



GLOUCESTER MARINE GENOMICS INSTITUTE

Newsletter

Spring 2015

Volume 1 Number 1

GMGI Mission

To become a world-class marine biotechnology research Institute, built on the rich heritage of Gloucester's maritime history, catalyzing a biotechnology hub that will sustain Gloucester and the Cape Ann economy for the 21st century and beyond.

www.gmgi.org

Dear Friends,

I am pleased to share with you our first newsletter! Despite being a young organization, GMGI has created quite a buzz among scientists, educators, businesses and the Cape Ann community. We have made progress on many fronts:

- Established a site and schedule for Gloucester Life Sciences Academy (GLSA)
- Hired the GLSA Education Director
- Conducted the first GMGI Science Forum
- Completed sequencing the Cod Genome
- Launched a new research project, Lobster Genome
- Obtained our 501c3 Non-Profit Status

These achievements were made possible by those who gave of their time, enthusiasm, and perseverance - needed in large quantities to launch a new research science Institute - and by the generous support of local philanthropists, along with funding from the Division of Marine Fisheries and MassTech Collaborative.

We hope you will enjoy reading about our progress over the past year. We welcome feedback - and your company - on the journey. Please contact me if you would like to learn more,

Chris Munkholm

Executive Director
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Gloucester Life Sciences Academy

We are excited about the launch of our school, Gloucester Life Sciences Academy (GLSA). GLSA will offer a 1 year, full-time program to prepare graduates for entry-level Lab Technician jobs in the biotechnology industry. The Academy will train students using marine biotechnology as its focus. In Fall 2015 we will begin a pilot program to analyze some teaching modules for their effectiveness. The first full class will be recruited for September 2016 enrollment.

To help us deliver the best educational program to our students we have hired John J. Doyle, PhD as our Education Director. John taught biology at both the high school and college levels, and earned an M.S. in Molecular Biology and a PhD in Oceanography. He is “beyond excited” to join the GMGI mission and help create this innovative education program for the youth of Cape Ann.

John believes “GLSA is a fantastic educational opportunity that will provide students with the requisite skill set needed to obtain jobs in the biotechnology industry. While attending GLSA, students will be immersed in a hands-on curriculum that will teach essential laboratory techniques and instrumentation, as well as engage in an internship with a local biotechnology company.”

GLSA Facility in Blackburn Park

We are exploring a site in Blackburn Industrial Park for the location of our school, with plans to soon break ground on the renovation and build out needed to convert the space into teaching and research labs. The architectural design work was generously donated by Payette, a premier architectural firm that has constructed buildings throughout the world. They have designed a state of the art laboratory learning environment that is certain to excite our future students.



Gloucester Life Sciences Academy
Gloucester Marine Genomics Institute
March 14, 2015

PAYETTE

GMGI Science Programs

COD DNA Sequencing Project

The GMGI Cod DNA sequencing project, supported by the Massachusetts Division of Marine Fisheries, was funded to sequence the whole genomes of cod from both the Gulf of Maine and Georges Bank fisheries. The field work was completed in 2014, with cod specimens obtained from both the Gulf of Maine and Georges Bank fisheries, which are currently regulated as two distinct fisheries. Many questions exist about the boundaries of these two large fisheries and the degree of cod migration between them. Genetics-based testing can address these issues, but first the cod DNA must be sequenced, which is the goal of this study.

This project is now in the bioinformatics stage. DNA sequencing has been completed on 31 cod samples, producing an immense data set requiring significant computing capacity. We are fortunate that the project has garnered the interest of Steven Palumbi, Director of the Hopkins Marine Lab at Stanford University, who is now collaborating with GMGI on this final stage of the project. The computing power of the Stanford computer cluster is being used to crunch the numbers by two members of the Palumbi group, Bryan Barney and Nina Therkildsen.

The results of this research will add to the genetic definition of these two fisheries, and also

provide genetic markers for development of commercial technologies that are cost effective for testing the large numbers of fish needed to map fisheries and their boundaries.

Lobster Genome Project Underway

GMGI has embarked on its second major research project, the first whole genome sequencing of the iconic local lobster, (*Americanus homarus*), pursued in collaboration with a California biotechnology company that will do the important analytical work needed to assemble the DNA sequence. The lobster genome is considered a difficult challenge due to its large size (larger than the human genome) and the presence of many repeating sections of DNA sequences, making the sequence assembly particularly challenging. Thus, the sequencing and assembly of the Lobster genome will represent a major crustacean trophy, and provide an important foundation for all future scientific studies of the lobster.



GMGI Hosts First Science Forum

February 14, 2015 marked an important GMGI milestone, when we hosted our first Science Forum. Despite an impending blizzard, the event was well attended. It was a stimulating day of scientific presentations and discussions. All participants left with a sense of excitement about the prospects for bringing new technologies to fisheries and aquaculture science. The selected topics and invited experts all represented areas for potential research programs in the future GMGI science portfolio.

Two scientists traveled from California, Dr. Cindy Lawley, Staff Scientist at Illumina Inc. and Dr. Nina O. Therkildsen, a postdoctoral fellow with Dr. Stephen Palumbi, Stanford University. Jackie Odell, Executive Director of the Northeast Seafood Coalition, gave a compelling presentation on the complexity of methods and regulations now used to manage the commercial fisheries for 20 groundfish stocks within the NE Fisheries Management region. Dr. Don Anderson, from Woods Hole Oceanographic Institute joined via Skype, and described his new in situ detection technology to monitor Harmful Algal Blooms, also called Red Tides, which cause tremendous loss to the coastal economies. David Alves, the Northeast Regional Coordinator for the NMFS Office of Aquaculture in Gloucester, gave an overview of the impressive growth of aquaculture in New England, and opportunities for research in that area.

GMGI Science Forum participant, Job Dekker, Professor in the Program in Systems Biology

and Department of Biochemistry and Molecular Pharmacology, University of Massachusetts Medical School provided novel approaches to accelerate assembling the architectural structure of the cod genome.



Building Our Network

GMGI Hosts Delegation from Iceland

On March 16, 2015 GMGI hosted a delegation from Iceland, including newly confirmed Ambassador Robert Barber (US Ambassador to Iceland), several embassy staff, Rector Ari Jonsson (President of Reykjavik University) accompanied by four students who won a prestigious business competition, and Thor Sigfusson, CEO of OceanCluster, which provides business structure for ventures originating from the fishing industry.



The goal of the meeting was to explore the potential for broad collaboration, including both economic development and research projects. Gloucester and Reykjavik both have long histories of commerce with the fish stock of the North Atlantic Ocean, and both have experienced the economic impact of closures due to overfishing.

To deal with the loss of revenue when the Icelandic cod fisheries were closed, OceanCluster was started to support businesses that would utilize parts of the cod other than the fillets, thus deriving more income from the decreased quantities of allowed catch. This decision has fostered many interesting enterprises, such as dyed cod skins suitable for making shoes, oil for topical skin treatment, and Omega-3 nutritional supplements. These products command a higher economic value than the meat and have resulted in use of nearly 80% of the fish mass. Their goal is 100%!!!

All participants departed with a sense of excitement about the prospects for bringing new technologies to fisheries science.

Museum of Science Hosts GMGI

On March 24, members from GMGI including Founders Greg Verdine, Marc Vidal, David Walt and GMGI Executive Director Chris Munkholm, visited with Dr. Ioannis Miaoulis, President of the Museum of Science (MOS), Paul Fontaine, VP of Education at the Museum of Science, and other museum staff. The goal of the meeting was to introduce GMGI and discuss ways that GMGI might collaborate with the Museum on exhibitions or educational events in the future. MOS offered to lend their expertise in helping GMGI design future exhibitions and we are fortunate to have the “best in the world” working with us.

Meeting with MDI Biological Laboratory and Bermuda Institute of Ocean Sciences

On April 4, the GMGI science team welcomed Kevin Strange, President of MDI Biological Laboratory and Bill Curry, President and CEO of Bermuda Institute of Ocean Sciences, for lunch at our headquarters on the harbor and a discussion to explore mutual research interests. We discussed the possibility of exchange visits between the Institutes and organization of a conference, in early September, contiguous with a retreat, organized by Marc Vidal at the Ames Estate in Annisquam.



We look forward to expanding our contacts with all of the North Atlantic marine research Institutes, and finding ways of combining our forces in the pursuit of fisheries and marine

research.

New Opportunity

We have started our search for the first GMGI Science Director, who will play a critical role in shaping our research strategy and proposal portfolio. We hope to have this person on board by August 1.

GMGI Board Members and Council Chairs

Board Members:

Michele May, Board Chair

Greg Verdine, PhD Founder, Board Member, Scientific Advisory Board

Marc Vidal, PhD Founder, Board Member, Scientific Advisory Board

David Walt, PhD Founder, Board Member, Scientific Advisory Board

Sheree Zizik, Founder, Board Member

Council Chairs:

John Bell, Chair, Community Advisory Council

Joe Rosa, PhD Co-Chair, Education Advisory Council

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