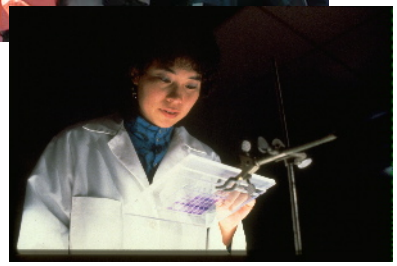
Broadening Participation in Marine Science

Potential Applications of US Programs to International Capacity Building



George Boehlert
Oregon State University
PICES

SCOR Committee on Capacity Building
Izmir, Turkey
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Brief Summary of Presentation

- Concept and Rationale: Applying US programs to involve under-represented groups in science as models for international capacity building
- Description and purpose of US programs
- Case studies
  - Mentoring students at scientific meetings
  - Undergraduate research internships
- Opportunities to apply to international CB
- Stimulate ideas for developing pilot programs

Concept and Rationale in the US

Broadening Participation in Marine Science

- US marine scientists do not reflect the diversity of society as a whole.
- Increasing diversity of marine scientists and educating the public will improve the cultural appreciation of issues facing the marine environment
- Programs exist to stimulate participation at all career stages – youth education through undergraduate, graduate, and post-graduate education
- Goal: create students dedicated to careers in science and aware of issues facing the marine environment.

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US Participation in Marine Science

	White	Asian/ Pacific Islander	African America n	Hispanic	Native American
% US Population 2005	67	5	13	14	1
% US Population projected 2050	47	9	13	29	1
% BS all Sciences	72	10	10	8	1
%BS Ocean Sciences	89	6	1	4	0
%MS Ocean Sciences	87	5	3	3	0
% PhD Ocean Sciences	95	0	1	1	0

Slide courtesy of Ben Cuker, Hampton University

US Programs to Broaden Participation

Undergraduate and Graduate Programs

*NSF-Research Experience for Undergraduates: Undergraduate research internships in diverse disciplines.
http://www.nsf.gov/crssprgm/reu/index.jsp

COSEE-PRIME: Promoting Research Investigations in the Marine Environment (PRIME) summer program provides internships for community college students to develop research and outreach skills through hands-on experience working with marine scientists, practitioners, and informal marine educators
http://www.coseepacificpartnerships.org/programs/CC/students/prime2009/

US Programs to Broaden Participation

Undergraduate and Graduate Programs

Louis Stokes Alliance for Minority Participation: increasing the quality and quantity of students successfully completing science technology, engineering and mathematics (STEM) baccalaureate degree programs, particularly underrepresented minority students.
http://www.nsf.gov/pubs/2003/nsf03520/nsf03520.htm
http://www.pathwaystoscience.org/LSAMP.asp

Hall-Bonner Program: Working to increase the diversity of students earning doctoral degrees in the marine and ocean sciences by creating a genuine community of minority ocean scholars.
http://science.hamptonu.edu/mes/hall_bonner.cfm

US Programs to Broaden Participation

Undergraduate and Graduate Programs

National Oceanic and Atmospheric Administration (NOAA) – Hollings Scholars: Creating opportunities for undergraduates to pursue careers in marine and atmospheric sciences and education in NOAA and other natural resource agencies
http://www.oesd.noaa.gov/Hollings_info.html

US Environmental Protection Agency, EPA-STAR: Numerous opportunities are available within EPA for students to gain vital career experience while contributing to the mission of protecting human health and safeguarding the environment. Internships, fellowships and other opportunities are available in Washington, D.C., laboratories, and at regional EPA locations nationwide.
http://www.epa.gov/careers/stuopp.html

US Programs to Broaden Participation

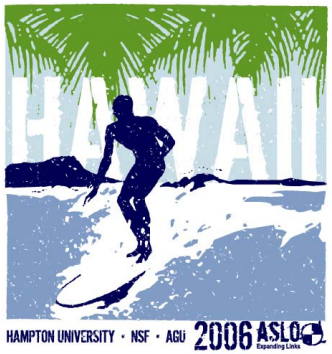
Mentoring Young Scientists at Meetings

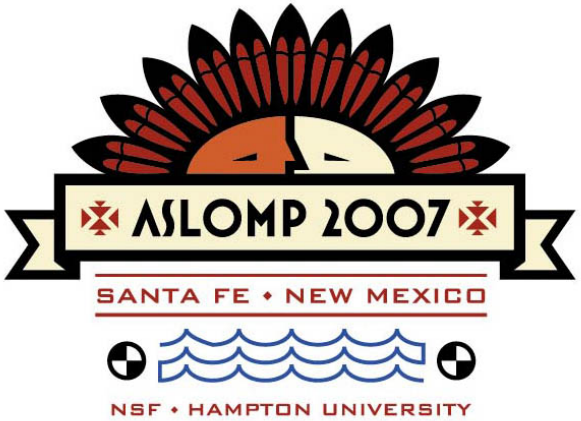
*American Society of Limnology and Oceanography Multicultural Program (ASLOMP)**: special opportunities for under-represented minority students (undergraduate and graduate) interested in aquatic sciences (oceanography, limnology, stream ecology, marine biology, fisheries, etc.). ASLOMP provides students full support (travel, housing, food, and registration) to participate in the annual meetings of ASLO.

http://www.hamptonu.edu/science/ASLO.htm

Case Study 1 – Meeting Mentoring

American Society of Limnology and Oceanography
Multi-cultural Program (since 1990)





ASLOMP information courtesy of Ben Cuker, Hampton University

Goal: Increase the diversity of the aquatic science community

Slide courtesy of Ben Cuker, Hampton University

ASLOMP Objectives

- Expose diverse undergraduates and beginning graduate students to cutting edge aquatic science
- Link students to internships, advanced studies, special programs, and employment
- Bring students into networks of minority and majority aquatic scientists
- Build a critical mass of diverse scientists in ASLO that will form a mentor core
- Create positive professional experience

ASLO Advancing the science of limnology and oceanography

NSF

Steps in ASLO Mentoring Process

Recruitment and Selection

- Pick balanced cohort of 65 students with potential
- Invite mentors – network and ASLO call

Pre-conference activities

- Opening Dinner, Keynote Address
- Sunday field trip to local aquatic site.
- Meet with "**meeting mentors,**" plan conference participation
- ASLO mixer – reach out

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Steps in ASLO Mentoring Process

Meeting Mentors

- Regular ASLO members
- Program mentors – role models
- Work with 3 – 7 students of similar interest
- Help students plan their meetings
- Discuss critiques of presentations
- Introduce students to other scientists
- Participate in social events with students
- Many now are former ASLOMP participants!

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Steps in ASLO Mentoring Process

Student Workbook

- Students work with meeting mentors to fill in times for presentations to attend
- Critique of two talks and two posters
- Copy available on SCOR website

Student Presentations

- Oral Presentations, 22 talks
- Poster or Oral presentation in subsequent meetings

Follow-up

- Mentor maintains contact with students after meeting
- Students, mentors, and outcomes evaluated annually

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Case Study 2 – Research Internship

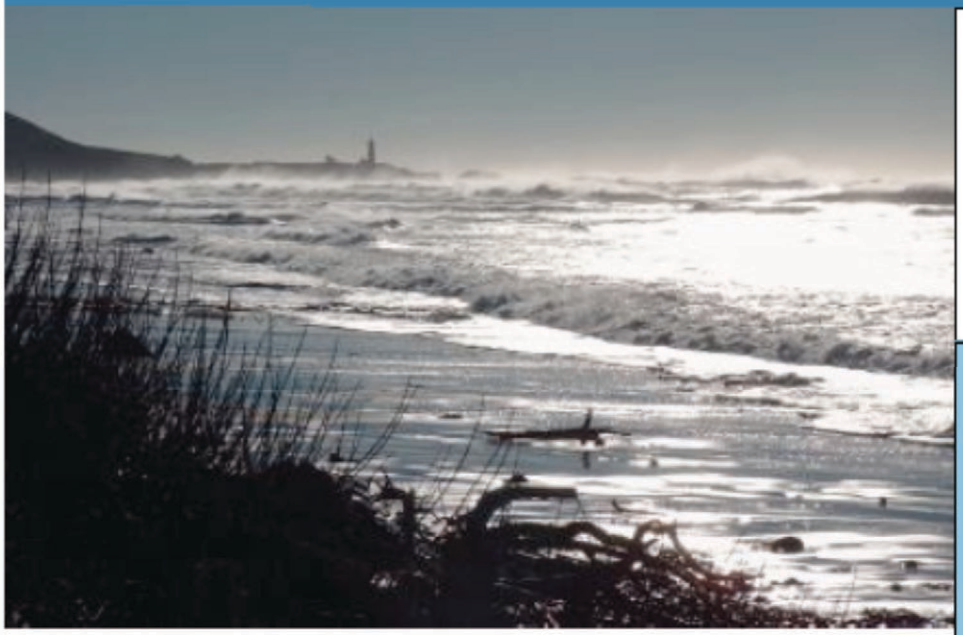
Research Experience for Undergraduates

- National Science Foundation sponsored
- Multiple sites across US in all scientific disciplines
- Some 15 REU sites in marine sciences

Nature of REU Program

- Recruitment to top students from throughout US
- Students without research opportunities favored
- REU interns receive travel to site, housing costs, $500 per week stipend, and mentored, 10 week research experience
- Example: OSU's Hatfield Marine Science Center REU site

Summer 2010 Marine Science Internships in Oregon



Hatfield Marine Science Center

College of Oceanic and Atmospheric Sciences

Research Experience for Undergraduates

www.hmsc.oregonstate.edu/REU

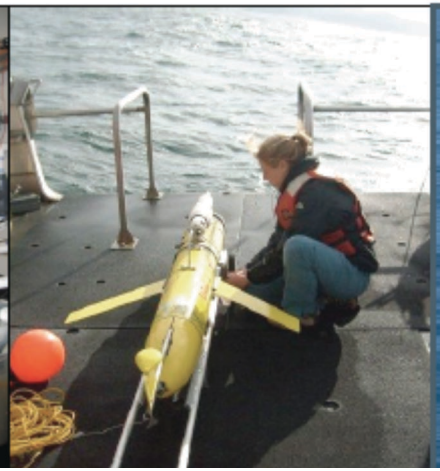
From Estuaries to the Deep Sea…

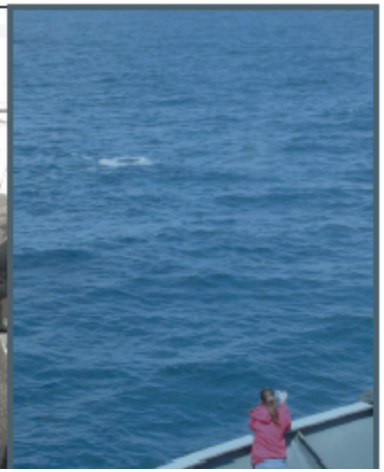
Eligibility

Currently enrolled undergraduates who have by June 2010 completed at least two years of coursework may apply. (Eligibility limited to U.S. citizens)

REU interns receive a weekly stipend, housing on-site, and round-trip transportation from their home area. Learn more and apply online at: **www.hmsc.oregonstate.edu/REU**

Come discover Oregon!





HMSC's REU Internship Program

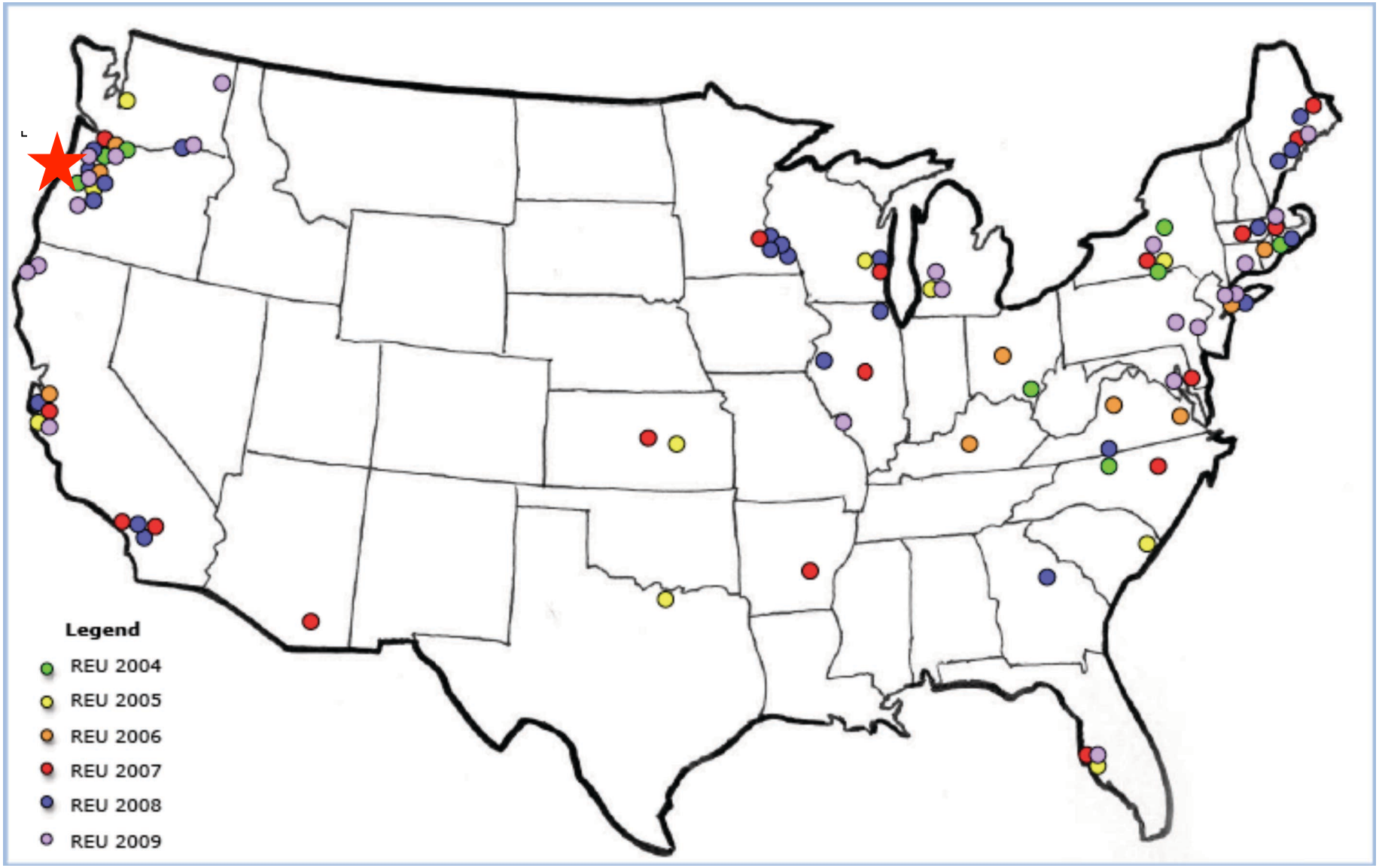
- Location: Hatfield Marine Science, Newport, Oregon
- Site funded since 2004, now in 8th year
- 2011: 282 applications for 18 positions
  - 9 interns at HMSC, 9 in Corvallis

Activities:

- Orientation to lab
- Scientific ethics
- Proposal writing
- Field work and research
- Writing reports
- Camping
- End of term symposium
- Rigorous evaluation

HMSC's REU Internship Program

Home Universities of HMSC's REU Interns



HMSC's REU Internship Program

Partnering to train young scientists via research, professional development and communication

- Mentors: a mix of regular OSU faculty and courtesy faculty (state and federal agency researchers)
- Exposure to a variety of research career paths
- Presentations and reports at end of term
- Presentations at Conferences (ASLO, AGU, SACNAS, AFS); roughly 50% of students
- Best projects often published
- High percentage move on to graduate programs
- Many are now academics or marine scientists

Applications and Relevance to Capacity Development

Can these US programs serve as models for international CD?

- **Mentored meeting experiences** are beneficial:
  - They allow students or young professionals to be part of the meeting.
  - Important networking tools can be gained.
  - Rigorous evaluation of success allows continual improvement of programs.
- Application of these approaches to funded meeting travel can show immediate results and benefits.
  - At the international level, travel funds will be more cost effective and have better outcomes.

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Applications and Relevance to Capacity Development

Can these US programs serve as models for international CD?

- **Research internships** may also have good potential at the international level.
- Moving training in science from faculty to graduate students to undergraduates has been successful.
  - Engaging interest at younger ages can lead to career development in marine sciences.

• Developing countries often lack the infrastructure to support so complex a program, so modifications will be needed, tailored to the specific location.

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Applications and Relevance to Capacity Development

How can we develop and evaluate research internships?

- Student recruitment is highly important.
  - Choose top students with interest in ocean issues
- Research experiences should be in-country (or region)
  - Engage student interest in their own nation's marine environment and the challenges it faces.
- Research projects should be appropriate
  - Match with level of intern, mentor, and infrastructure.
  - Should be designed with high likelihood of outcomes.
- Create opportunities to work with visiting scientists.
- Suggestions? How might a pilot project work?

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Applications and Relevance to Capacity Development

How can we develop and evaluate research internships?

Suggestions, Questions, and Discussion

How might a pilot project work?

What might be an appropriate pilot project site?

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