

TRANSATLANTIC OCEAN SYSTEM SCIENCE & TECHNOLOGY
HELMHOLTZ OCEAN SYSTEM SCIENCE & TECHNOLOGY



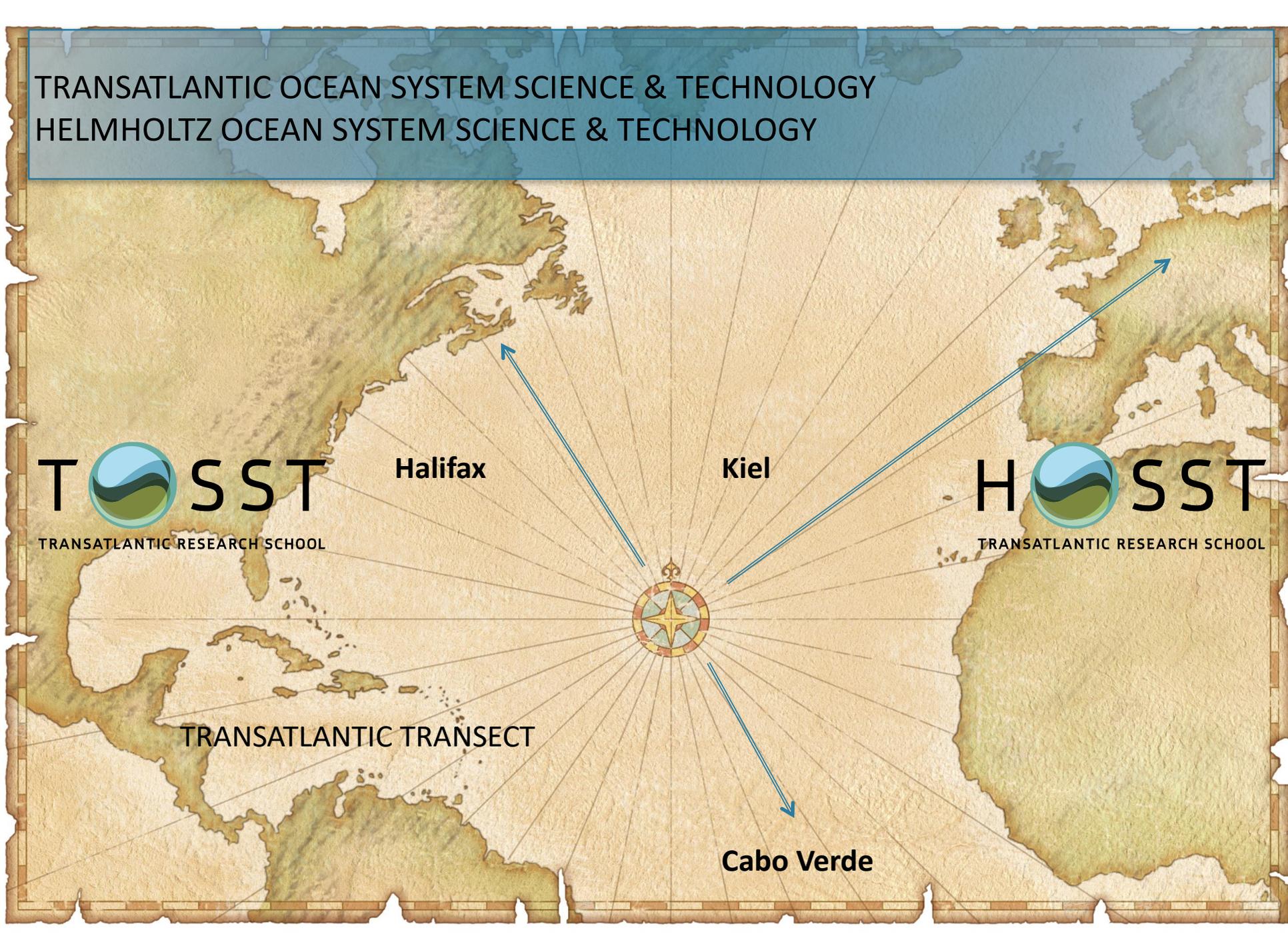
Halifax

Kiel



TRANSATLANTIC TRANSECT

Cabo Verde



Origin: German-Canadian Workshop on Cooperative Research in the North Atlantic Ocean

Dalhousie University, Halifax, Nova Scotia, Canada
June 3-4, 2011



Working Groups – Identified Strong Collaboration Needed!

- The Labrador Sea, Carbon and Climate Variability
- Sub-Arctic Ecosystems: Sensitivity to Change
- Climate Change and Atlantic Overturning in the Past
- The North Atlantic Seafloor: Resources and Risks
- Ocean Governance and Ecosystem Management

The workshop revealed.....

- ◆ Large amounts of common scientific interest
- ◆ Strong interest in closer, project-level cooperation
- ◆ Researchers were largely connected, but the programs and students were not
- ◆ Mutual benefit of coordination, sharing and planning of logistics, and large infrastructure

Chancellor Angela Merkel's Visit to Dalhousie University



August 2012; Dalhousie University

“Marine science in particular, but science in general, can only succeed with international collaboration”

NSERC (Canada) - Collaborative Research and Training Experience Program Helmholtz Association (Germany) – Helmholtz Research School

- TOSST-HOSST is a joint, transatlantic graduate research school, linking two major centres of ocean research on opposite sides of the Atlantic Ocean, in Maritime Canada and northern Germany
- Research addresses key issues facing the North Atlantic under the three themes of: Ecosystem Hotspots, Seafloor Structures, and Ocean Dynamics

Funding from 2013-2019



HOSST 	\$1.8 million Euros (Stipends, summer schools, internships overseas, housing, workshops, conferences, student exchange)
TOSST 	\$3.2 million CA (Stipends, summer schools, internships overseas, workshops, conferences, publications, student exchange)

TOSST-HOSST Link to Cabo Verde

- Building upon the GEOMAR-Cabo Verde long-term cooperation and scientific investment
- Provide students with a very different perspective on science and technology and society/management issues, than what they see in Europe or North America
- Additional support of exchange of technology and research expertise, and students, between Germany, Canada and Cabo Verde
- Common research projects: ocean conservation, biogeochemical studies, marine management, ocean-atmosphere interfaces, and fisheries





4D Ocean-Atmosphere Dynamics

- Past and present climate changes
- Ocean circulation dynamics
- Main areas of research include NW Atlantic and NW Africa.
- Ocean-atmosphere exchange



Ecosystem Hotspots

- Commercial Aquaculture
- Marine Protected Areas
- Hydrothermal vents
- Seamounts
- Population connectivity of deep-sea ecosystems
- Fisheries



Seafloor Structures

- Volcanic and sedimentary processes
- Influence of geohazards and mineral resources on ocean circulation and mixing.
- Remote imaging of sediment and crustal structures.

Program Goals and Structure

2013-2019

Main Goal

1. Convey technical and research skills in ocean science and advanced technologies, and promote informed management of deep sea and open ocean environments.

Secondary Goals

1. Prepare trainees for an increasingly internationalized research and business environment
2. Provide innovative training in business skills and knowledge of private-sector applications of marine science and technology
3. Provide training at the interface between science and policy and its relevance to ocean management

Number of Trainees



PhD = 22



PhD = 23

MSc = 3

Undergrad = 9

Number of PIs



Supervisors = 22



Supervisors = 22

TOSST-HOSST Features

TRAINEES:

1. Participation in 3 summer schools (Halifax, Kiel, and Cabo Verde)
2. Bilateral cohort structure
3. Intensive professional development training: business development, management skills, leadership and policy
4. Internships in industry, government, and NGOs (TOSST)
5. Interdisciplinary research using state-of-the-art facilities in Canada, Germany, and Cabo Verde;
6. Co-supervision in Canada and Germany with international research stays

1st TOSST-HOSST PhD Cohort (25)

Countries

- Russia, Poland, Iran
- China, United States
- Germany, Switzerland
- Italy, Canada

Research Topics

- Marine Management, Conservation
- Microbiology, Bio-physical
- Ocean Technology
- Chemical & Physical Oceanography
- Biology, Fisheries, and Aquaculture
- Volcanology and Seafloor Structures

2nd TOSST-HOSST PhD Cohort (22)

Countries

- Canada
- Germany;
- Phillipines
- Greece
- Lithuania
- Holland
- Cuba
- China
- Switzerland
- France
- Spain
- Iran

Research Topics

- Paleocenaography; Marine Geology
- Biological Oceanography
- Marine Geophysics
- Atmospheric Physics
- Coastal communities
- Biogeochemistry/ sensors
- Autonomous vehicles
- Fisheries and fishery policy
- Sediment dynamcs
- Marine acoustics

1st Transatlantic Summer School 'Ocean Technology & Observation'

Halifax, Nova Scotia 2013



- 2 week intensive school
- Visited over 10 ocean technology and observation companies
- Expert panels
- Networking events
- Dragon's Den
- Exposure to science in industry



FORCE

MetOcean

Data Collection and Communication Experts



PRO OCEANUS stability in a sea of change

WELAPTEGA
MARINE LIMITED



2nd Transatlantic Summer School 'Ocean Seafloor Structures & Dynamics

Kiel, Germany 2014



- 2 week intensive school
- Visited MPA sites in the North Sea
- Expert panels on seafloor structures and MPAs
- Networking events
- Offshore energy visit
- Students developed a theoretical MPA

3rd Transatlantic Summer School 'Ocean Biodiversity and Management'

Mindelo, Cabo Verde 2015



- 2 week intensive school
- Visited active volcanic island -Fogo
- Visited fishing communities and processing plants
- Participated in an island-wide beach clean up!
- Developed a 10-year business plan for the ocean science centre

4rd Transatlantic Summer School 'Ocean Technologies and Observations'

Halifax, Nova Scotia, 2016



- 2 week intensive school
- Visited active volcanic island -Fogo
- Visited fishing communities and processing plants
- Participated in an island-wide beach clean up!
- Developed a 10-year business plan for the ocean science centre



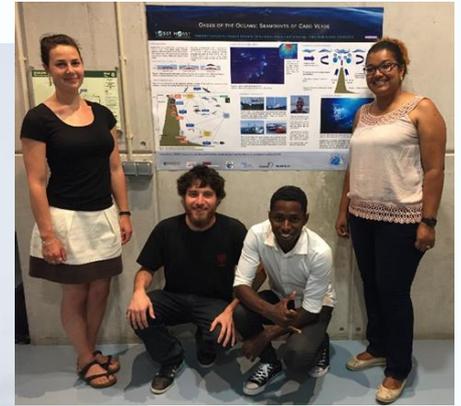
5th Transatlantic Summer School:
“Multi-use conflicts in an industrialized coastal zone”

Kiel, Germany, 2017



6th and Final Transatlantic Summer School 'Cabo Verde: Life on a Volcano'

Sao Vicente and Fogo, Cabo Verde, 2018.



Some Challenges and **Our Responses or Lessons Learned:**

1. Coordination of funding in two nations for joint training program:
We wrote 2 separate but excellent proposals (and/or we got lucky)
2. Differing degree requirements and timing of PhD studies
(e.g. Germany: 3 years; Canada: 5 years)
We did not attempt joint degrees; we focussed on networking of PhD candidates and their research. This limited approach worked.
3. Recruitment of candidates into cohorts. Recruitment was a major challenge in Canada, predominantly; delays disrupted establishment of cohorts.
We did not fully resolve the recruitment problem in Canada
4. Establishment of a PhD network across the Atlantic.
This worked. Face-to-face meetings + joint projects at summer schools required to develop personal contacts; maintained by videoconferencing. The bilateral, long-term connections allowed networks to build.
5. “Value-added” program requirements place an extra burden on PhD candidates and risk delays in graduation
This was a problem; academic credit should be sought for these important activities (e.g. Summer Schools and regular seminars)
6. Supervisors view “value-added” activities as diverting PhD candidates from their research tasks; (some) supervisors do not engage with program
This was a problem in some cases. Funding should be restricted to supervisors who see the (non-financial) benefits of the program and commit.

Additional lessons-learned

A complex, international training program of this nature requires a very stable funding environment and an appropriate, internationally-coordinated review mechanism; these aspects were problematic on the Canadian side

The complexity of international networking, especially involving mobility across the Atlantic, requires full-time, dedicated coordinators working together on both sides of the Atlantic. Again this was problematic on the Canadian side where program funding for coordination was limited to the first 2 years only.

Some Program Benefits:

Creation of an international peer network

Exposure to broad multidisciplinary topics

Broader cultural exposure/ awareness

Exposure to diverse research cultures and opportunities

Expanded research opportunities (e.g. research locations; infrastructure; complementary scientific input)

Value-added training and experience beyond the academic: including business skills; policy issues

Awareness of challenges facing researchers in different countries, including developing nations

Thank you!

