



Promoting BlueTech  
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# Mariculture and the Blue Economy

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**The Maritime Alliance**  
**Michael B. Jones – President**

**The Future of Hawaii's Blue Economy “Organizing for 2020”**  
**November 16, 2017**  
**Kailua Kona, Hawaii**



## Global **Blue Economy**: Enormous and growing

OECD\* 2016 study:

### **The Ocean Economy in 2030**

2010 – US \$1.5 trillion (conservatively)

2030 – US \$3.0 trillion (conservatively)

*“The ocean economy is essential to the future welfare and prosperity of humankind...only recently begun to garner attention and move up the international policy agenda.”*

Comparison:

2010 global water industry = \$500 B

2015 space industry = \$355 B

OCEANOLOGY INTERNATIONAL CONNECTS THE ENTIRE SUPPLY CHAIN:



UNDERWATER  
COMMUNICATIONS



UNMANNED  
UNDERWATER  
VEHICLES



MARINE  
AND SURVEY  
VESSELS



HYDROGRAPHY



METROLOGY



MARINE  
RENEWABLES



OCEAN  
RESEARCH



OIL & GAS



MARINE  
SECURITY

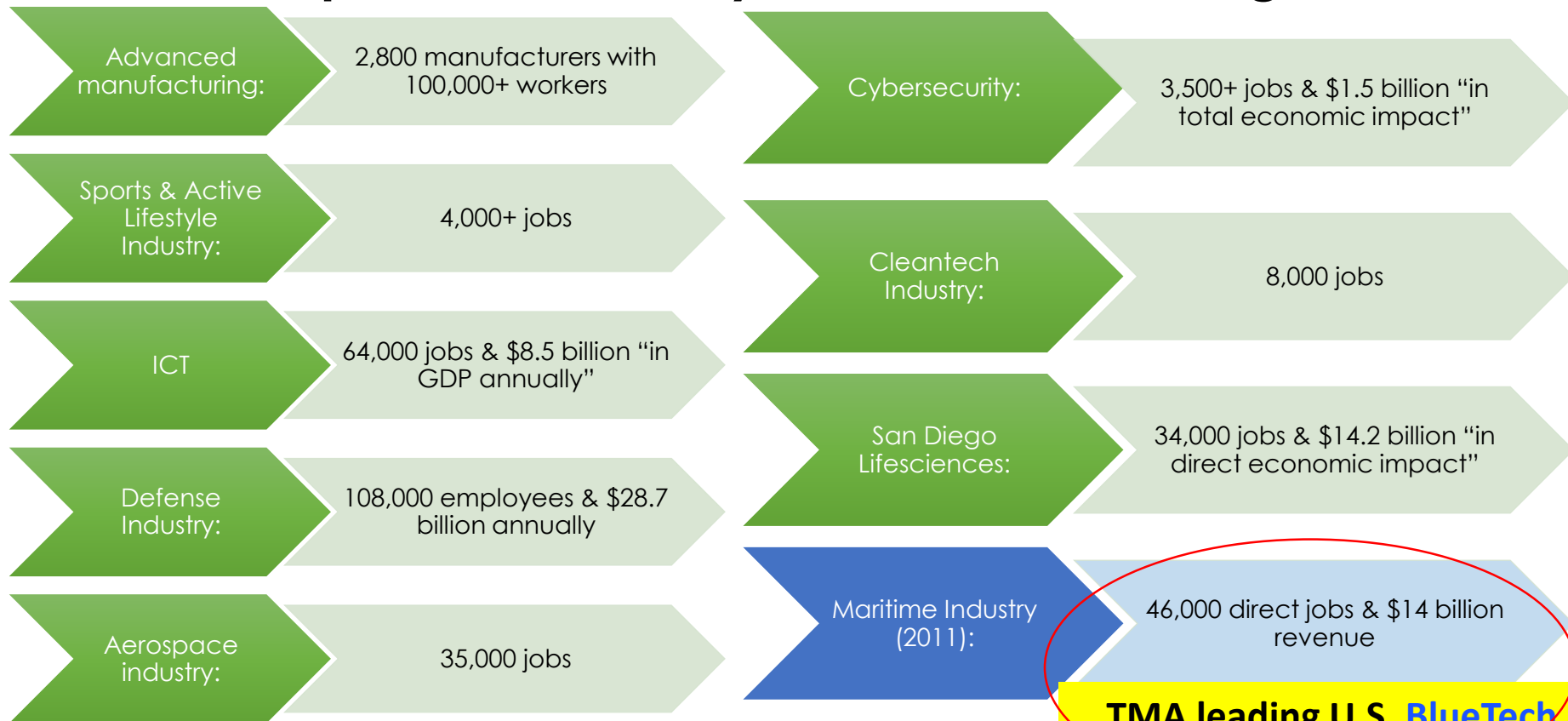


AQUACULTURE

*\*NOTE: The OECD is a Paris-based organization with 35 democratic country members founded in 1960 to stimulate economic progress and world trade.*



## Comparative industry clusters in San Diego



Source: San Diego Regional Economic Development Corporation 2016



Non-profit industry association & cluster organizer for the SD maritime (ocean & water) technology community

The largest, most organized **BlueTech** cluster in the U.S. & one of largest in the world

We bring together **academia, industry, and policy makers** to promote innovation and economic development in the **Blue Economy**

Create a **Blue Voice** via information sharing, national & international outreach, networking, research, & workforce development

Just began 11<sup>th</sup> year

Our Tagline:

**“Promoting BlueTech and Blue Jobs”<sup>®</sup>**

**Our Mission:**

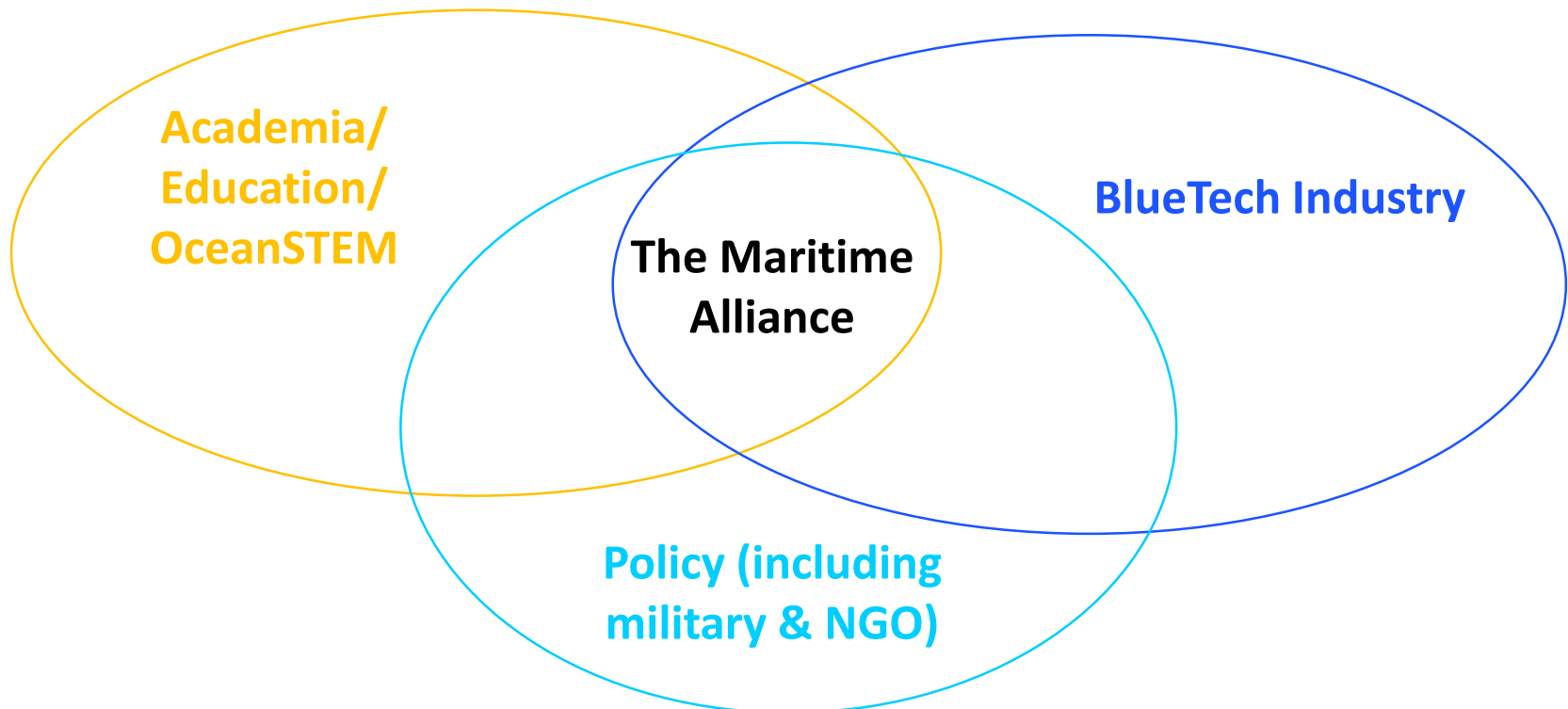
**“Promote sustainable science-based ocean & water industries”**



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**TMA** is all about collaboration across Academia, Industry and Policy to create a regional **Blue Voice** & promote **Blue** opportunity.



# Canada



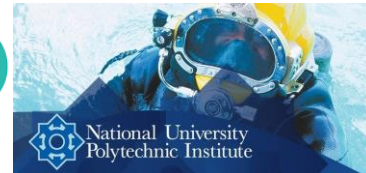
## Partner Organizations



INTERNATIONAL  
**TRADE**  
ADMINISTRATION



UC San Diego



Inter - American Committee  
on Ports







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## BlueTech Cluster Alliance

- **Mission** of BTCA: promote sustainable investment & growth of the knowledge-based ocean and water industries, to the mutual benefit of all Parties, through active regional, national and international collaboration.
- **Goal**: Work together in areas where members of participating clusters can share information, collaborate on research and development initiatives, and jointly pursue business development opportunities.

### Charter Members of **BTCA**:

- Forum Oceano (Portugal)
- Marine Institute (Ireland)
- Oceans Advance (Canada)
- PLOCAN (Spain)
- Pôle Mer Mediterranee (France)
- **The Maritime Alliance** (U.S.)
- UK Blue Growth Network (UK)
- Regular Members of **BTCA**:
- Pôle Mer Bretagne Atlantique (France)
- To be determined



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# Process to join **BlueTech Cluster Alliance**:

## Criteria to join **BTCA**

- It needs to be a formal, industry-oriented, BlueTech “cluster” organization (not a general association, government entity, university, or the like); and,
- There should be a history of and budget for attending leading international shows, which is where most **BTCA** meetings will take place; and,
- There should be a history of demonstrable collaboration between international clusters, including promoting business-to-business opportunities.

## The process will be:

- A member cluster needs to recommend a new member based on past and/or on-going collaboration; and
- Review and approval by majority of the seven **BTCA** Charter Members (representing 7 countries)

# Cluster promotion over next 12 months:

International events: (*collaboration with **BTCA** and non-**BTCA** clusters*)

June 5-9, 2017: 1<sup>st</sup> UN “Ocean Conference” in NYC (Sweden & Fiji co-presidents)

Oct. 5-6, 2017: 4<sup>th</sup> “Our Ocean” conference in Malta (EU and US Dept. of State)

Nov. 6-10, 2017: 9<sup>th</sup> annual **BlueTech Week** in San Diego (**TMA**)

Nov. 22-23, 2017: OECD “Blue Economy” economic analysis seminar in Paris

March 7-9, 2018: *The Economist’s* “World Ocean Summit” in Playa del Carmen, Mexico

March 13-15, 2018: Oceanology International 2018 in London (48<sup>th</sup> year)

June 28-29, 2018: SeaFest (Galway, Ireland)

Nov. 5-9, 2018: 10<sup>th</sup> annual **BlueTech Week** in San Diego (**TMA**)

On-going academic, b2b and cluster collaboration (examples):

- Attracting funding to the industry
- Capacity building across Triple Helix
- Internships at different clusters and cluster member companies
  - Possible 2-year secondment to **TMA** funded by Irish Research Council
- Linking accelerators, b2b opportunities, incubators, publicity, etc.

# THE MARITIME ALLIANCE

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## THE NEXT WORLD OCEAN SUMMIT

Fairmont Mayakoba,  
Riviera Maya, Mexico;  
March 7th-9th  
2018

Register to attend or enquire about  
sponsorship opportunities at  
**[oceansummit.economist.com](http://oceansummit.economist.com)**.



# OECD: *The Ocean Economy in 2030*

- Marine bio-resources:
  - US \$2.8 billion in 2010
  - Projected to grow to US \$4.6 billion by 2017

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- Two sectors:
  - Medical related: development of new antibiotics, anti-bacterial and anti-fungal pharmaceuticals, cosmeceuticals and nutraceuticals
  - Biofuel potential: A theoretical production volume of 20,000 to 80,000 liters of oil per hectare per year can be achieved from micro-algal culture (European Science Foundation Marine Board, 2010), higher than biofuel from terrestrial crops.

Source: *The Ocean Economy in 2030*, April 2016, p. 197

# Biomarine market size

Pierre Erwes, Chairman of BioMarine estimates:

- US \$168 billion market and growing
- Marine Biotech represent 6% of current Biotechnology market
- Marine Pharmaceuticals no more than 3% of current market
- Marine cleantech represents 15% of current cleantech market
- Marine nutraceuticals account for 33% of global market
- Marine cosmetics represent only 12% of the cosmetics market
- Marine Bio energies represent 1% at most of the energy market
- Aquaculture represents 48% of total catch and 2% of the global animal protein market

Source: [http://www.fem.pt/lac/Apresentacoes/29Nov6/0\\_Pierre\\_Erwes.pdf](http://www.fem.pt/lac/Apresentacoes/29Nov6/0_Pierre_Erwes.pdf)

# Ocean Biotech

Icelandic Ocean Biotech companies:

## COUNTRY EXAMPLES:

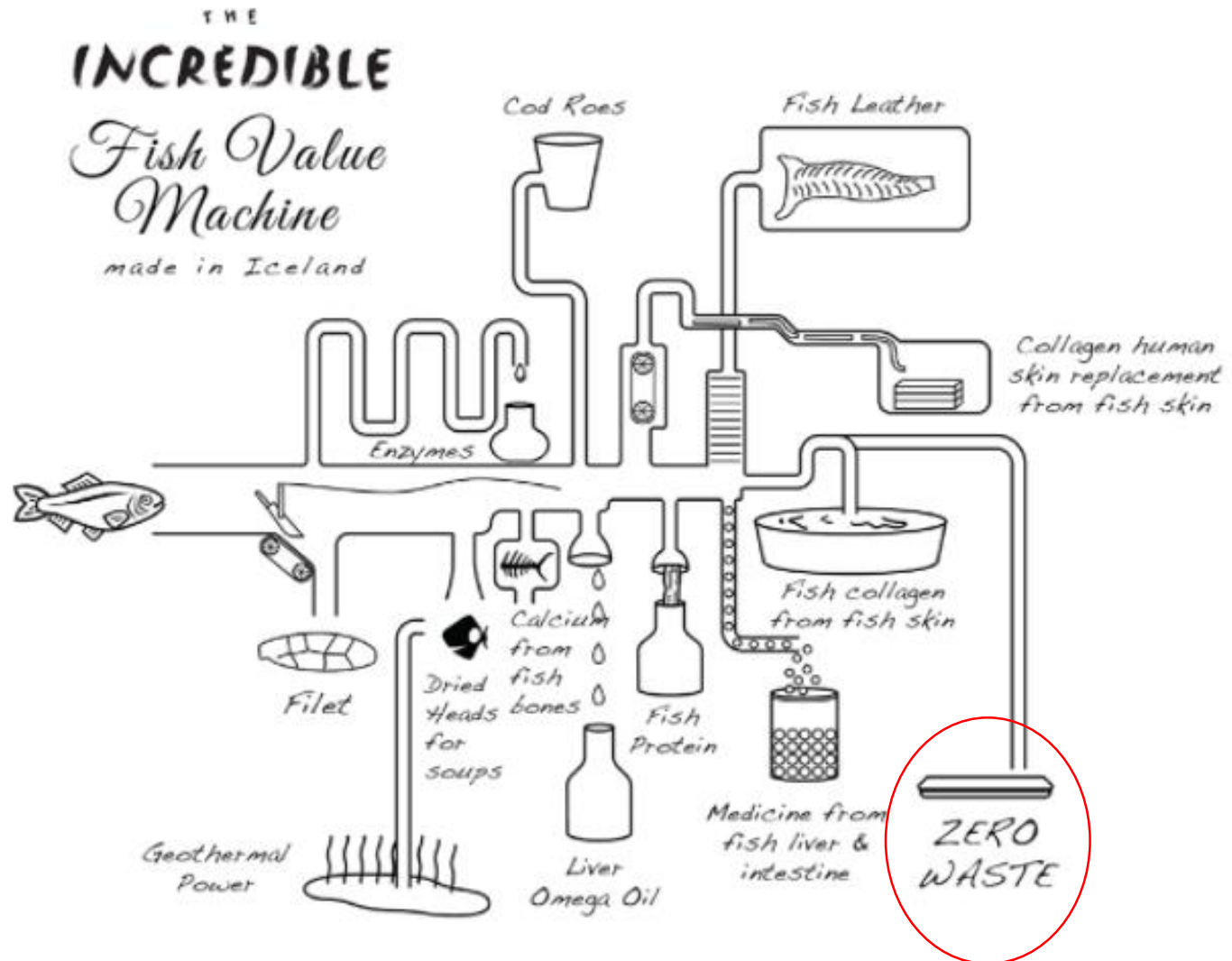
- **Iceland Ocean Cluster**: “Fish & Ships”.  
“Our 100% Fish project emphasizing full utilization of seafood products currently used as landfill in many countries...”.  
Uses: aquatic proteins, cosmetic products, leather from fish skins, medical devices, natural ingredients for food, pharmaceuticals, skincare, vitamins
- **Norway**: In March 2015, Norwegian government drew up a national bioeconomy strategy focused on 4 focus areas where they have a strategic advantage including aquaculture, seafood, & management of the marine environment



# ICELAND: Total utilization of the cod



# The Incredible Fish Value Machine





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## Measuring water quality Assure Controls

1. QwikLite™ Biosensor 200 System, provides **rapid** detection of contaminants at biologically harmful levels. Environmental or coastal water quality testing **at low cost** based on bioluminescent marine organisms.
2. The Ballast Water Channel™ provides IMO & USCG compliance to new regulations. BW Personal, and My Port featured offerings.



QwikLite 200 & Test Kit



# Aquatics research housing Aquaneering

1. Created and perfected the Process Flow for Fluidized Bed Biofilter Systems that has become Research Industry standard
2. Promoted the no-maintenance Fluidized Bed Biofilter for highest water quality with non detectable levels of ammonia (less than 0.1 ppm)



Part of a Central Filtration System  
in a Large Aquatics Lab



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# Additional revenue sources for ports

## Pacifico Aquaculture



- First commercial striped bass hatchery in the world in Ensenada harbor
- Using advanced production techniques.
- 179 hectares near Isla de Todos Santos, eight miles west of Ensenada.
- The company analyzes the ocean water column on a regular basis to ensure water quality.

URL: <http://www.pacificoaquaculture.com/>

# Hopefully...Hawaii BlueTech Cluster

- Attributes and assets:
  - Attributes:
    - San Diego: Ocean; Border; and Weather.
    - Hawaii: Ocean, Remoteness, Weather...??
  - Assets:
    - Testing facilities (asset inventory for what can be shared)
    - Deep ocean
- Areas of potential focus:
  - Aquaculture
  - Blue biotech
  - Maritime cyber & IoT
  - Ocean observation
  - Ocean renewable energy
  - Port & maritime safety and security
  - WaterTech
- Process:
  - Blue Economy study (including asset inventory)
  - Marine Innovation Center plan (Port of Seattle)
  - International outreach (BlueTech Cluster Alliance & intl. shows)



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*"If you want to go quickly, go alone.  
If you want to go far, go together."*

an African proverb

We need each other. We need to collaborate.  
Thank you!



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