their own experiments revealed how land plants miraculously survive in saltwater. Maybe they'll recall when a professor took time after class to guide them through the statistics needed to analyze their data, that moment when they first realized that ecological research really does require math -- and they could handle it.

However, some of these students will indeed become marine scientists, often despite the odds against those dreams. Many students hold down time-consuming jobs that they juggle with classes. So they have little extra time for studying, or for the volunteer work in research labs that is so critical for a future in science. But some persevere and with guidance and opportunity break into the competitive field of marine biology. Like one of the snorkelers in my class from southside Virginia, the one who could not swim, but later accepted a minority internship at a marine research center in Florida and is working on a career in marine biology. Or the kid who many years ago emerged from a poverty stricken home in a big midwestern city and later became a marine biologist and a professor at Old Dominion University.

Success stories are born from defining moments, from special experiences, and from people who care enough to offer you a chance, but expect you to work. This is why I teach the way

that I do. It's why I drag students from my laboratory classes into the field with me: to get dirty and wet, to test their resolve, to do science. It's why students - often for the first time – become engaged in science, developing hypotheses, collecting and analyzing data, and debating the results of their own findings. It's why I don't teach with an expensive textbook, preferring instead that students get right to the source by reading original scientific papers, and exchanging ideas with visiting scientists whom I often host at my home.

Teaching is about activities and relationships that connect teachers and students. It's about building upon a foundation of scientific knowledge by learning how to generate new information, thereby demonstrating that the process of learning continues and institutions of higher education are where that new knowledge is generated. This is why I teach, but it is also why I love research and why I think it makes me a better instructor.

I study tropical marine ecology, especially the ecology of spiny lobsters. Although the study of these tasty creatures has obvious economic relevancy, my interest in them stems more from the fact that their ecology is characteristic of many coastal animals and they are hardy. They serve as my marine ecology "lab rats" and have proven to be useful "model" organisms for my investigations of coastal marine ecology. Indeed, over the past two decades more scientific papers on the ecology of lobsters have been born in my laboratory at ODU than probably any other in the world. Among other things, my students and I have investigated the reproductive biology of lobsters and how over-fishing can change their mating systems. We have studied the ecology of planktonic lobster larvae, their transport across the sea, and how they maneuver into coastal nurseries rocked by ecosystem change. We also discovered the first known viral disease in lobsters, and have studied its effect on their behavior and ecology, its threat to fisheries, and how its transmission among lobsters may provide us clues on how diseases spread in other social organisms.

Although lobsters are my "bread and butter" research organism, my students and I have also studied such things as the importance of algae-eating crabs for coral reef health, the fascinating ways that octopuses and lobsters compete for habitat as predators and prey, and the ecology and restoration of tropical sponges that are critical for filtering tropical coastal seas. It has been my pleasure, indeed my mission, for the past two decades at ODU, to show first hand both undergraduate and graduate students the marvels of the underwater world and to train them to be capable, experienced scientists and stewards of our seas.

The general public and marine policy makers also need information or training in ecological stewardship, and it is here that my research finds additional purpose in outreach. My expertise is most applicable in developing tropical nations that struggle to maintain the integrity of their natural environments against a backdrop of poverty and pressure for unrestrained development. Thus, I have been involved in efforts to better educate and train marine resource managers in places throughout the Caribbean, the Galapagos Islands, and Austral-asia in cooperation with agencies such as the World Bank, The Nature Conservancy, the United Nations University, and the Agency for International Development.

Back home in Virginia, I help to maintain the ecological integrity of a small portion of Virginia's coastal environment via my participation on the City of Suffolk Wetlands Board. No less important to me are the numerous marine science talks I give to local school groups and the summer internships in marine science that I've sponsored for students from ODU, other colleges, and local high schools. These service experiences have been richly rewarding for me, knowing that my scholarly activities have had practical economic and environmental relevancy. In short, that my research findings and teaching experience has been "put to work."

Abbreviated Curriculum Vitae Mark J. Butler IV

Education

Postdoctoral Fellow	1988-89	Florida State University; University of Wisconsin
Ph.D.	1988	Biological Sciences, Florida State University
M.S.	1983	Zoology, Ohio State University
B.A.	1980	Biology (Geology minor), Wittenberg University

Teaching Experience

Eminent Professor	2009	Department of Biological Sciences, ODU
Professor	2000	Department of Biological Sciences, ODU
Associate Professor	1994	Department of Biological Sciences, ODU
Assistant Professor	1989	Department of Biological Sciences, ODU
Visiting Lecturer	1989	Biological Oceanography, University of Wisconsin

Awards (Selected academic awards)

- 2009 Eminent Scholar Designation, Old Dominion University
- 2008 Hirschfield Award for Faculty Excellence in Teaching, Research & Service, College of Sciences, ODU
- 2005 Award for Outstanding Teaching, Department of Biological Sciences, ODU
- 1995 "Best Paper in Fisheries Science," New Zealand Marine Sciences Conference
- 1991 "Most Inspiring Faculty Award," College of Sciences, ODU

Publications (Selected from over 100 scholarly publications cited over 1500 times).

- Butler, M.J. IV**, C. B. Paris, J. S. Goldstein, H. Matsuda and R. K. Cowen. in press. Behavior constrains the dispersal of long-lived spiny lobster larvae. *Marine Ecology Progress Series*.
- Butler, M.J. IV** and J.A. Lear. 2009. Habitat-based intraguild predation by Caribbean reef octopus (*Octopus briareus*) on juvenile Caribbean spiny lobster (*Panulirus argus*). *Marine Ecology Progress Series* 386:115-122.
- Steneck, R.S., M.C. Ablan, A. Alcalá, S. Arnold, **M.J. Butler**, L. McCook, C. Paris, G. Russ and P.F. Sale. 2009. Managing outside the box: coalescing connectivity networks to build resilience in coral reef ecosystems. *Coral Reefs* 28:367-378.
- Robertson, D.R. and **M.J. Butler IV**. 2009. Variable reproductive success in isolated populations of lobster. *Journal of Experimental Marine Biology and Ecology* 377: 84-92.
- Sale, P.F., **M. J. Butler IV**, A. Hooten, K. Lindeman, Y. Sadovy, and R. S. Steneck. 2008. Stemming Decline of the Coastal Ocean: Rethinking coastal marine management. *United Nations Policy Brief, United Nations University, Hamilton, Ontario, Canada*.
- Behringer, D.C. Jr., **M.J. Butler IV**, and Jeffery Shields. 2006. Avoidance of disease in social lobsters. *Nature* 441: 421.
- Butler, M.J. IV**, R.S. Steneck, and W.F. Herrnkind. 2006. Juvenile and adult ecology. Pp. 263 – 309 in *Lobsters: Biology and Management*, B.F. Phillips (ed.). Blackwell Scientific Press, Oxford.
- Butler, M.J. IV**, T. Dolan, J. H. Hunt, W. F. Herrnkind, and K. Rose. 2005. Recruitment in degraded marine habitats: a spatially-explicit, individual-based model for spiny lobster. *Ecological Applications* 15: 902-918.
- Butler, M.J. IV**. 2003. Incorporating ecological process and environmental change into spiny lobster population models using a spatially-explicit, individual-based approach. *Fisheries Research* 65: 63-79.
- Reznick, D., **M.J. Butler IV**, and H. Rodd. 2001. Life history evolution in guppies 7: the comparative ecology of high and low predation environments. *American Naturalist* 157:126-140.

Presentations (Selected from nearly 200 invited presentations given at national and international scientific conferences)

Butler, Mark J. IV. 2010. Plenary speaker: A Glimpse Beyond Lobster Shell Disease: Twists & Turns in the Ecology of Marine Diseases. New England Sea Grant Science Symposium, Kingston, Rhode Island.

Butler, Mark J. IV. 2009. The ecological consequences of catching the big ones: examples from spiny lobsters, The Crustacean Society International Conference, Tokyo, Japan.

Butler, Mark, Robert Cowen, Hirokazu Matsuda, Jason Goldstein, and Claire Paris. 2006. Connectivity in Caribbean Spiny Lobster: the tail of the dispersal kernel? Gulf and Caribbean Fisheries Institute Meeting, Belize City, Belize.

Butler, Mark J. IV. 2004. Keynote Presentation: Benthic Fisheries Ecology in a Changing Environment: Unraveling Process to Achieve Prediction. Australian Society for Fish Biology, Adelaide, Australia.

Grants and Contracts (Current sources of funding from a total of over \$8.5 million awarded)

Butler, M., D. Behringer, R. Cowen, C. Paris, and J. Shields. 2009 - 2012. "Connectivity of Disease in Marine Ecosystems: Multi-scale Dynamics of a Viral Disease Infecting Caribbean Spiny Lobster", National Science Foundation, \$1.4M

Shields, J., **M. Butler**, K. Reese, and H. Wang. 2007 – 2012. Ecological determinants of *Hematodinium* epidemics in the American Blue Crab. National Science Foundation. \$2.25M

Butler, M. 2009 - 2011. "A Proposal for Shallow Hard-bottom Sponge Community Restoration Research in the Everglades National Park", Everglades National Park, \$75K

Butler, M. and D. Behringer. 2009-2011. "Restoration of shallow sponge communities in the Florida Keys: Phase I", NOAA-The Nature Conservancy Community Restoration Grant Program, \$82K

Behringer, D. and **M. Butler**. 2008 – 2010. "The possible effects of the commercial trap fishery on a lethal viral disease (PaV1) in spiny lobster", Florida Sea Grant, \$154K

Behringer, D., T. Frazer, R. Swett, R. Watkins, and **M. Butler**. 2007-2009. "Determining Coral Reef Impacts Associated with Boat Anchoring and User Activity", Florida Fish & Wildlife Conservation Commission, Wildlife Legacy Program, \$105K

Butler, M.J. IV. 2010. "Assessment of PaV1 Virus Prevalence in Bahamian Lobster Fishery", World Wildlife Fund, \$13.5K

Public and Academic Service

Appointed to International Union for Conservation of Nature panel on endangered lobsters (2010)

World Bank sponsored workshop instructor for resource managers in Central America (2004-09)

Appointed by city council to Suffolk Wetlands Board (2008 -)

Appointed to United Nations scientific panel on coastal resource management (2007-2008)

Appointed by Virginia Secretary of Natural Resources Blue Crab Scientific Task Force (1999)

Scientific Advisory Council: Gulf of Mexico Fishery Management Council (1995-2003)

Editor, *The Lobster Newsletter* (an international publication; 1996 - 2008)

Staff Editor, *Marine Ecology Progress Series* journal (1999 - 2004)

Organizer and Chair, 6th International Lobster Conference (2000)

Panelist, The National Science Foundation (nearly every year since 1998)

Board of Directors and Senior Editor, Gulf and Caribbean Fisheries Institute (1989 - 1995)

Organizer and Chair, Academic Scuba Diving Program, ODU College of Sciences (2008 - pres)

Graduate Student Supervision: Major advisor to 26 graduate students (18 Masters and 8 Doctoral) and four postdoctoral fellows since 1990.

Letters of Support (Excerpted)

"[I was] his first graduate student, and he was a 'natural' in all aspects of his faculty duties from the start. His lectures were well-organized and highly effective. To this day, I often refer to notes from his Biometry course when advising my own graduate students on matters of statistical import. His positive attitude and energy for the subjects at hand were obvious and motivational. He remains dedicated to the professional development of his students and sets an excellent example for us to follow.... I consider myself very fortunate to have encountered such a capable advisor at a crucial stage in my education. His mentorship and encouragement were vital to my decision to continue my graduate education and embark on an academic career. I was raised in a rural area of Kentucky and had not traveled widely before arriving at ODU. Through Dr. Butler's guidance I was able to spend two week in Trinidad and Tobago as part of my M.S. thesis research. This international experience provided me with an ecological and cultural perspective that has been invaluable in my career and in my life in general. In short, he fostered my growth in ways that reached beyond the classroom, and he continues to be an excellent role model and mentor to this day."

--Hayden T. Mattingly, Associate Professor of Biology, Tennessee Technological University

"I have known Dr. Butler since 2004 during a Coral Reef Targeted Research Program workshop, a partnership between the Global Environment Facility and the World Bank, in Akumal, Mexico.... At the time, I was still an undergrad developing fish, coral, and lobster surveys for the CRTR Project in Guatemala.... I got very excited with Dr. Butler's research interests not only because of his area of expertise, but also because of the applicability of his approach to real ecological, conservational and managerial problems. In 2006 I was awarded a scholarship from the United Nations University and the World Bank to pursue my masters in marine Ecology under Dr. Butler at Old Dominion. As an international student, I am truly grateful Dr. Butler welcomed me in his lab and supported me during my degree. I feel proud of being Dr. Butler's student and as a recent graduate I feel very well prepared for my professional future."

--Angela Mojica, former graduate student

"Dr. Butler has had a profound personal effect on me and the course of my life. As a child, I watched the Jacques Cousteau specials.... I was going to be a marine biologist when I grew up. Somewhere along the way, I lost sight of that. When I entered graduate school, I had completed a pre-medical degree, but did not particularly excel and was not happy with that.... Needing income, I accepted a Graduate Research Assistantship with Dr. Butler. His passion re-awakened in me a love of marine biology and ecology that I had forgotten. And I have never looked back."

--Thomas W. Dolan, graduate student, Old Dominion University

"Dr. Butler is one of the most demanding instructors that I have ever encountered; but that is part of his excellence, for he challenges his students to be better than they believe they are or can be. Learning in such an environment is not only exceptional but character-building. Dr. Butler also displays a level of respect for his students, both as individuals and intellectuals.... He instructs and introduces professionalism throughout his teaching, building better scientists, rather than better students."

--Alden J. Cleanthes, student, Old Dominion University

"When I was a visiting prospective student, Dr. Butler welcomed me to ODU. Because of Dr. Butler and the verbal recommendations of his graduate students, I decided to come to ODU for my doctoral research. In my experience at ODU and other universities, there are few professors

that can honestly match the passion and dedication he has for mentoring students, and his professionalism in teaching, guidance, and research.... He challenged me to open my mind—and therein lays the most valuable personality trait of a good mentor.... He is an ODU Treasure for his career accomplishment as a mentor and researcher.”

--Grechen Bath Martin, ODU alumna (PhD), U.S. Depart. of Commerce, NOAA Fisheries Service

“I sought out Mark to serve as mentor for my doctoral degree based on his work and reputation in marine ecology. We continue to collaborate on research that has gained significant international attention. I am honored to have been trained by such a capable scientist and believe my success has hinged upon the knowledge and training I received from him.”

--Donald Behringer, Research Assistant Professor, Institute of Food and Agricultural Sciences, University of Florida

“[Mark and I] have jointly applied for and received NSF funding for research on spiny lobster reproductive dynamics, and I have worked with Mark and his students and colleagues in the Florida Keys and in Norfolk.... He works very actively with his students in the field and thus has a clear idea of their progress, short-comings and research opportunities. He very clearly mentors them. Mark also fosters a strong team spirit while in the field, often talking with his students and colleagues till late in the night about the day’s fieldwork, research possibilities and general science issues. He thus provides his students with the very best opportunities to acquire the skill set and attitude necessary to become a productive research and is a wonderful model of how post-graduate supervision should be done.”

--Alison MacDiarmid, Group Manager, Marine Ecology, National Institute of Water and Atmospheric Research, Wellington, New Zealand

“Professor Butler’s publications represent the productivity of a first-rate academic scholar in the prime of his scientific career.”

--Chris Platsoucas, Dean, College of Sciences, Old Dominion University

“Professor Butler’s publications, citations, and research grant support are second to none in the department, which includes four Eminent Scholars.... These research achievements put Mark at a very high level of scholarly activity locally, nationally and internationally.... Mark has also maintained a high standard in his teaching with evaluations near the top of the department.... One class in particular that I would stress is Biometry (BIOL 620), an upper level graduate course. Most students would rate this course as one of the most intense and difficult courses they take during their graduate studies yet his numerical scores for this course in 2007, 08, and 09 were well above the department and college mean scores.”

--Wayne Hynes, Interim Chair of Biological Sciences, Old Dominion University

"Dr. Butler's research program is internationally recognized, as evidenced by his many national and international colleagues and his exceedingly strong record of extramural funding. He is a leading authority on the ecology of the spiny lobster, and his research over the past several decades has shed new light on the life history of that economically important species. Recently, Dr. Butler’s work has expanded into the realm of epizootic diseases affecting crustaceans, including both lobsters and blue crabs. His work brings a strong ecological perspective to the study of diseases affecting economically important marine organisms, attracting major funding by NSF and establishing Mark as a leader in the field of emerging epizootic diseases. He has served as an invited expert on lobster biology and fisheries management for governments and agencies around the Caribbean Basin and in the Pacific. Notable among these have been interactions with USAID and the World Bank regarding management of marine resources in

developing countries.... His extensive professional service includes major editorial posts, conference organization, and service on numerous NSF panels."

- Alan Savitzky, Program Dir., Division of Biological Infrastructure, National Science Foundation

"His own research and the approach to that research has consistently challenged and overturned accepted wisdom in coastal marine ecology, such that it has had a major international impact in this scientific field. Most importantly, he has pioneered a novel approach to integrating detailed ecological studies with the operation of larger scale and important ecological systems. This powerful scientific approach has consistently provided valuable insights into ecological functioning which have proven particularly useful in ecosystem management. He has promoted this approach not only through his own widely published and presented research, but through superbly trained graduates, who are not making major contributions to the field in their own right."

--Dr. Andrew Jeffs, Associate Professor, Leigh Marine Laboratory, Department of Marine Science, The University of Auckland, New Zealand

"Dr. Butler is a renowned specialist on benthic ecology, particularly on the ecology of spiny lobsters.... I have known Dr. Butler for more than two decades as an author of influential works in the field of spiny lobster ecology, and a leading participant in academic meetings. Also recently, I have had the opportunity to develop a successful academic collaboration with Dr. Butler."

--Dr. Eloy Sosa Cordero, Artisanal Fisheries, El Colegio de la Frontera Sur, Chetumal, Quintana Roo, Mexico

"His service contributions are outstanding in the department, university, and his research community. He has served the department as Graduate Program Director for the Masters program, Assistant Chair, and Chair of our Promotion, Tenure, and Continuance Committee. Department faculty look to Professor Butler as a leader, someone who is willing to take on tough tasks and build consensus.... [N]o one in our ecology program has been more successful at the discovery and integration of knowledge through both computing and field techniques."

--Lyttton Musselman, Eminent Professor of Biology, Old Dominion University

"I first met Dr. Butler in 2003 when he was selected among top researchers from around the world to participate in a global project that was designed to target research for coral reef ecosystems.... Our project seeks to fill crucial gaps in knowledge so that information can be better integrated into applied management in key regions around the world where coral reefs are threatened from overuse, exploitation and factors associated with climate change. Many of these regions face significant poverty among growing populations, and natural resources, like coral reefs, are sources of natural capital that provide crucial ecosystem and economic services in sustaining coastal communities for the future. Our project is supported by the Global Environment Facility, the World Bank, and more than 50 institutions from around the world.... Dr. Butler was among a highly select group of experts invited to participate because of his extensive experience in the research of the biology, ecology, and life history of spiny lobsters specifically, and in seeking answers to the significant gaps that we face in understanding the demographic connectivity of marine species' populations at sub-regional and regional levels. Dr. Butler's expertise, combined with his positive and generous attitude toward all with whom he has engaged during our project, has made significant contributions to our program and to new knowledge.... He has shown commitment, care, patience and understanding in working with professional colleagues from other world institutions."

--Anthony Hooten, Synthesis Panel Executive Secretary and U.S. Coordinator, Coral Reef: Targeted Research and Capacity Building for Management

Additional Materials

Service

Additional Excerpts from Letters of Support

As the director of Goshen College's J.N. Roth Marine Biology Station in the Florida Keys, I have worked collaboratively with Dr. Butler to create a partnership between Goshen College and Old Dominion University. Our goal has to been to increase the quality of research based at our facility, while providing outstanding teaching opportunities for both ODU and Goshen students. Dr. Butler is quite simply both an outstanding scholar and teacher, and someone who understands the important links between these approaches. In Dr. Butler we have found a colleague with impeccable research credentials, but more importantly we have observed Dr. Butler's ability to engage students in active inquiry related to marine biology. His engagement with our college has energized our Marine Biology program and I look forward to many more years of creative and collaborative development of curriculum and opportunities for students interested in marine science.

--Ryan L. Sensenig, Ph.D., Assistant Professor of Biology, Director of Environmental Science Program, Lindsey Fellow, Goshen College

"When I was asked, in 2003, to form a working group of global experts on reef connectivity for the World Bank's Coral Reef Targeted Research project, Mark was one of my first choices. His participation has been one of the reasons we have been very successful over the past 5 years.

I have interacted frequently with him since 2003, both within this project and outside it. My early good impression of him has only strengthened. As well as being talented scientifically, he is intellectually and personally honest, reliable, and totally dependable. Further, while doing cutting-edge research, he makes time for the seldom-rewarded tasks involved in transferring knowledge to management agencies, especially in developing countries. He interacts with developing country managers and students in an egalitarian, non-patronizing way, always taking extra time to be sure that the exchange of ideas has been effective. This is the kind of academic that the real world really needs -- an outstanding researcher who can teach far outside the classroom as well as on campus."

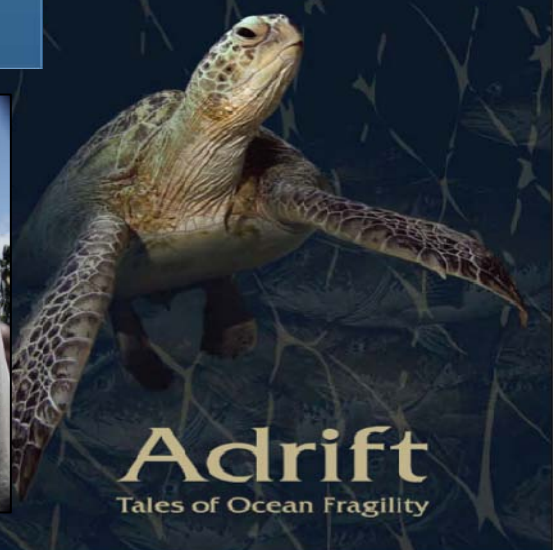
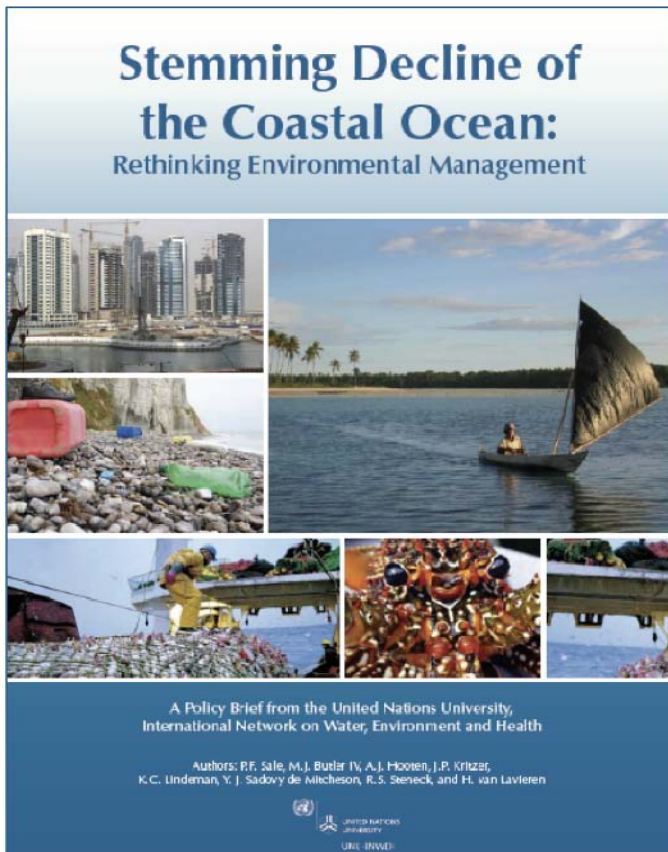
--Peter F. Sale, Assistant Director, International Network on Water, Environment and Health
United Nations University and University Professor Emeritus, University of Windsor

"In a professional capacity, I have known Mark as a co-editor of The Lobster Newsletter, a free on-line newsletter that is subscribed to by anyone with an interest in lobster issues (http://www.fish.wa.gov.au/the_lobster_newsletter/Index.html). He has recently stepped back from that role, but during the period that we worked on the newsletter together I was continually impressed with his enthusiasm and ability in getting lobster research accessible to not only experts, but to people across all walks of life. He is an inspirational scientist."

--Roy Melville-Smith, Supervising Scientist: biodiversity and Biosecurity Branch, Western Australian marine Research Laboratories

Knowledge Integration: Putting Marine Science to the Acid Test.

Professor Butler's research findings on exploited marine species, such as lobsters and sponges, has found direct application in his international outreach activities in resource management. Top left: Co-authored policy brief to the United Nations. Top right: EPA public brochure on spiny lobster nursery habitat. Middle right: Sponge fisherman's vessel with whom Professor Butler has collaborated. Bottom right: IUCN "coffee table" book on ocean fragility in which Professor Butler's work on lobster ecology is highlighted in the chapter "*More than an Entree*". Bottom Left: Professor Butler (on right) discussing resource management issues with fishermen on the beach in St. Kitts, Caribbean Leeward Islands.



Discovery: Advancing understanding of coastal ecology, disease dynamics, and resource sustainability in our tropical oceans.

Top left: Professor Butler in his business suit. Top right: Another day at "the office". Middle right: Research subjects: a massive loggerhead sponge whose filter feeding activities help maintain the crystal clear tropical waters, while also providing critical shelter for juvenile lobsters in Caribbean nursery habitats. Bottom right: Professor Butler's studies of the dispersal, behavior, and nursery habitat requirements of spiny lobsters - like the crystalline postlarvae shown here - have revolutionized the field and set the stage for international fishery management strategies. Bottom left: A portrait of Professor Butler's marine "lab rat" - a spiny lobster.



Teaching: Students Learn Science by Doing Science.

Top Left and Right: Professor Butler's "classroom" in the Florida Keys where students get wet learning experimental techniques and participate directly in Dr. Butler's research projects. Middle Left: Students of all ages have benefitted from Professor Butler's hands-on approach to teaching marine science. Middle right: The salt marsh behind Professor Butler's home becomes a teaching laboratory each fall for his marine ecology class. Bottom left and right: The story is true. At left is "Jackie", the student from rural Virginia who couldn't swim, shown here on her first snorkeling adventure on a coral reef. The other true part of the story - one of the two grey reef sharks who showed up on that trip.

