

MARINE ALLIANCE FOR SCIENCE AND TECHNOLOGY FOR SCOTLAND

MASTS



Creating excellence in marine science
for the benefit of the people of
Scotland

<http://mss.st-andrews.ac.uk/>

NEW INITIATIVE

marinescotland

Institutional partners

University of Aberdeen

Marine Scotland

University of Glasgow

Heriot-Watt University

University Marine Biological Station, Millport

Napier University

University of St Andrews

Scottish Association for Marine Science (UHIMI)

University of Stirling

University of Strathclyde



University of St Andrews





MASTS

- New initiative to better coordinate marine science research effort in Scotland.
- Discussions between the various HEIs identified some £25 million of existing investment in these activities.
- HEIs recognised benefits of pooling these activities and sought SFC funding to establish new organisational structure and strengthen the science base in key disciplines.



MASTS Accepted

- In recent weeks we have been informed that SFC are willing to invest £17million to establish the new organisational structure and support the appointment of 33 new scientists and fund 50 PhD scholarships.
- The SFC investment has to be matched by an equivalent investment from the HEIs.
- This is a very significant investment in the Scottish Science base. This will total over £74 million over the 5 years of the initiative.



MASTS organisation

- Director based in Aberdeen.
- Operational Director based in St Andrews.
- Graduate School based in SAMS.
- 9 Research Theme Leaders.
- Governing Council (HEI principals)
- Executive Committee
- Science committee



The 9 Research themes:

1. Biodiversity and Ecosystem Function
 - *"The web of life in the oceans"*
2. Coastal Zone *"The land- people-and sea interface"*
3. Marine Predators *"Bellwethers of change"*
4. Sustainable Mariculture
 - *"Scotland's largest agricultural export"*
5. Genomics *"Predicting effects and responding to change"*
6. Fisheries *"Sustainable harvesting from the oceans"*
7. Physical Oceanography
 - *"The fundamental driver of change"*
8. Modelling *"Synthesising knowledge and building hypotheses"*
9. Platforms and Sensors *"Observing the oceans"*



Research Themes

- Over 700 Scottish scientists potentially involved
- Themes recognition of existing research strengths and future ambitions.
- Each theme will have a lead scientist and a steering committee.
- They will develop their own research priorities and action plans.
- Work in progress!

Scottish Mariculture

- Scotland's 18,000 km coastline is used to produce some of the highest quality farmed fish and shellfish in the world.
- The mariculture industry in Scotland is worth over £1 billion (retail) and is responsible for 40% of the country's agricultural exports.
- Research has been key to the industry overcoming many challenges faced during the development of this new animal production system over the past 30 years.
- Scotland's world-leading aquaculture research scientists from a wide range of disciplines will be united under MASTS to collaborate on improving the quality and quantity of farmed seafood while continuing to reduce the environmental footprint of these activities.
- The lead given in improving the sustainability of this important wealth creation activity will further enhance the international reputation and influence of Scotland's aquaculture research community.

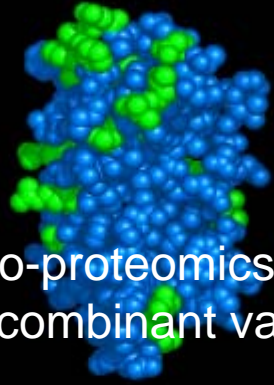
Sustainable Mariculture

What will the Mariculture Research Theme do?

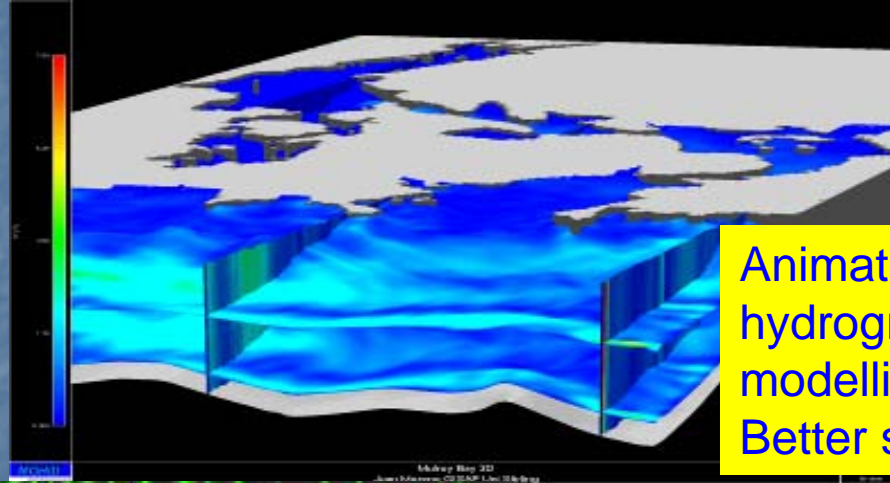
- Unite leading aquaculture scientists and research groups in developing the science base of mariculture in Scotland.
- Provide a cross-disciplinary forum that will enable scientists to address important questions on fundamental and applied aspects of the culture of marine organisms and its impact on marine ecosystems.
- Provide a focus for better communication with the general public, representatives of industry, government and academia, and to show how a better understanding of the fundamental biological and ecosystem processes can help minimise human impacts upon the marine environment.
- Provide a platform allowing Scotland to more effectively influence national and international debates and initiatives concerning the marine environment, sustainable aquaculture and food security and to contribute to the formulation and implementation of more effective policies and regulations.



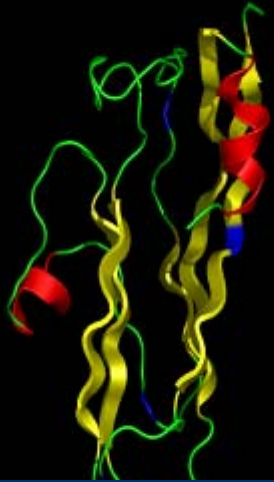
Sustainable Mariculture New Scottish Developments



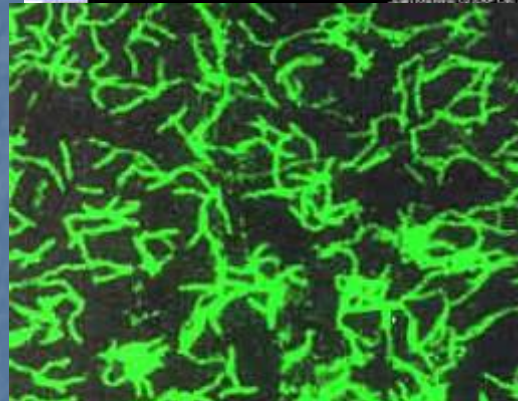
Immuno-proteomics
new recombinant vaccines



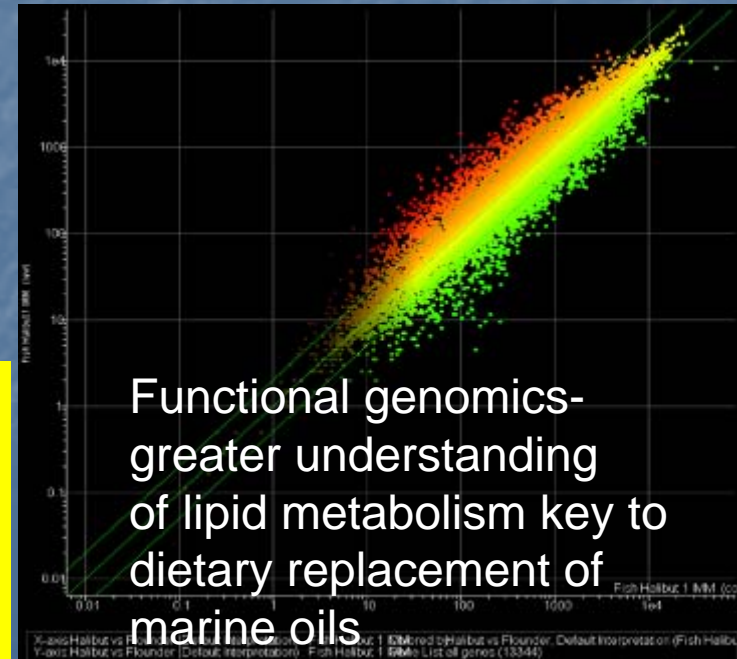
Animated 3D
hydrographical
modelling =
Better site selection



QTL for viral resistance
included in selective
breeding of salmon



Epidemiology of fish
diseases Collaborative
programme between
FRS and Institute of
Aquaculture



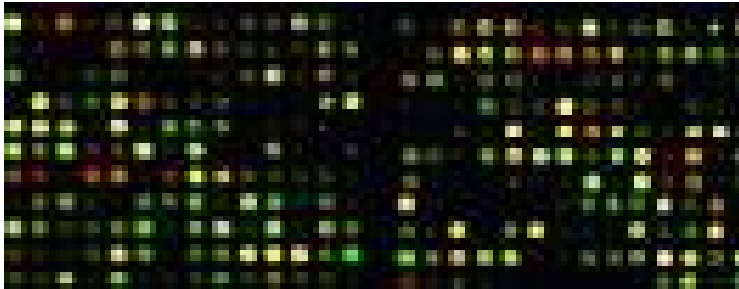
Functional genomics-
greater understanding
of lipid metabolism key to
dietary replacement of
marine oils



Marine genomics

Scotland is taking a lead in the development and application of genomic tools to improving our understanding the fundamental biology of fish. This will lead to rapid improvement in our ability to manage and enhance the quality of farmed fish.

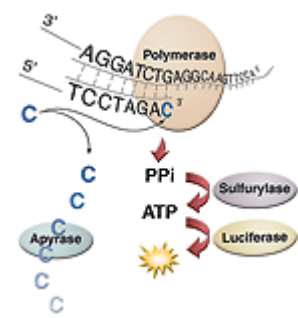
Expression profiling/microarrays



Salmon "Traits" Programme



cGRASP Genomic research in all salmonids project



Pyrosequencing



SOLEXA from Illumina

Next generation high throughput sequencing opens new horizons in marine genomics

Applications include:

- Draft genome sequencing
- The digital transcriptome
- Whole genome SNP (single nucleotide polymorphism) analysis.



Conclusion

- **MASTS will be a new organisation that will help to deliver Research Excellence and establish a better mechanism for Knowledge Exchange.**
- **Better organisation will probably deliver the Science excellence but the KE process will be much more challenging requiring greater involvement by all stakeholders.**