

marine
research



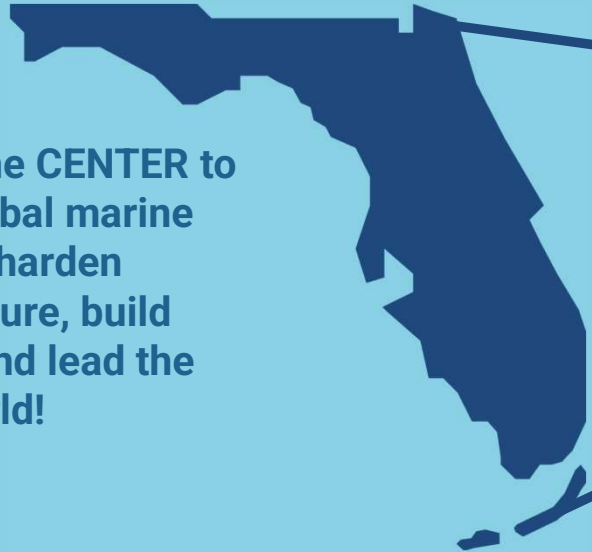
Connecting the Dots of Florida's Blue Economy!

BLUE ECONOMY

Sustainable use of ocean resources for economic growth, improved livelihoods & jobs, and ocean ecosystem health.

The NEW Blue Economy is “a **knowledge-based economy**, looking to the sea not just for extraction of material goods, but for data and information to address societal challenges and inspire their solutions.”

Florida is at the **CENTER** to address global marine issues, harden infrastructure, build business, and lead the world!



The Opportunity...

Economic growth and ocean health are not just compatible, they are mutually dependent for long-term sustainability.

This “NEW Blue Economy” is built on a three-legged platform:

Economic Growth

- South Florida estimated 23,251 businesses in Blue Economy, supporting 521,441 jobs & \$16.5 billion in wages.
- **Ocean/Blue economy is expected to reach \$3 trillion & 40 million jobs world-wide by 2030.**
- **Fastest growth expected**
 - Marine aquaculture (i.e. oysters, algae)
 - Fish processing (from catch to consumer)
 - Energy (i.e. wind, wave, tidal)
 - Port activities (i.e. shipping, cruise)

Healthy Ecosystem

- 71% of Earth is water
- Only 29% is land
- 97% of Earth’s water is in the ocean
- 90% of the ocean is unexplored potential in bio-medicine
- Offer protection from storms & climate impacts
- Infinite clean energy source: tidal, wave, and wind energy

Thriving Communities

- Approx. half the world’s population live within 200 km the coast
- 9 billion people will need protein in 2030 from land or sea, limited land and depleting seas need new solutions
- 90% of goods are transported by ocean through ports and waterways to consumers.



Florida has all the pieces of the Blue Economy



Mission

The Marine Research Hub is building Florida's Blue Economy by engaging collaboration from all sectors: research, education, government, private, & economic development organizations to support commercialization of research-based solutions to create jobs, build business, harden our infrastructure, and create positive impact for the health of our marine environments and community.



Ocean of Potential

The best discoveries that do not leave the lab will never really impact the world.

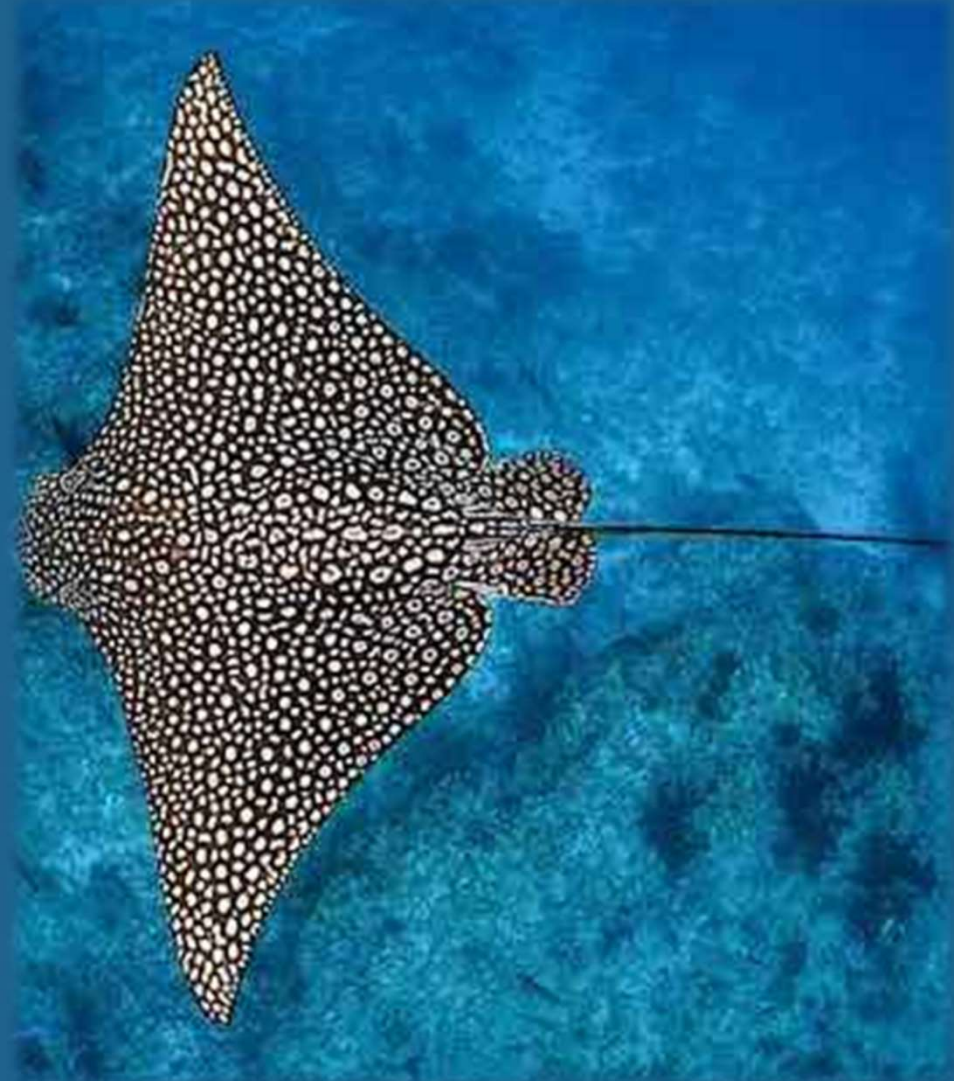
Take the emerging discoveries to commercialization, impact the world, and Blue Economy lives here.

**Florida Atlantic University
Florida International University
Nova Southeastern University
University of Miami**

All part of the Marine Research Hub consortium.

Florida has 17 colleges/universities with Marine Biology degree tracks tied with California for the same number.

Three of the Florida top 10 schools with Marine Engineering tracks are in South Florida.



Founding members of the Marine Research Hub

Since 2017



Business Development Board of Palm Beach County
Greater Fort Lauderdale Alliance
Miami-Dade Beacon Council
Marine Industries Association of South Florida
Florida Atlantic University
Florida International University
Nova Southeastern University
University of Miami

Industry & Workforce

- All industry sectors
 - Energy
 - Transportation
 - Construction
 - Agriculture
- Marine Industries Association of South Florida
 - Apprenticeship Program
 - Pre-Apprenticeship - Junior Achievement
- Credentialing Programs



Government & Policy

- Municipalities
- County
 - West Palm Beach
 - Broward
 - Miami-Dade
- State



Port Connections

- Port Everglades
- PortMiami
- Port of West Palm Beach



Outreach & Education

- MODS (Museum of Discovery & Science)
- Guy Harvey Foundation
- Public School programs
- Educational events



Academic & Research

- Florida Atlantic University – Harbor Branch Oceanographic Center & SEATECH
- Florida International University – College of Arts, Science, & Education & FIU Research
- Nova Southeastern University – Halmos College of Arts & Science, Guy Harvey Research Institute
- University of Miami – Rosenstiel of Marine, Atmospheric & Earth Science
- Broward College



Incubator/Award Programs- Blue Tech Development

- Ocean Exchange
- Levan Center at NSU
- University-based business development
- Seaworthy Collective
- Pitch Competitions/Business Development
- Mentors



Funding Support, Investors & Partnerships

- Investors
- Private Equity
- Public-Private Partnerships
- Family Offices
- Grants



Economic Development

- Greater Fort Lauderdale Alliance
- BDB - Business Development Board of Palm Beach County
- BEACON Council
- Broward Workshop



Investable Solutions with global impact

Ocean Exchange 2022 global accelerator program with three award categories each carrying \$100,000 prize with aim to advance technologies for the health of our oceans along with a collegiate award for \$10,000.



**OCEAN
EXCHANGE**

**October 22-24, 2023
Fort Lauderdale, FL**

Opportunities to be a Florida delegate

- 1** Total of 173 applicants in all three categories from 17 different countries.
- 2** Marine Research Hub Annual Co-sponsorship of the Neptune Award
- 3** 2019 Neptune Winner - Nicholas Flanders – Co-founder and CEO of **TWELVE** the recipient of 2015 Collegiate Award. Twelve uses carbon dioxide, water and renewable energy to create a wide range of materials and fuels traditionally created using fossil fuels. The company recently entered into a partnership with Virgin Voyages that will enable it to scale the production of **E-Marine™**, the newest sustainable fuel made using its carbon transformation technology.

2022 Neptune Finalists - Ocean Exchange

Sway

Seaweed-Based, Compostable Replacements for Plastic Packaging



Team

Julia Marsh
Co-Founder & CEO
Matt Mayes
Co-Founder & COO
Leland Maschmeyer
Co-Founder

Problem

~8 million tons of plastic waste escape into the oceans each year, 40% of which is thin-film packaging. These bags and wrappers are not recyclable and eventually degrade into microplastics. As demand continues to grow, we need solutions.

Solution

Sway offers home compostable thin-film packaging derived from seaweed. Our packaging meets the critical performance requirements of plastic, but comes from a benevolent feedstock and degrades within weeks rather than decades.

SWAY



NovFeed

Biotechnology Platform That Transform Organic Waste into Protein-Rich Feed Ingredients



Team

Diana Orembe
Founder & CEO
Otaigo Elisha
Founder & COO
Stephano Karoza
Aquaculture Scientist

Problem

Yearly, over 20 million tons of wild fish are caught and processed into feed for the fastest growing part of the world food system aquaculture. Since 2000, there's been a 5-fold increase in prices of protein ingredients rendered from wild fish.

Solution

NovFeed offer a protein feed for aquaculture made from renewable raw materials through precision fermentation-based ingredients and proprietary bio factories. It offers a sustainable high-protein alternative to fish meal. The product contains 70% crude protein and a balanced amino acid profile.

NovFeed

Science. Future. Feed



2022 Neptune Winner

Water Warriors

Poseidon Pellets to absorb phosphorous on contact



Team

John Gradek
CEO
Steve Chamberland
CRO
Dr. Mallikarjuna Nadagouda
Lead Scientist



Problem

Nutrient pollution is one of our most challenging environmental problems, resulting in compromised water from our smallest stream to our coastlines. It's a menace, impacting human health, and causing millions of dollars in damage.

Solution

Poseidon pellets were made to adsorb phosphorus on contact. So issues like algae blooms and loss of marine life never happen. Water flows through our pellets and phosphorus stays behind. We return the nutrients to the land as a fertilizer.



Kintra Fibers

A New Polyester

Bio-based, Biodegradable, Infinitely Recyclable

KINTRA



Team

Billy McCall
Co-Founder & CEO
Alissa Baier-Lentz
Co-Founder & COO
Dr. Rebecca Ruckdashel
Fiber Extrusion Scientist

Problem

Traditional PET polyester is fossil fuel-based, is responsible for fibrous microplastic pollution in the ocean, and results in toxic textile waste in landfills. No sustainable alternative delivers performance and price parity.

Solution

We have developed a new polyester that is: 1) Bio-based, 2) Biodegradable, and 3) Compatible with standard manufacturing equipment. Kintra reduces emissions by 95%, and addresses microfiber pollution and textile waste. All while delivering performance and price parity.







Additional 2022 Finalists - Ocean Exchange

Neptune Finalists Continued:

- Aqualumos
Photocatalytic Forever Chemical Destruction System
- HonuWorx
Uncrewed Robotic Systems for Scalable Subsea Work
- Sunfish
Autonomous Underwater Inspection and Exploration
- Atlantic Sea Farms
Proving That Regenerative Seaweed Aquaculture Is A Viable Climate Change Mitigation and Adaptation Strategy
- Ebb Carbon Removing Gigatons of CO₂ from the Air While Reversing Ocean Acidification
- Vesta
Harnessing the Power of the Oceans to Remove CO₂ from the Atmosphere and Enhance Coastal Resilience
- Spira
Carbon Negative Dyes from Algae
- Whale Seekers
Marine Mammal Detection from Imagery Using Ethical AI

Wallenius Wilhelmsen Orcele®

& Transportation Hub Finalists:

- BlueNode
Data (Carbon) Visibility for the Global Supply Chain
- TRABUS
Ripplego
First AI-Based Voyage Planning System for Inland Waterways
- Lios
Smart Acoustic Material
- Modalinta
SafLash: Safe, very fast, practical ships lashing
- Whale Seeker
Marine Mammal Detection from Imagery Using Ethical AI
- Salient Predictions Ocean Intelligence for Superior Long-Range Weather Forecasts
- Nabrawind Technologies Modular Bottom Fixed Structure for Offshore Wind Turbines for Deep Waters
- Blackfish Engineering Decarbonizing Offshore Wind Marine Operations Enabling Crew Transfer Vessel Offshore Charging
- BeePlanet Factory Energy Storage Systems Based on 2nd Life Li-Ion Automotive Batteries
- C2C-NewCap Eco-Friendly Energy Storage Technologies Based on Hybrid Supercapacitors
- KineticCore
Next Generation Non-chemical Energy Storage
- C-Quest Pacific
Linking Direct Ocean Carbon Capture to the Carbon Capture Utilization and Storage Value Chain

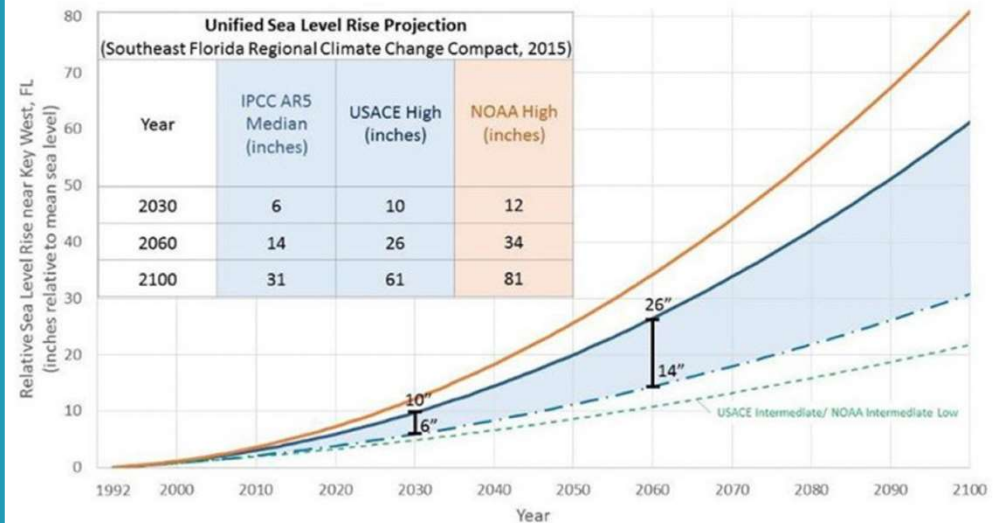
Total of 24 blue economy companies



South Florida Concerns & Emerging Solutions

Sea Level Rise

- Florida: 9,243 miles of sea walls.
- Estimate cost: \$75.9 billion
- Miami-Dade; \$3.2 billion
- Broward: \$863.2 million
- Palm Beach: \$544.2 million
- Alone Fort Lauderdale has over 200 miles of seawalls.
- New Law requires 5ft seawall height from 4.2ft
- Coastal counties: 40% of the population
- Flooding is expected to occur 10X more frequently by 2050.
- Shorelines will need to adapt to over 2 feet of sea level rise by 2070.

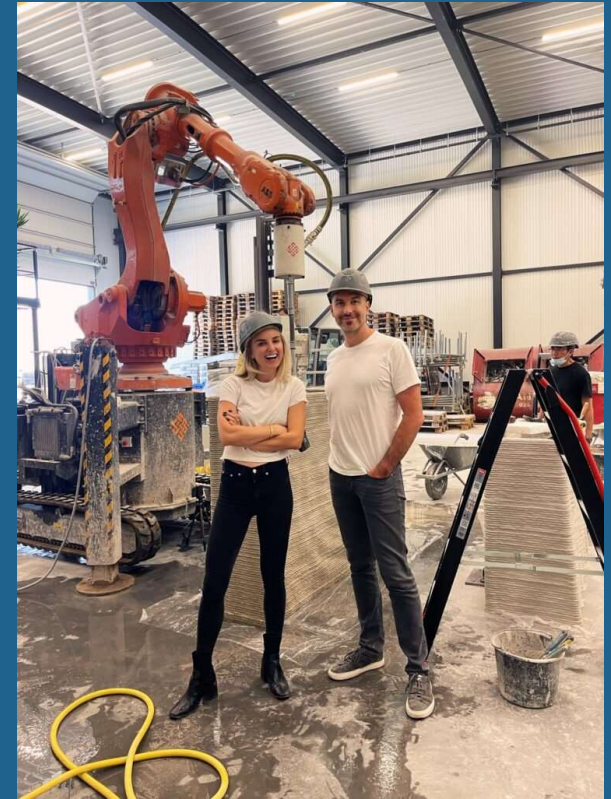


Sea level rise predictions by the US Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), and Intergovernmental Panel on Climate Change (IPCC).

SOLUTIONS:

Kind Design - Living SeaWall, Miami, FL

Next Generation of Sea walls - Living shoreline seawalls use natural materials for 3D printed, no rebar, and 5x longevity of the structure. Structure creates habitat for organisms and has imbedded sensors to collect data.



SOLUTIONS:

FENEX, Fort Lauderdale, FL

Glass flood barriers designed to withstand extreme coastal environments with aesthetically pleasing barrier.



Smart Sea Wall Technologies, Hollywood, FL

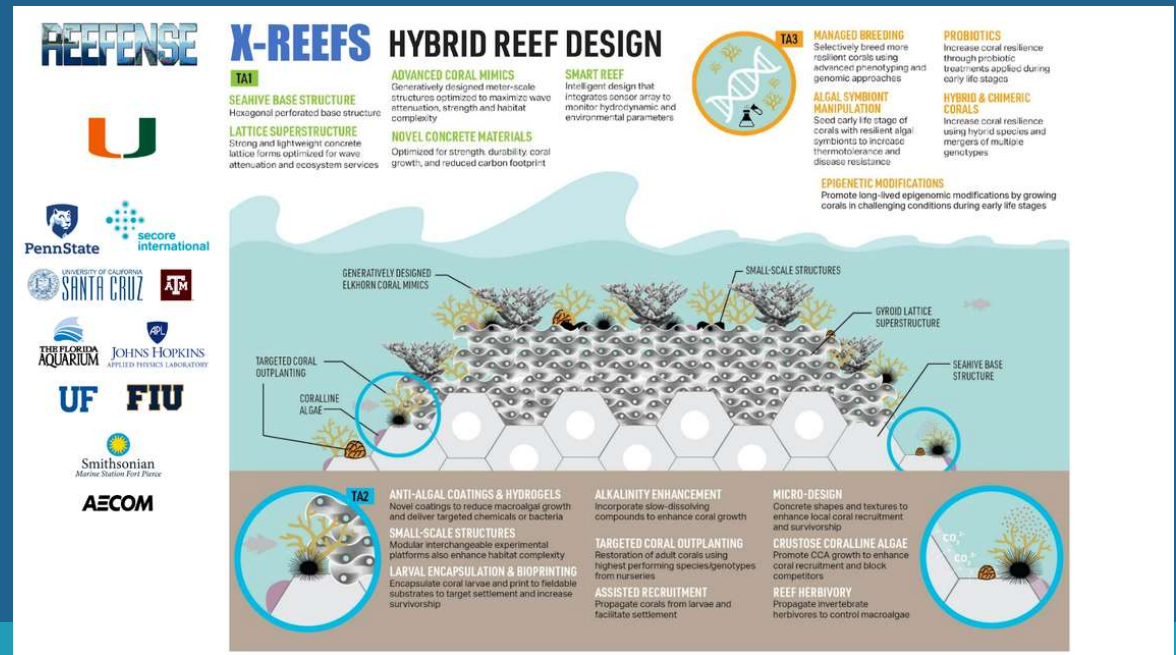
Patented technology absorbs and redirects wave energy away from the shoreline and back to its natural environment. In addition, our Gen 2 systems have aquatic elements to sustain marine habitats and create elegant shoreline protection.

SOLUTIONS: Current research

Hybrid Reef System

Combination of hardened structures (i.e. Concrete) with living structures like coral reefs and oyster beds to help break up and dissipate damage from sea level and storm surges.

Project with various universities lead by University of Miami along with the Department of Defense.



Jobs in the Blue Economy: Aquaculture Example



Solving the need for more sustainable protein source without putting more strain on our oceans; addressing food waste decomposing; lowering the carbon footprint of supply chain; and creating jobs is an example of the connections.

Filthy Organics

Collects compostable materials, processes, and returns to customers for gardens. Serving Broward & Palm Beach.



NovFeed

Ocean Exchange - Neptune 2022
Process of taking food scraps from restaurants & markets convert to aquaculture feedstock.



FAU Aquaculture Innovation & Global Food Security

FAU Harbor Branch projects:
Queen Conch
Pompano fish
Marine algae

Atlantic Sapphire

Homestead, FL based largest indoor aquaculture facility in the world for salmon built in 2019.

Florida Atlantic University – Harbor Branch

Cancer Cell Biology Program focused on finding treatments for aggressive cancers, including lung, colon, pancreatic, and triple-negative breast cancers, to name a few, but necessarily to cure but to slow progression and immune response.

Applications in slowing cancer growth

This lab alone has identified over 100 natural products with cancer-fighting properties.

- Identified marine natural products from sponges block cells from dividing and spreading to other organs.

Biomedical Applications





MRH is connecting the dots!

Supporting the commercialization/monetizing of research-based solution companies to create jobs, build business, & harden our infrastructure while creating sustainable and healthy oceans.

If we are always look for the perfect solution, we will never do anything, we must at least try and what better place to implement solutions than Florida.



Since 2017

Marine Research Hub

Katherine O'Fallon

Executive Director

Katherine@marineresearchhub.org



Board of Directors

President – Bob Swindell/Greater Fort Lauderdale Alliance president & CEO

Vice President – Phil Purcell/Marine Industries Association of South Florida CEO and president

Secretary/Treasurer – Howard Greenberg/HGreenberg Advisors, LLC

Members:

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- Steve Hudson/Hudson Capital
- Efrem “Skip” Zimbalist III/AI Media
- Patrick Lahey/Triton Submarines president and co-founder
- Timothy Bryant/FPL