REPORT TO THE
HARBOR BRANCH OCEANOGRAPHIC INSTITUTE FOUNDATION
SUBMITTED BY
MEGAN DAVIS, PH.D., INTERIM EXECUTIVE DIRECTOR
FAU HARBOR BRANCH
AUGUST 28, 2015

Grant: New Faculty Hiring Plan

Purpose: Invest in new faculty to carry out research initiatives related to the HBOI Strategic Plan. The new faculty will increase HBOI’s ability to grow its research portfolio and to enhance the University’s overall research enterprise.

Inception/term: FY 2014/7 years

Grant award: $5,481,051

Report section                  Page
Laurent Chérubin, Ph.D.          1
Mingshun Jiang, Ph.D.            14
Marty Riche, Ph.D.               29
Guojun Wang, Ph.D.               49
Michael Twardowski, Ph.D.        54
Laurent Chérubin, Ph.D.
Hired August 26, 2013
Associate Research Professor
Ocean Dynamics & Modeling (Ocean Modeling & Bio-physical Processes Lab)

Dr. Chérubin is a physical oceanographer specialized in the understanding of ocean dynamics, which is the study of why the water moves the way it moves. It establishes the connection between forces that act on the ocean, such as gravity, the earth’s rotation, the wind, the moon and the heat from the sun, and the water motions. His research has focused on dynamics of motions associated with instabilities in coastal currents and eddies, using both analytical and numerical models in the quasi-geostrophic, shallow-water formalisms, and in realistic models. Dr. Chérubin also is interested in the relationships between these factors and marine population connectivity, larval transport, spawning aggregations, and coral reef community ecology. This research provides a deep understanding of the environmental forces that affect ocean ecosystems at multiples levels of the trophic chain.

Dr. Chérubin’s CV begins on page 4.

Use of start-up funds
Please see page 14 for a spreadsheet comparing start-up spending to budget.

Significant purchases
A portion of the start-up funds went toward development of a high-performance computing center at Harbor Branch, which will provide the processing capabilities needed to run simulations of marine aquatic systems. For the SLP-funded IRL Ventilation Rate project, 3 Microstar, 3 SVP and 10 surface shallow drifters were purchased. Four Cyclops chlorophyll, 4 Cyclops CDOM, and 4 Smart turbidity sensors were purchased to equip the shallow drifters. The drifters are equipped with telemetry to transmit in real time water quality measurements from the sensors. All drifters will be used to track the water pathways in the Lagoon near Ft Pierce Inlet. A tempest drone with a multispectral camera, which is used for water quality monitoring at the surface of the Lagoon waters was also purchased. The Institute is in the process of getting its Certificate of Authorization to fly the drone.

Team
- Kelley Kearney, Ph.D. – Postdoctoral Investigator – 1/20/2013 to 2/19/2015
- Lysel Garavelli, Ph.D. – Postdoctoral Investigator – 7/7/2014 to present
- Aaron Evans, Ph.D. – Programmer – 12/12/2014 to present
- Shekhar Suman – Link Foundation Summer Intern – 5/2014 to 8/2014
- Mahdi Esfahanian – Link Foundation Summer Intern – 5/2014 to 8/2014
- Bertrand Lequeux – Intern – 7/2014 to 09/2014
- Pauline Tedesco – Intern – 4/2015 to 8/2015

A sensor-equipped drifter in the lab
Grants
Transferred

- Integrated MODels for Evaluating Climate Change, Population Growth, & Water Management (i.e. CERP) effects on south Florida coastal marine and estuarine ecosystems (iMODEC) – PI: L.M. Chérubin – $20,013 (NOAA) – 8/1/2012 to 7/31/2015

Awarded

- Application of Underwater Laser Technology to Track Fish Eggs – PI: A. Vuorenkoski Dalgleish; Co-PI: L.M. Chérubin – $14,978 (HBOIF Save Our Seas specialty license plate) – 2/30/2015 to 9/30/2015

Submitted

- Consortium for Human-Robotic Operations Modeling of Environmental Spills Response (CHROMER) – PI: L.M. Chérubin; Co-PIs: F.R. Dalgleish, A. Vuorenkoski Dalgleish, B. Ouyang, P.P. Beaujean – $12,772,968 (Gulf of Mexico Research Initiative)
- Management of red hind (Epinephelus guttatus) spawning aggregations in the US Caribbean Islands: what is the most effective option? – PI: L.M. Chérubin – $148,241 (University of the Virgin Islands federal flow through from NOAA Saltonstall-Kennedy)
- Innovative Sampling Strategies Using a Network of Mobile Persistence Presence Platforms to Investigate tracer Dynamics Within Oceanic Eddies – PI: L.M. Chérubin; Co-PIs: F.R. Dalgleish, J. VanZwieten – $1,192,381 (Gulf of Mexico Research Initiative)

Declined

- Collaborative Research: Investigating the Transmissibility of Coral Disease at Multiple Scales – PI: L.M. Chérubin – $274,246 (National Science Foundation)
- Modeling near bottom carbon dioxide and pH over the Florida Keys and Pulley Ridge coral reefs in the southwest Florida shelf – PI: M. Jiang; Co-PI: L.M. Chérubin – $24,791 (HBOIF Save Our Seas specialty license plate)
- Ocean Acidification: Collaborative Research: Variability of Deep-water Carbonate Chemistry and Coral Responses in the Southeastern U.S. – PI: M. Jiang; Co-PIs: J. Reed, F.R. Dalgleish, L.M. Chérubin, A. Vuorenkoski Dalgleish – $600,000 (National Science Foundation)
- Projecting the Coupled Effects of Eutrophication and Ocean Acidification on Florida Bay and the Florida Reef – PI: M. Jiang; Co-PI: L.M. Chérubin – $577,601 (University of Miami federal flow through)
- Real-time networked sampling of coastal eddies in the Southeast USA using gliders, drifters and HF radar – PI: F.R. Dalgleish; Co-PIs: L.M. Chérubin, A. Vuorenkoski Dalgleish – $50,000 (Southeast Coastal Ocean Observing Regional Association federal flow through)
• Predictability of Oil Spill Dispersion in the Gulf of Mexico – PI: L.M. Chérubin – $394,089 (Florida State University)

Publications


Chérubin, L.M., L. Garavelli. Eastern Caribbean circulation and island mass effect on St. Croix, US Virgin Islands: a mechanism for relatively consistent recruitment patterns. (Submitted to PLOS ONE)

Scientific Presentations


Laurent M. Chérubin
PHYSICAL OCEANOGRAPHER

Florida Atlantic University, Harbor Branch Oceanographic Institute
5600 US 1 North, Fort Pierce, Florida 34946

PERSONAL
Current Academic Rank: Research Associate Professor
Primary Department: Ocean Dynamics and Modeling
Office Telephone: 772 242 2314
Office Fax: 772 242 2412
E-mail: lcherubin@fau.edu

ACADEMIC APPOINTMENTS
September 2013 to present: Research Associate Professor at Harbor Branch Oceanographic Institute, Florida Atlantic University
September 2012 to August 2013: Adjunct Faculty in oceanography, physics and mathematics at Miami-Dade College
January 2011 to present: Associate Scientist at the University of Miami-Rosenstiel School of Marine and Atmospheric Science (RSMAS).
2011: Visiting Scientist at the University of the Virgin Islands – Center for Marine and Environmental Studies.
January 2004 to 2010: Assistant Scientist at RSMAS.
March 2002 - December 2003: post-doctoral associate at the University of Miami- RSMAS. Advisers: Pr. Eric Chassignet (RSMAS) and Pr. Wilton Sturges, Florida State University, Tallahassee.

JOB DESCRIPTION/DUTIES
In charge of the observatory and modeling components of various projects funded by federal grants (NFS, ONR, USGS, NOAA) and NGOs. Deployment of oceanographic equipments at sea. Data processing and analysis. Theoretical research on coastal currents and vortex dynamics. Numerical studies of reef ecosystem oceanography and biophysical processes. Graduate students and post-docs mentoring. Teaching at the undergraduate and graduate level.

COMPETENCES
Physical Oceanography
Current and vortex instabilities, eddy formation and interaction with topography; coastal shelf processes and circulation; water-masses and mixing processes; numerical modeling (MICOM,
ROMS), biophysical coupling, Lagrangian transport in coastal waters and marine population connectivity; sub-mesoscale dynamics and vertical fluxes; remote sensing.

**Bio-physical Oceanography**
Individual Based-Model, marine population connectivity, larval transport, coral reef community’s ecology, spawning aggregation

**Experience at sea and field studies**
Thirteen oceanographic cruises and one as chief scientist.
Equipment: expandable probes (XBT, XCTD, XCP), CTD, LADCP, surface drifters, RAFOS floats, acoustic source, mooring assembly and deployment.
Small boat field trips; instruments, moorings, ROV deployments; diving and snorkeling trips.

**Methodologies**
Process studies, experiment at sea, coastal field studies, numerical modeling (quasi-geostrophic, primitive equations, contour dynamics), data processing, data analysis.

**Computer experience**
Unix, Matlab, Latex, Fortran, Live Access Server.

**Languages**
French: native tongue
English: fluent
Spanish: read and spoken
Portuguese: read and spoken

**ACADEMIC QUALIFICATIONS**


**1995 - DEA (Master’s degree) in Physical and Coastal Oceanography** (With honors). University of Méditerranée, Marseille – France.
Classes: Carbon cycle; Marine ecological processes; Introduction to Ecological modeling; Remote sensing; Waves theory; Analysis of stochastic processes; Numerical modeling and observational techniques. Coastal oceanography.

**1993 - BS in Fluid Mechanics** (Maîtrise de Mécanique)- University of Bordeaux I – France.
Classes: Optimization techniques; Partial derivative equation analysis; Fluid mechanics; Numerical methods; Deformable solid mechanics; Physics of transfers.

**OTHER ACTIVITIES**

**I. Projects at sea**

**March-April 2011:** Fish movement during spawning aggregation using acoustic imagery in poor light conditions (PI).

**February-May 2009:** Coral reef and reef fish monitoring at Glover’s Reef Atoll, Belize. Supervisor

**2003-2005:** Coastal landscape, wetland and tidal channel evolution affecting critical habitats of Cape Sable, Everglades National Park, Florida: collaborator, small boat survey, data processing and analysis (PI Prof Harold Wanless).

**October 2003:** guest on the Windward Passage Experiment.

**September 2001:** co-PI of the project MEDTOP01/3 (Mediterranean Outflow and Topography, Institute of Oceanography of Lisbon, University of Lisbon). Survey, processing, and analysis.
June - July 2001: PI of the project SEMANE (Mediterranean Outflow in the Atlantic, French Navy).

May 2001: co-PI of the project MEDTOP01/2.

February 2001: co-PI of the project MEDTOP01/1.


July 1999: co-PI of the project SEMANE 99.

June - July 1997: co-PI of the project SEMANE 97.

September - October 1995: co-PI of the project SEMANE 95.

II. Teaching and student mentoring experience and other synergistic activities

Co-Organizer: 2009 Ecosystem modeling Workshop, St. Petersburg, Florida, 14-16 October.

Lecturer and teacher
- PHYS 1004 and 2053, Miami Dade College.
- MAT 1033, Miami Dade College.
- MPO 583. Ocean Monitoring Systems and Implementation Strategies, RSMAS.
- Coastal Dynamics Modeling, CNRS Thematic School, France. Practical training of the ROMS model (September 2006)

Committee member
Master’s students: Sophia Mckenzie and LeAnn Colon, University of the Virgin Islands (present). Ph.D. student Mandy Karnauskas, Univ. of Miami, USA (2006-2011); Ph.D. student Jean-Olivier Irisson, Univ. of Perpignan, France (2006-2008); Benjamin Jaimes, MS thesis (2003-2005), Univ. of Miami, USA.

Post-doctoral adviser
Joann Gyory, University of the Virgin Islands (present). Silvia Gremes-Cordero, Univ. of Miami USA (2010). Jean-Olivier Irisson, Univ. of Miami USA (2008-2009).

Manuscript reviewer

Proposal reviewer
NSF OCE, BIO OCE

Model development
- CARibbean Regional Association (CARa) regional ocean forecasting system, PI. (http://www.caricoos.org/drupal/)
- Connectivity Modeling System (CMS) intended to be a community population connectivity model that will serve to support marine population studies - collaborator (http://www.rsmas.miami.edu/personal/cparis/cms/description.html)

III. Summer School - Seminars

Summer School
- Cambridge UK, 1996: Sixth National Geophysical Environmental Fluid Dynamics Summer School (GEFD), University of Cambridge.

**Seminars**
- Chérubin, L. M. (2010), Uncovering the role of sub-mesoscale dynamics in coastal ecosystems. Florida Gulf Coast University; LPO IFREMER, Brest France.
- Chérubin, L. M. (2006) How to account for the spatial and temporal variability of Lagrangian parameters RSMAS/MPO, University of Miami USA.

**IV. Workshops and Invited Talks**
modeling. ICES Workshop on advancements in modelling physical-biological interactions in fish early-life history, Nantes (France) 3-5 April.

- Workshop on the Mediterranean Water in the Atlantic 2003, Brest (France).

V. Talks

- European Geophysical Society (EGS) (Abstract), Nice (France), 1998.
- IAPSO-IAMAS (Abstract), Melbourne (Australia), 1997.
- EGS (Abstract), Vienna (Austria), 1997.
- EGS (Abstract), Den Haag (Holland), 1996.

VI. Miscellaneous
- International Kite-surfing Organization Instructor, Level II, #3905
- CMAS certified scuba diver, **
- Rugby player (#4, #11) in college and club (Brest Université Club, France, 1995-2000)
- First Aid certification Expired (09)

**BIBLIOGRAPHY**

Peers reviewed articles


**Submitted articles**


Chérubin, L.M., and L. Garavelli. Eastern Caribbean circulation and island mass effect on St. Croix, United States Virgin Islands: a mechanism for relatively consistent recruitment patterns Submitted to *Progress in Oceanography*.

### Estimated Budget Categories

<table>
<thead>
<tr>
<th>Estimated Budget Categories</th>
<th>Funds Received During FY 2014</th>
<th>Funds Expended During FY 2014</th>
<th>Funds Received During FY 2015</th>
<th>Funds Available During FY 2015</th>
<th>Funds Expended During FY 2015</th>
<th>Funds Remaining During FY 2015</th>
<th>Funds Received During FY 2016</th>
<th>Funds Expended During FY 2016</th>
<th>Funds Remaining During FY 2016</th>
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<tbody>
<tr>
<td>Salary &amp; Benefits - PI</td>
<td>52,989</td>
<td>44,887</td>
<td>8,102</td>
<td>52,416</td>
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<td>Salary &amp; Benefits - Post Doc</td>
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<td>58,230</td>
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<td>Salary &amp; Benefits - Graduate Research Assistant</td>
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<td>Post Doc Supplies &amp; Travel</td>
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<td>Server</td>
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<td>(26,148)</td>
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<td>Miscellaneous Office Setup</td>
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<td>434</td>
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<tr>
<td>Scientific Equipment - Purchases, Parts &amp; Supplies</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>74,781</td>
<td>-</td>
<td>65,321</td>
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<tr>
<td>Scientific Equipment - Engineering Support (Design, Construction)</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>2,840</td>
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<td>Travel - Scientific Conferences</td>
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<td>1,550</td>
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<td>Moving Expenses</td>
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<td>2,200</td>
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<tr>
<td>Totals</td>
<td>171,633</td>
<td>89,942</td>
<td>81,691</td>
<td>252,416</td>
<td>334,107</td>
<td>195,311</td>
<td>138,797</td>
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</tr>
</tbody>
</table>

Note: Year 1 was Partial Year: Cherubin start date was August 26, 2013

### Significant Purchases: Year 1

- Portion of shared Microway High Performance Computing System: 26,148
- Office Computing & Modeling systems: 10,851
- **Year 1 Significant Purchases Total**: 36,999

### Significant Purchases: Year 2

- Microstar GPS Drifter: 4,587
- Aргенaut-XR 3-D Acoustic Doppler Current Meter: 7,860
- Cyclops-C7 Chlorophyll Sensor: 7,619
- Cyclops-C7 CDOM Sensor: 8,569
- Smart Turbidity Meters (4): 12,349
- SVP Drifters (3): 5,204
- Surface Drifters with GPS (10): 5,188
- **Year 2 Significant Purchases Total**: 51,376

### Known Commitments from Year 2 funds:

- Tempest Drone: 39,584
Mingshun Jiang, Ph.D.
Hired September 23, 2013
Associate Research Professor
Ocean Dynamics & Modeling (Physical-Biogeochemical Ocean Observation &
Modeling Lab)

Dr. Jiang is a physical oceanographer specializing in coupled physical-biogeochemical-ecological
modeling. His research interests include estuarine and coastal dynamics, iron and carbon cycles, water
quality, ecosystem functioning, and coastal inundation. Dr. Jiang has been developing numerical models
for a wide range of marine systems from coastal to open oceans including Boston Harbor,
Massachusetts Bay, Gulf of Maine, Pacific Ocean, and Southern Ocean. These models provide powerful
tools to studying fundamental marine processes such as river plumes, meso-scale eddies, nutrient fluxes
and harmful algal blooms, iron and carbon cycling, and coastal flooding. Understanding of these
processes is critical to addressing a number of pressing issues for coastal and ocean environments
including land-ocean interactions, human activities and eutrophication, carbon cycle and ocean
acidification, and the impacts of sea level rise. This knowledge will further assist in the management
decisions in marine ecosystem protection, habitat restoration, and conservation efforts.

Dr. Jiang’s CV begins on page 18.

Use of start-up funds
Please see page 30 for a spreadsheet comparing start-up spending to budget.

Significant purchases
A portion of the start-up funds went toward development of a high-performance computing center at
Harbor Branch, which will provide the computing capabilities needed to run massive simulations of
ocean systems. Other purchases included a 16-processor workstation for modeling and data
visualization, specialized software for configuring the simulations, several state-of-the-art water sensors
for collecting high-resolution in situ biochemical data, and a lightweight
tow vehicle (Acrobat; see image) that will be a platform for the sensors
and can operate in shallow aquatic environments. The Acrobat will be
used to help studying estuarine-coastal physical-biogeochemical
processes including the movement and effects of fresh water plumes in
the St. Lucie Estuary, a project funded by a NOAA grant (see below) that
was secured with these capabilities. This investment is also augmented
by several other sensors purchased with a NOAA-CIOERT grant.

Team
Chudong Pan, Ph.D. – Postdoctoral Investigator – 5/12/2014 to present
Ahsan Habib – Master’s Student – 1/1/2015 to present
Jason Peck – Link Foundation Summer Intern (co-advised with F. Dalgleish) – 5/2014 to 8/2014
Rhiana Holland – Link Foundation Summer Intern – 5/2014 to 8/2014
Stella Coelho – Link Foundation Summer Intern (co-advised with P. Wills) – 5/2015 to 8/2015
Grants Awarded

- Water quality impacts of St. Lucie river plume on northern end of the Florida Reef Tract – PI: M. Jiang; Co-PI: B.E. Lapointe – $59,556 (NOAA Coral Reef Conservation Program) – 8/1/2015 to 1/31/2017
- An Initiative to Design and Demonstrate a Prototype Integrated Multi-Trophic Aquaculture System for Sustainable Land-Based Aquaculture – PI: P.S. Wills; Co-PIs: M. Jiang, A. Vuorenkoski Dalgleish – $100,000 (HBOIF Aquaculture specialty license plate) – 7/1/2015 to 6/20/2016
- Connectivity of the Pulley Ridge - South Florida Coral Reef Ecosystem: AUV/ROV Complementary Technology Development – AUV/ROV Complementary Technology Development
- Submitted
- PIRE: Our Virtual Global Estuary – subcontract PI: M. Davis; Co-PI: M. Jiang – $29,557 (National Science Foundation)
- Collaborative Research: An integrated high-resolution field and modeling study water column controls on the calcium carbonate cycle in the Gulf of Maine – PIs: Z.A. Wang, G. Lawson, C. Pilskaln, M. Jiang – $1,330,000 (HBOI portion $126,000; National Science Foundation)

Grants Declined

- Development of a prototype operational forecast system for the southwest Florida freshwater plume for water quality monitoring and management – PI: M. Jiang; Co-PIs: B.E. Lapointe, L.M. Chérubin, C. Hu – $194,727 (Environmental Protection Agency, Gulf of Mexico Program)
- Coastal SEES: Collaborative Research: Changing land-use and the ecological sustainability of Florida’s Indian River Lagoon – PI: B.E. Lapointe; Co-PIs: M. Jiang, Z. Xie, D. Mistova – $1,300,000 (HBOI portion $1,000,000; National Science Foundation)
- Ocean Acidification: Collaborative Research: Variability of deep-water carbonate chemistry, and coral responses in the southeastern U.S. – PI: M. Jiang; Co-PIs: J.K. Reed, F.R. Dalgleish, L.M. Chérubin, et al. – $1,700,000 (HBOI portion $640,00; National Science Foundation)
- Observing and Modeling Water Quality and pH in St. Lucie Estuary – PI: M. Jiang; Co-PI: B.E. Lapointe – $199,351 (NOAA Florida Sea Grant)
- Projecting the Coupled Effects of Eutrophication and Ocean Acidification on Florida Bay and the Florida Reef – PI: M. Jiang; Co-PI: L.M. Chérubin – $577,601 (University of Miami federal flow through)
• *In-situ* and Modeling Study on the Carbon Dioxide System of the Meso-photic Coral Reefs at the Pulley Ridge – PI: M. Jiang; Co-PI: Z.A. Wang – $51,177 (CIOERT-NOAA)

**Publications**


Pan, C. M. Jiang, and F. Dalgleish, 2015, Impacts of the Loop Current on the Meso-scale Circulation over Pulley Ridge on the southwest Florida Shelf. (In development; to be submitted to *Cont. Shelf Res.*)

Jiang, M., C. Pan, J. Salisbury, R. Wanninkhof, 2015, CO$_2$ variability driven by large-scale and meso-scale processes in the southwest Florida shelf/slope. (In development; to be submitted to *Deep Sea Research I*)

**Presentations**


Panc C., and M. Jiang, 2015, Modeling the Loop Current Impact on the Shelf Circulation and Water Properties over the Pulley Ridge: a Preliminary Analysis, Florida Academy of Science, March 20-21, St. Leo, FL.

Jiang, M. and C. Pan, 2015, Meso-eddies and carbonate chemistry over deep coral reefs in the Florida Straits, Feb. 28, Shanghai Jiaotong Univ.
Mingshun Jiang
Harbor Branch Oceanographic Institute
Florida Atlantic University
5600 US 1 North, Ft. Pierce, FL 34946
Email: jiangm@fau.edu
Phone: (772) 242-2254, Fax: (772) 242-2412

Education
Ph.D., Physical Oceanography, Ocean University of Qingdao, Qingdao, P.R. China, 1994
B.S., Applied Mathematics, Peking University, Beijing, P.R. China, 1986

Professional Experience
2013-present Associate Research Professor Harbor Branch Oceanographic Institute, Florida Atlantic University
2010-present Adjunct professor School for the Environment (previous EEOS), University of Massachusetts Boston
2002-2013 Research Associate School for the Environment (previous EEOS), University of Massachusetts Boston
2012-2013 Consultant Deluares-USA, Inc.
1999-2002 Post-Doctoral Associate School of Marine Sciences, University of Maine
1998 Visiting scholar Dept. of Marine Sciences, Univ. of Georgia
1996-1997 Associate Scientist Institute of Atmospheric Physics, P.R. China
1994-1996 Post-Doctoral Associate Dept. of Geophysics, Peking University, PRC
1989-1994 Teaching Assistant Ocean University of Qingdao, P.R. China
1986-1989 Lecturer Nanjing Institute of Meteorology, P.R. China

Research Interests
- Coupled physical-biogeochemical-ecological modeling
- Estuarine and coastal dynamics
- Water quality and phytoplankton blooms
- Fe and carbon cycles
- Transport, dispersion, and retention of zooplankton and fish larvae
- Coastal inundation and impacts of climate change
Research Grants

- Connectivity of the Pulley Ridge - South Florida Coral Reef Ecosystem: AUV/ROV Complementary, Fraser Dalgleish (PI) and Mingshun Jiang (co-PI), NOAA/CIOERT, July 1, 2014-June 30, 2015, $250K.


- Development of a coupled physical-biological model and investigation of the inter-annual and long-term changes of plankton abundances in the Gulf of Maine, Healey Endowment Grant, Mingshun Jiang (PI), Zhongping Lee, Meng Zhou, 07/01/2012-06/30/2013, $12K.

- Collaborative data mining research center (DMRC) on cyber-enabled discovery and innovation, University of Massachusetts President’s Science and Technology Fund 2012, PIs: Dan Simovici (PI), Wei Ding, Melissa Morabito, Meng Zhou, Mingshun Jiang, 08/01/2011-07/31/2012, $125K.

- Collaborative Research: Modeling and synthesis study of a natural iron fertilization site in the Southern Drake Passage. Meng Zhou (PI), Mingshun Jiang (co-PI), NSF, 08/01/2010-07/31/2013, $176,459.


- Developing the forecasting model-GIS system for the physical environment in Massachusetts Bay. M. Zhou (PI), Y.Q. Tian, Mingshun Jiang, University of Massachusetts, President Fund, 7/2005-6/2006, $39,773.


- The multi-fractal characteristics of finestructures in the western equatorial Pacific Ocean. National Science Foundation of China (NSFC) (1/96-12/98). 130,000 RMB (~$16,000). PI.

Field Surveys
• St. Lucie Estuary, Florida, Sept. 2014, 2 days
• Ft. Lauderdale, Florida, July 14, 1 day
• East China Sea, 1991, 7 days
• North Sea (Guangxi, China), 1992, 2 days
• Massachusetts and Cape Cod Bay, 2004, 1 day
• Boston Harbor, 2008, 1 day
• Boston Harbor, 2012, 1 day
• Florida Strait, 2014, 1 day

Societies and Professional Affiliations
• American Geophysical Union (AGU)
• American Society of Limnology and Oceanography (ASLO)
• The Oceanography Society (TOS)
• Chinese American Oceanic and Atmospheric Association (COAA)

Journal Review

Proposal Review
NSF, NOAA, NERC-UK

Peer-reviewed Publications


**Non-Peer Reviewed Publications**


**Manuscripts**

• **M.S. Jiang** and M. Zhou, 2013, Dynamics of the Gulf of Maine intruding current into Massachusetts Bay (To be submitted to *Continental Shelf Research*).


Presentations


- **Jiang, M.S.** et al., 2013, Fe transport from the Antarctic shelf and the impacts on phytoplankton blooms in the southern Scotia Sea, OCB summer workshop, July 22-25, 2013, Woods Hole, MA.


- **M.S. Jiang,** 2010, Nutrient input and phytoplankton competition in Massachusetts Bay spring bloom, November 2, 2010, Laboratoire d'Oceanographie Physique et Biogéochimie, CNRS/Université de la Méditerranée.


• **M.S. Jiang**, 2007, Modeling and Forecasting the Massachusetts Bay Ecosystem. March 7, 2007, Chinese Academy of Atmospheric Science, Beijing, China (invited).


• M.S. Jiang, and M. Zhou, 2005, Inter-annual variability of springtime zooplankton transport into Cape Cod Bay and the implication to right whale foraging activity, RARGOM meeting, July 7-9, 2005. Ogunquit, Maine.


• M.S. Jiang, and F. Chai, 2005, Modeling the ecosystem and carbon cycle in the equatorial Pacific, January 5, 2005. Institute of Oceanology, Chinese Academy of Science, China (invited).

• M.S. Jiang, M. Zhou, and G.T. Wallace, 2004, Modeling the ecosystem and water quality in Massachusetts Bay, December 23 2004, Xiamen University, China (invited).

• M.S. Jiang, M. Zhou, G.T. Wallace and Z. Zhang, 2004, The formation of a high nutrient low oxygen pool in Cape Cod Bay during summer. RARGOM meeting, July 15, University of Massachusetts Boston, USA.

• Wallace, G. T., F. Pala, L. Li, M.S. Jiang, M. Zhou and C. Krahforst, Metal Distributions in the Water Column and Sediments of Boston Harbor, Massachusetts and Cape Cod Bays – An Integrated Modeling Approach. RARGOM meeting, July 15, University of Massachusetts Boston, USA.


- F. Chai, H. Xue, **M.S. Jiang** and A. Thomas, 1999, Coupled circulation/ecosystem model with coastal applications. *Sigma coordinate ocean model users meeting ’99*. Bar Harbor, Maine, USA

<table>
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<td>-</td>
<td>-</td>
<td>534</td>
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<td>Totals</td>
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<td>122,154</td>
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<td>213,756</td>
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</table>

Note: Year 1 was Partial Year: Jiang start date was September 23, 2013

Significant Purchases: Year 1

- Portion of shared Microway High Performance Computing System: 50,229
- YSI/Xylem Water Quality Sonde & Conductivity/Temperature Sensors: 9,555
- Deltares Delft3D Hydro-Morphodynamics & Water Quality System: 4,471
- Office Computing & Modeling systems (portion): 2,531
  Year 1 Significant Purchases Total: 66,786

Significant Purchases: Year 2

- pH Sensor & Temperature Logger: 2,402
- Acrobat Tow Vehicle: 62,370
- SeaFET Sensor: 10,224
  Year 2 Significant Purchases Total: 74,996
Marty Riche, Ph.D.
Hired September 15, 2014
Research Professor
Aquaculture & Stock Enhancement

International in scope, Dr. Riche’s aquaculture experience in the private, public, and academic sectors spans 30 years, and he is recognized as an expert in freshwater and marine fish culture, larval culture, feed formulation, fish nutrition, and design and operation of recirculating aquaculture systems. He served two years as a Peace Corps volunteer in Sierra Leone, West Africa. He received a Ph.D. from Michigan State University in Aquatic Animal Nutrition and earned the Global Young Scholars’ Award. In 1997, Dr. Riche was selected for the National Academies of Science Christine Mirzayan Science & Technology Policy Graduate Fellowship Program. He served a one-year appointment to the National Indian Center for Marine and Environmental Research & Education to develop research facilities and curricula in aquaculture. In 2001, Dr. Riche joined USDA’s Agricultural Research Service as the Lead Scientist for the Sustainable Marine Aquaculture Systems project located at FAU’s Harbor Branch Oceanographic Institute, and later received the Agricultural Research Service’s Southern Plains Area Early Career Research Scientist of the Year award. He supplements his research by serving as an Aquaculture without Frontiers volunteer in African nations, sharing his knowledge with governmental and non-governmental organizations as well as with small- and medium-scale farmers.

Dr. Riche’s CV begins on page 34.

Use of start-up funds
Please see page 50 for a spreadsheet comparing start-up spending to budget.

Significant purchases
The Synergy H1 Multi-Mode Reader is a hybrid system that allows for optical scanning at any excitation and/or emission wavelength (high-flexibility mode) and a filter-based optical module (high-sensitivity mode) for conducting fluorescence-based assays. Typical applications include nucleic acid quantification, protein quantification, enzyme kinetics, enzyme quantification, biomarker quantification, and ELISAs, which can be used to help assess the nutritional value of experimental feeds.

Pending purchases
High pressure liquid chromatography (HPLC) is a rapidly changing technology for separating principal building block components of feeds, feed ingredients, plant and animal tissues, as well as other small molecules. Recent advances have led to a new technology, ultra-high pressure liquid chromatography (UHPLC) which allows faster separation and higher throughput. In the case of amino acids, which is critical for investigating fish nutrition and alternative protein sources to fish meal, this represents a 10 min sample run time for UHPLC relative to 60 min for HPLC. Although both technologies represent powerful analytical tools, each can have benefits and drawbacks depending on the analysis demands placed on it. In order to best leverage the investment, Dr. Riche has been conferring with a few of the other HBOI faculty on potential collaborations and funding opportunities to gauge current and future needs. They have been evaluating multiple platforms for both technologies to provide the greatest flexibility and affordability to meet the variety of assays we anticipate running. He is continuing to collect quotes for the equipment and anticipates making a purchase in November 2015.
Similar to HPLC, gas chromatography-mass spectrometry (GC-MS) is a powerful analytical tool to separate and quantify components in complex materials, based on their ability to be volatilized. As with HPLC, GC-MS lends itself to a wide variety of different assays with different system components and requirements. Again, to best leverage the investment, Dr. Riche is taking a similar approach as above. There are currently at least two funded projects among the faculty in aquaculture, as well as his IMTA project that will benefit from this piece of equipment. It is anticipated that all leg work will be completed and the GC-MS purchased by December 2015.

Team
Maxine Holst – Research Assistant – 5/5/2015 to present
Jamie Bonino – Link Foundation Summer Intern – 5/2015 to 8/2015

Grants
Awarded
   • Supplement: An Initiative to Design and Demonstrate a Prototype Integrated Multi-Trophic Aquaculture System - Sea Urchins – PI: S. Laramore; Co-PI: M. Riche – $33,333 (HBOIF Aquaculture specialty license plate) – 7/1/2015 to 6/30/2016

Submitted
   • Application of underwater LED lighting with tunable spectra and intensity to enhance larval quality and production of marine fish – PI: M. Riche; Co-PI: P.S. Wills – $177,888 (Florida Sea Grant federal flow through)
   • On-farm Application of Integrated Multi-Trophic Aquaculture to Land-Based Systems to Improve Water Quality and System Sustainability – PI: P.S. Wills; Co-Pls: S. Laramore, M. Riche – $274,428 (Sustainable Agriculture Research & Education federal flow through)

 Declined
   • Developing Diets for the Economical Production of Aquacultured Pinfish To Supply the Sportfish Industry – PI: M. Riche – $66,922 (Florida Department of Agriculture Aquaculture Review Council)

Publications


MARTY A. RICHE
5025 Bald Cypress Trail, Fort Pierce, FL 34951
(870) 672-2860
marty.riche@gmail.com

ACADEMIC PREPARATION:

Ph. D.  Aquaculture - Aquatic Animal Nutrition  2000
Michigan State University, East Lansing, Michigan, USA
Dissertation: Effect of phytic acid on nitrogen retention in tilapia
(Oreochromis niloticus).

M.S.  Aquaculture - Aquatic Animal Nutrition  1993
Purdue University, West Lafayette, Indiana, USA
Master’s Thesis: True and apparent phosphorus absorption coefficients for rainbow trout
(Oncorhynchus mykiss) fed plant and animal proteins.

B.S.  Fishery Biology  1988
Humboldt State University, Arcata, California, USA
Senior Thesis: Clearance rate of plasma ammonia in steelhead trout (Oncorhynchus
mykiss) after induced exercise.

EXPERIENCE:

Research Professor, Fish Nutrition (September 2014 – present)
Florida Atlantic University, Harbor Branch Oceanographic Institute, Fort Pierce, FL
* Research in nutrition and physiology of aquatic animals.
* Research of larval marine fish.

Research Fish Biologist (July 2011 – June 2014)
United States Department of Agriculture, Agricultural Research Service, HKD, Stuttgart
National Aquaculture Research Center, Stuttgart, AR
* Research in nutrition & physiology of hybrid striped bass, larval feeds development.

Acting Center Director/Research Leader (April 2012 – September 2012)
United States Department of Agriculture, Agricultural Research Service, HKD, Stuttgart
National Aquaculture Research Center, Stuttgart, AR
* Detail assignment; responsible for programmatic direction and management,
administrative functions, and all fiscal and human resources.

Lead Scientist (November 2003 – July 2011)
United States Department of Agriculture, Agricultural Research Service, HKD, Stuttgart
National Aquaculture Research Center/Harbor Branch Oceanographic Institute at Florida Atlantic
University, Fort Pierce, FL
* Project leader – Engineering and Production Strategies for Sustainable Marine
Aquaculture.

Research Fish Biologist (July 2001 – July 2011)
United States Department of Agriculture, Agricultural Research Service, HKD, Stuttgart
Marty A. Riche

National Aquaculture Research Center/Harbor Branch Oceanographic Institute at Florida Atlantic University, Fort Pierce, FL
* Project leader – Developing Sustainable Marine Aquaculture Technologies.
* Research in spawning, nutrition, & physiology of flounder, black sea bass and Florida pompano.

External Graduate Faculty Member, Animal Sciences Department (November 2006 – July 2011)
University of Maine, Orono, ME.

Graduate Faculty Member, Department of Biological Sciences (January 2003 – January 2006)
Florida Institute of Technology, Melbourne, FL.

National Indian Center for Marine and Environmental Research & Education, Bellingham, WA
* Development of research center facilities.
* Established training workshops with Northwest Indian Fisheries Commission.

Instructor (August 2000 – June 2001)
Northwest Indian College, Bellingham, WA
* Instructor Fisheries/Aquaculture.
* Curriculum development.

Research Assistant (August 1994 – May 2000)
Michigan State University, East Lansing, MI
* Prepared extension materials related to Sunfish and Tilapia culture.
* Experimental design and research in Sunfish and Tilapia nutrition.

Instructor (August 1999 – December 1999)
Michigan State University, East Lansing, MI
* Advanced Aquaculture

Michigan State University, East Lansing, MI
* Mentored 3 National High School Science Honor Students.
* Designed and directed summer research projects.

Teaching Assistant (August 1994 - December 1997)
Michigan State University, East Lansing, MI
* Aquaculture
* Advanced Aquaculture
* Resource Ecology

National Academy of Sciences Intern (June 1997 - August 1997)
National Research Council, Washington, D.C.
* Assisted in editing The Role of Chromium in Animal Nutrition, released 1998
* Prepared and presented a prospectus to U.S. Environmental Protection Agency detailing a three phase study on environmental implications of livestock feeding.
* Initiated a Users Guide for the NRC Swine nutrient requirement modeling program.
* Performed troubleshooting on modeling program software.
Marty A. Riche

**System Design Consultant** (January 1994 - June 1994)  
Min-Kota Fisheries, Inc., Philip, South Dakota  
*Assisted in design and construction of a recirculating tilapia hatchery.

**Research Assistant** (June 1991 - December 1993)  
Purdue University, West Lafayette, Indiana  
* Experimental design and research involving relevant fish nutrition problems.

**Systems Biologist** (August 1989 - February 1991)  
Simplot Aquaculture, Caldwell, Idaho  
* Monitored water quality for a 22 million gallon tilapia recirculating system.  
* Analyzed system and design criteria for alternative biofiltration methods.  
* Outlined treatment processes and monitoring needs to meet discharge permits.  
* Disease diagnosis and designed a preventative fish health program.

**Hatchery Technician** (February 1989 - August 1989)  
Simplot Aquaculture, Caldwell, Idaho  
* Responsible for maximizing productivity by optimizing feeding, sampling, harvesting, stocking, and transfer strategies for a tilapia facility.

**Inland Fisheries Officer** (1986-1988)  
Sierra Leone National Fish Station, Makali, Sierra Leone, West Africa - Ministry of Agriculture, Natural Resources, and Forestry/ U.S. Peace Corps  
* Acting co-manager of the country's tilapia fingerling production station.  
* Technical consultant to the Ministry.  
* Inland fisheries extension agent.

**CONSULTING:**

Aquaculture without Frontiers (Volunteer), Eldoret, Kenya (2013), Kevin Fitzsimmons.  
Advisory capacity for nutrition, feeding, feed management, feed formulations and production, and pond management and construction for farmers groups and the University of Eldoret Fish Farm Demonstration Station.

Advisory team on feasibility and management of small-scale farmer owned fish culture projects including site selection and construction.

Nutrition and feed formulations for marine ornamental fish.

Feed formulations for tilapia diets.

Designed a computer monitored and controlled oscillating thermal incubation system for heat shocking Mediterranean fruit fly eggs.
AWARDS:
USDA, ARS, Southern Plains Area Early Career Scientist of the Year (2008)
Global Young Scholars Award, Michigan State University (1999)
Dean’s Travel Award, Graduate School, Michigan State University (1999)

COMMITTEES:
Departmental Representative to Council of Graduate Students, Michigan State University (1999-2000)
Treasurer, Council of Graduate Students, Michigan State University (2000)
Finance Committee Chair, Council of Graduate Students, Michigan State University (2000)
Chair Animal Use and Care Committee, USDA, ARS, Fort Pierce, FL (2002-2011)
Chair Safety Committee, USDA, ARS, Stuttgart, AR (2012)
Chair Faculty Assembly Budget and Finance Committee, FAU-HBOI (2015-present)
Faculty Assembly Personnel Committee, FAU-HBOI (2015-present)

PROFESSIONAL AFFILIATIONS:
World Aquaculture Society
United States Aquaculture Society
Comparative Nutrition Society
American Society for Nutrition, Nutritional Sciences Council
American Oil Chemists Society
Gamma Sigma Delta, Agriculture Honor Society
The Science Advisory Board

PROFESSIONAL SERVICE:
Indian River Research and Education Center Aquaculture Advisory Committee

Associate Editor, Journal of the World Aquaculture Society (2011-present)
Associate Editor, Frontiers in Marine Science (2015-present)
- Marine Fisheries, Aquaculture, and Living Resources Section

Invited reviewer for the National Academy of Science to review the National Research Council’s report
titled *Nutrient Requirements of Fish and Shrimp*.

*Ad Hoc* Peer Review for the following Journals:
- Journal of the World Aquaculture Society
- North American Journal of Aquaculture
- British Journal of Nutrition
- Aquaculture Nutrition
- Aquaculture
- Aquaculture Research
- Aquacultural Engineering
- Aquatic Living Resources
Ad hoc proposal reviewer for the following National and International granting agencies:

Canada Natural Sciences and Engineering Research Council

USDA-CREES/NIFA Small Business Innovation Research Grant


Optimizing inland tank based recirculation aquaculture methods to produce cobia under reduced salinity conditions. (2010).

Development of cost effective inland super-intensive production system of the Pacific white shrimp with no water exchange using an innovative aeration system. (2012).

NOAA, Texas Sea Grant

NOAA, National Aquaculture Program
*Sustainable aquafeeds for Atlantic salmon (Salmo salar) using plant-protein concentrates and exploiting genetic influences to maintain performance and quality.* (2008).


NOAA/NMFS Saltonstall-Kennedy


Marty A. Riche

USDA-CSREES, Western Regional Aquaculture Center
*Optimizing dietary protein and energy utilization to improve production efficiency of tilapia in the Western United States. (2008).*
*Optimizing the larval nutrition of marine finfish aquaculture species along the West coast. (2010).*

USDA-NIFA, North Central Regional Aquaculture Center
*NCRAC Project – Regional Aquaculture Extension Specialist (2013).*

NOAA, Office of aquaculture, Tiger Team Grant Referee (2012)
*Reducing vaccination costs and increasing grow-out efficiency: efficacy of an immersion vaccine in sablefish aquaculture.*

Evaluating muscle growth in fish.

*Monosex production of sablefish for improved growth performance in aquaculture.*

*Marine oil and protein recovery for sustainable aquaculture feeds.*

*Pedigree analysis of deformities and phenotypes of reared California yellowtail, Seriola Lalandi.*

*Vitamin A and temperature effects on skeletal malformation in California halibut, Paralichthys californicus larvae.*

*Developing genomic resources for the improvement of sablefish aquaculture.*

*Using higher temperatures to speed larval development.*

- Growth and Development, and Nutrition
- Aquaculture Production Systems

Steering Committee, First International Sustainable Marine Fish Culture Conference and Workshop, October 9-10, 2003, Harbor Branch Oceanographic Institution, Fort Pierce, Florida.


Nutrition Lecturer, Latin American Aquaculture Development 2007, Cochran Fellowship Program.

Nutrition Lecturer, Latin American Aquaculture Development 2008, Cochran Fellowship Program.


Moderator, 39th UJNR Aquaculture Panel Scientific Symposium, October 25-26, 2010, Kagoshima,
Marty A. Riche

Steering Committee Chair and Host, USDA, ARS, Aquaculture Stakeholder Direction Setting Workshop, August 9, 2012, HKD Stuttgart National Aquaculture Research Center, Stuttgart, Arkansas.
Steering Committee Chair, Marine Fish Section, USDA, ARS/NIFA National Program - Aquaculture Stakeholder's Meeting, July 31, 2013.

FUNDED GRANT PROPOSALS:


One year grant of $33,333. To identify feed ingredients and develop feeds for increasing uni quality in sea urchins *Lytechinus variegatus* used as an extractive species in an integrated multi-trophic aquaculture system platform.


One year grant of $17,000. In collaboration with scientists with NFRDI (South Korea) and NOAA (U.S.A.), to provide an energy analysis of existing systems, recommendations for improvement of existing systems, and development of (a) pilot-scale high-intensity flow-through systems, (b) low-energy reuse systems, and (c) improved feed management and waste treatment systems.


One year grant of $17,000. In collaboration with scientists with NFRDI (South Korea) and NOAA (U.S.A.), provide an energy and life-cycle cost analysis of land-based culture systems and develop models to reduce pollution impacts through engineering and feed management and feed-based approaches.


One year grant of $169,331. To develop a science, engineering and mathematics teaching laboratory to provide a quality academic program and increase the number of students graduating in science, engineering, and math.

"Improving Salmonid Aquaculture in the North Central Region". United States Department of Agriculture, North Central Regional Aquaculture Center, 1997.
Two year grant of $40,000. To evaluate phytase treatment of plant diets for increasing 
nitrogen and phosphorus retention in rainbow trout. Evaluate effect of the anticipated 
benefits on serum insulin-like growth factor levels, and muscle and liver mRNA levels.

"Develop Cost-effective, Soybean Based Feeds for Tilapia Culture in Recirculating Systems 

Two year grant of $25,000. Use of in vitro and in vivo techniques to evaluate digestibility 
and retention of nitrogen in tilapia fed untreated and phytase treated soybean meal.

"Develop Cost-effective, Soybean Based Feeds for Tilapia Culture in Recirculating Systems 
That Minimize Waste Generation". - Supplement. Michigan Soybean Promotion 

One year grant of $10,000. Evaluate effect of phytic acid on kinetic parameters of tilapia 
proteolytic enzymes.

"Improving Culture Technology for Tilapia in the North Central Region". United States 
Department of Agriculture, North Central Regional Aquaculture Center, 1996.

Two year grant of $32,000. Evaluate effect of phytic acid on amino acid availability. 
Evaluate effect of endogenous and exogenous sources of phytic acid on kinetic 
parameters of tilapia digestive enzymes utilizing in vitro digestibility techniques.

PEER-REVIEWED PUBLICATIONS:

Riche, M., F.T. Barrows and T.G. Gaylord. (In review). Digestibility of feed ingredients in Florida 
pompano, Trachinotus carolinus adapted to seawater and low-salinity. Aquaculture Nutrition.

Riche, M., C.R. Weirich, A. Rhodes, H. Barnett, and F.T. Barrows. (In review). Evaluation of 
dimethyl-β-propiothetin and glycine-betaine as feeding stimulants for Florida pompano, Trachinotus 
carolinus (Carangidae). Frontiers in Marine Science.

McEntire, M., M. Riche, B. Beck, and D. Carter. 2015. Effect of contrasting agents on survival, 
performance, and condition of larval hybrid striped bass (Morone chrysops x M. saxatilis) in tanks. 

Riche, M. 2015. Nitrogen utilization from diets with refined and blended poultry by-products as 
partial fishmeal replacements in diets for low-salinity cultured Florida pompano, Trachinotus 

Riche, M. 2014. Development of a semipurified test diet for determining amino acid requirements 
of Florida pompano Trachinotus carolinus reared under low-salinity conditions. Aquaculture 420-
421:49-56.

fish feeds for production of juvenile cobia in recirculating aquaculture systems. North American 


MANUSCRIPTS IN PREPARATION:

Riche, M. Soy in Aquaculture. (Book Chapter).


Riche, M., N. Trottier, P. Ku and D.L. Garling, Jr. True and apparent crude protein digestibility and amino acid availability in tilapia (Oreochromis niloticus) fed phytate containing diets. British Journal of Nutrition.

Williams, T. and M. Riche. Digestible protein and energy, and apparent amino acid availability of poultry by-product meal, meat-and-bone meal, and distillers dried grains fed to Florida pompano Trachinotus carolinus in seawater and low-salinity culture systems. Aquaculture Nutrition.


OTHER PUBLICATIONS:


Riche, M., C.R. Weirich, T.J. Pfeiffer, P.S. Wills and M. Davis. 2009. Trials advance low-


**PRESENTATIONS:**


Riche, M. 2014. Invited Speaker – Fish nutrition: feeding fish to feed the planet. Ocean Research Colloquium, Harbor Branch Oceanographic Institute, Fort Pierce, Florida


Riche, M. 2009. Invited Speaker - Feeding fish to feed the planet. USDA, ARS, Southern Plains Area Seminar Series, College Station, Texas.


Paul B. Brown and Marty Riche. 1996. Availability of phosphorus in Feedstuffs fed to rainbow trout. The Seventh International Symposium on Nutrition and Feeding of Fish, College Station, Texas.


### Marty Riche

**HBOIF Start-Up Funds**

**Comparison of Budget to Actual at June 30, 2015**

<table>
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<tr>
<th>Estimated Budget Categories</th>
<th>Funds Received During FY 2015</th>
<th>Funds Expended During FY 2015</th>
<th>Funds Remaining At End of FY 2015</th>
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<tr>
<td>Salary &amp; Benefits - PI</td>
<td>62,208</td>
<td>49,581</td>
<td>12,627</td>
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<tr>
<td>Salary &amp; Benefits - Technician/Research Assistant</td>
<td>10,000</td>
<td>4,159</td>
<td>5,841</td>
</tr>
<tr>
<td>Office Computing System</td>
<td>2,500</td>
<td>2,288</td>
<td>212</td>
</tr>
<tr>
<td>Equipment</td>
<td>264,000</td>
<td>23,272</td>
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</tr>
<tr>
<td>Lab Supplies</td>
<td>5,000</td>
<td>1,696</td>
<td>3,304</td>
</tr>
<tr>
<td>Travel</td>
<td>2,500</td>
<td>1,880</td>
<td>620</td>
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<tr>
<td><strong>Totals</strong></td>
<td>346,208</td>
<td>82,876</td>
<td>263,332</td>
</tr>
</tbody>
</table>

Note: FY 2015 was a Partial Year: Riche start date was September 15, 2014

**Significant Purchases: Year 1**

- Synergy H1 Multi Mode Reader (portion) 23,272
Guojun Wang, Ph.D.

Hired March 2, 2015

Assistant Research Professor

Marine Biomedical & Biotechnology Research (Biosynthesis & Biocatalysis of Natural Products Lab)

Dr. Wang’s research focuses on the biosynthesis and biocatalysis of marine natural products, especially those with potential applications in medicine, veterinary medicine and agriculture. Primary tactics include cloning gene clusters from culture-dependent or -independent sources, determination of biosynthetic pathways, metabolic engineering of pathways, and functional and structural elucidation of key catalysts in pathways of interest. He is especially interested in the exploration of new methods to identify novel natural products from cryptic gene clusters in microbial genomes and from uncultivable microorganisms in marine habitats. In close cooperation with other groups in the Marine Biomedical & Biotechnology Research Program, his central aim is to discover new drug leads via biosynthetic approaches. Prior to joining FAU Harbor Branch, Dr. Wang was a postdoctoral researcher and research associate at University of Kentucky College of Pharmacy. He earned his Ph.D. from the Institute of Microbiology at the Chinese Academy of Sciences in Beijing.

Dr. Wang’s CV begins on page 52.

Use of start-up funds

Please see page 55 for a spreadsheet comparing start-up spending to budget.

Significant purchases

New equipment purchases will be used for culture and incubation of experimental strains (biosafety cabinet, shakers and incubators), storage of important experimental samples (-80 deep freezer), genetic analysis (MasterCycler, Hybridization Oven, Crosslinker, and UV transilluminator), and sample proceeding (rotator, centrifuge). All of these items are considered fundamental and necessary for Dr. Wang’s projects such as Leiodermatolide biosynthesis and marine actinobacteria and drug discovery.

Team


Publications


GUOJUN WANG
Assistant Research Professor
Harbor Branch Oceanographic Institute, Florida Atlantic University
5600 U.S. 1 North, Fort Pierce, Florida, 34946
Tel: 772-242-2423; Fax: 772-242-2332; E-mail: guojunwang@fau.edu

EMPLOYMENT
2015. 03 ~ present  Assistant Research Professor, Harbor Branch Oceanographic Institute, Florida Atlantic University, Fort Pierce, FL, USA
2014. 10 ~ 2015. 03 Research Associate, College of Pharmacy, University of Kentucky, Lexington, KY, USA.

EDUCATION AND TRAINING
2014. 09 Postdoctoral scholar, College of Pharmacy, University of Kentucky, Lexington, USA.
2009. 02 Postdoctoral researcher, National Food Research Institute, Tsukuba, Japan.
2004. 03 Ph.D, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China.
2000. 07 M.S., National Key Laboratory of Crops Genetic Improvement, Huazhong Agricultural University, Wuhan, China.
1997. 07 B.S., Huazhong Agricultural University, Wuhan, China.

RESEARCH INTERESTS
Marine Natural Product Biosynthesis and Drug Discovery, Genome mining, Enzyme Function and Engineering, Metabolic Engineering, Medicinal Chemistry

TEACHING INTERESTS
Marine Microbiology and Biotechnology, Microbial Genetics, Natural Product and Drug Discovery

PROFESSIONAL MEMBERSHIP AND ACTIVITIES
• American Chemical Society;
**Publications** (*: equal contribution; *: corresponding author)


Guojun Wang  
HBOIF Start-Up Funds  
Comparison of Budget to Actual at June 30, 2015

<table>
<thead>
<tr>
<th>Estimated Budget Categories</th>
<th>Funds Received During FY 2015</th>
<th>Funds Expended During FY 2015</th>
<th>Funds Remaining At End of FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary &amp; Benefits - PI</td>
<td>23,040</td>
<td>15,344</td>
<td>7,696</td>
</tr>
<tr>
<td>Office</td>
<td>2,500</td>
<td>1,616</td>
<td>884</td>
</tr>
<tr>
<td>Miscellaneous Office Setup</td>
<td>1,000</td>
<td>551</td>
<td>449</td>
</tr>
<tr>
<td>Equipment</td>
<td>61,000</td>
<td>57,553</td>
<td>3,447</td>
</tr>
<tr>
<td>Lab Supplies</td>
<td>21,000</td>
<td>20,848</td>
<td>152</td>
</tr>
<tr>
<td>Moving Expenses</td>
<td>6,500</td>
<td>4,398</td>
<td>2,102</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>115,040</strong></td>
<td><strong>100,310</strong></td>
<td><strong>14,730</strong></td>
</tr>
</tbody>
</table>

Note: FY 2015 was a Partial Year: Wang start date was March 2, 2015

Significant Purchases: Year 1

<table>
<thead>
<tr>
<th>Paid from HBOIF Funds</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - Isotemp 100L Incubators</td>
<td>3,295</td>
</tr>
<tr>
<td>Mini Orbital Rotator</td>
<td>1,192</td>
</tr>
<tr>
<td>HB-1000 Hybridization Oven</td>
<td>2,171</td>
</tr>
<tr>
<td>Crosslinker 254NM</td>
<td>1,205</td>
</tr>
<tr>
<td>UV Transilluminator</td>
<td>658</td>
</tr>
<tr>
<td>MasterCycler Pro S &amp; Control Panel</td>
<td>7,753</td>
</tr>
<tr>
<td>Incubator/Shaker</td>
<td>11,805</td>
</tr>
<tr>
<td>Innova C760 26.9 CF Freezer</td>
<td>12,953</td>
</tr>
<tr>
<td>Biosafety Cabinet</td>
<td>9,645</td>
</tr>
<tr>
<td>Ohaus Analytical Balances</td>
<td>683</td>
</tr>
<tr>
<td><strong>Year 1 Significant Purchases Total</strong></td>
<td><strong>51,359</strong></td>
</tr>
</tbody>
</table>

8/21/2015--2:40 PM
M:\FAU-AED\FAU-HBOI\Endowment\Annual_Reporting_HBOIF_to_HBOIF\HBOIF_Hiring_Model\4_Start-Up_Wang_Start_Date_20150302\Start_Up_Wang_FY2015_&_1ST_FULL_YR\20150630_HBOIF_Hiring_Model_LTD_FY2015_Wang.xlsx\Wang-HBOIF_ONLY
Michael S. Twardowski, Ph.D.
Hired June 1, 2015
Research Professor
Ocean Engineering & Technology

Dr. Twardowski’s research interests include using optical sensing techniques to study problems in imaging, ocean color remote sensing, harmful algal blooms, oil detection, long-term and autonomous monitoring, sediment transport, and particle characterization. Dr. Twardowski has two decades of experience developing transformational technologies for ocean science, several of which have been commercialized. Dr. Twardowski was previously Director of Research and Vice President of WET Labs Inc., where he led the Advanced Technology and Research group in Narragansett, RI. He received his Ph.D. in Oceanography from University of Rhode Island in 1998 and was a postdoctoral fellow in Environmental Optics at Oregon State University. He has been a Naval ASEE Fellow and conducted research at the NATO Centre of Maritime Research and Experimentation as a Visiting Scientist. He is Adjunct Professor at the Universities of Rhode Island and Connecticut. He has authored more than 50 peer-reviewed publications and has participated in more than 30 interdisciplinary field efforts in waters throughout the world.

Dr. Twardowski’s CV begins on page 58.

Use of start-up funds
Please see page 66 for a spreadsheet comparing start-up spending to budget.

Team
- Aditya Nayak, Ph.D. – Postdoctoral Investigator – 6/6/2015 to present
- Nicole Stockley – Research Technician – 7/13/2015 to present
- Schuyler Nardelli – Research Technician – 7/13/2015 to present

Grants
Transfered
- Improving retrieval of IOPs from ocean color remote sensing through explicit consideration of the VSF – PI: M.S. Twardowski – $330,000 (NASA) – 6/1/2015 to 5/31/2018
- Improving IOP measurement uncertainties for PACE ocean color remote sensing applications – PI: J.M. Sullivan; Co-PI: M.S. Twardowski -- $386,143 (NASA) – 9/1/2015 to 8/31/2018
- TOPGATE: Performance assessment for environmental sensing system and imaging prediction algorithm – PI: M.S. Twardowski; Co-PI: F.R. Dalgleish – $125,000 (DDL OMNI Engineering federal flow through) – 6/15/2015 to 6/14/2016
Awarded
- Research for Non-Acoustic Anti-Submarine Warfare Center of Excellence – PI: M.S. Twardowski - $100,000 (Naval Sea Systems Command) – 9/1/2015 to 8/31/2016

Submitted
- Remote Sensing Laser Package for Real-time Depth-Resolved Water Quality Profiles of the Upper Coastal Ocean at Normal Vessel Cruising Speeds – PI: F. Dalgleish; Co-PIs: A. Dalgleish, M.S. Twardowski – $1.25M (Keck Foundation; selected for next phase)

Publications


MICHAEL S. TWARDOWSKI
Harbor Branch Oceanographic Institute, Florida Atlantic University
5600 US 1 N, Ft. Pierce, FL 34946
office: (772) 242-2220; FAU Extension: x62220; cell: (401)862-9067
email: mtwardowski@fau.edu
website: http://www.fau.edu/hboi/personal/

PROFESSIONAL PREPARATION

Postdoc Environmental Optics Fellowship, Oregon State University 1998-1999
Ph.D. Biological Oceanography, University of Rhode Island 1998
B.S. Biology with Honors, Trinity University, San Antonio, Texas 1992

APPOINTMENTS

Professor, Harbor Branch Oceanographic Institute, Florida Atlantic University 2015-present
Director of Research, WET Labs, Inc. 2005-2015
Adjunct Professor, University of Connecticut 2005-present
Adjunct Professor, Graduate School of Oceanography, University of Rhode Island 2003-present
East Coast Research Director, WET Labs, Inc. 2002-2005
Visiting Scientist, Graduate School of Oceanography, University of Rhode Island 2000-2003
Oceanographer, WET Labs, Inc. 2000-2015
Research Associate, COAS, Oregon State University 1999-2000

Ph.D. Advisor: Percy Donaghay (University of Rhode Island)
Postdoctoral Advisors: Drs. Ronald Zaneveld and Timothy Cowles (Oregon State Univ.)

- Leads a research team in oceanographic research, specializing in ocean optics
- Develops optical sensors for oceanographic research applications

PROFESSIONAL AWARDS

WET Labs Postdoctoral Fellowship, 1998.
Early Career Faculty Award, Office of International Research and Development, Oregon State University, 2000.
ASEE Visiting Faculty Fellowship, Naval Research Labs, Stennis Space Center (R. Arnone, A. Weidemann) and Washington, D.C., (Curt Davis), 2000.
NATO Visiting Research Fellowship, Naval Underwater Research Centre, La Spezia, Italy, 2010.
MICHAE L S. TW ARDOWSKI

PUBLICATIONS: PEER-REVIEWED (reverse chronological)


20 Huot, Y., M. Babin, F. Bruyant, C. Grob, M. S. Twardowski, and H. Claustre. 2007. Does chlorophyll a provide the best index of phytoplankton
MICHAEL S. TWARDOWSKI


MICHAEL S. TWARDOWSKI

Islands, Washington, U.S.A. Marine Ecology Progress Series, 225:123-137.


PUBLICATIONS: PEER-REVIEWED, WEB ONLY


MICHAEL S. TWARDOWSKI

PUBLICATIONS: NOT PEER-REVIEWED


PUBLICATIONS: DISSERTATION

### Comparison of Budget to Actual at June 30, 2015

<table>
<thead>
<tr>
<th>Estimated Budget Categories</th>
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<th>Funds Expended During FY 2015</th>
<th>Funds Remaining At End of FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary &amp; Benefits - PI</td>
<td>21,600</td>
<td>7,253</td>
<td>14,347</td>
</tr>
<tr>
<td>Salary &amp; Benefits - Post Doc</td>
<td>56,320</td>
<td>4,263</td>
<td>52,057</td>
</tr>
<tr>
<td>Salary &amp; Benefits - Technicians/Interns</td>
<td>15,483</td>
<td>-</td>
<td>15,483</td>
</tr>
<tr>
<td>Consultants</td>
<td>50,000</td>
<td>-</td>
<td>50,000</td>
</tr>
<tr>
<td>Computers &amp; Accessories</td>
<td>21,189</td>
<td>1,234</td>
<td>19,955</td>
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<tr>
<td>Equipment</td>
<td>96,008</td>
<td>326</td>
<td>95,682</td>
</tr>
<tr>
<td>Supplies</td>
<td>5,000</td>
<td>-</td>
<td>5,000</td>
</tr>
<tr>
<td>Travel</td>
<td>15,000</td>
<td>2,868</td>
<td>12,132</td>
</tr>
<tr>
<td>Moving Expenses</td>
<td>25,000</td>
<td>5,502</td>
<td>19,498</td>
</tr>
<tr>
<td>Totals</td>
<td>305,600</td>
<td>21,447</td>
<td>284,153</td>
</tr>
</tbody>
</table>

Note: FY 2015 was a Partial Year: Twardowski start date was June 1, 2015