

SAML Education Committee (EdCom) Report

March 20, 2008

A. SAML student awards program.

1. At the last SAML meeting Matt Gilligan shared a report the ASLO Student Awards 2007 at the Aquatic Sciences Meeting Santa Fe, New Mexico February 5-9, 2007. Minutes of SAML 2007 Business Meeting in Savannah, April 26, 2007 reflect that \$1,000 was approved for the ASLO 2008 student awards.(attached).
2. Steve Jordan reported that the Estuaries Section of AFS selected two students (from a pool of 8 applicants) for the SAML-supported awards for the AFS annual meeting in San Francisco, September 2-6, 2007. The students were Cassie Reed Martin, University of North Carolina, Wilmington, and Joshua Newhard, University of Maryland, Eastern Shore. Each received a \$500 travel award and plaque presented on Tuesday evening, September 4, at the joint business meeting and reception of the Estuaries and Marine Fisheries Sections.

B. NAML Education and Diversity Committee.

1. NAML Biennial Meeting and E.E. Just National Medal of Excellence proposal to NOAA (attached).
2. White Paper on Ocean Education from NAML (Jim Sanders) to NOAA Education Office (Louisa Koch). Other developments: NRCs Board on Science Education (BOSE) requested nominations for a 12-15 person, 24-month study committee to produce a report on the effectiveness and appropriate roles, goals, and evaluation strategy of NOAAs education programs. (attached)

C. Education Sessions at the 2008 Ocean Sciences Meeting · 2-7 March 2008 · Orlando, Florida, USA, Co-sponsored by the American Society of Limnology and Oceanography, the American Geophysical Union, The Oceanography Society and the Estuarine Research Federation:

001. ASLO Multicultural Program Student Symposium [S]
Organizers: Benjamin Cuker, Hampton University, benjamin.cuker@hamptonu.edu;
Deidre M. Gibson, Hampton University, Deidre.Gibson@hamptonu.edu

020. Underrepresented But Not Forgotten: How to Increase Student Diversity in Marine Science [S]

Organizers: Deidre M. Gibson, Hampton University, deidre.gibson@hamptonu.edu; Kam Tang, Virginia Institute of Marine Science, kamtang@vims.edu

Author: Matt Gilligan

Title: Marine labs and majority underrepresented institutions can build partnerships that increase underrepresented minority participation in the marine sciences.

Abstract: Few underrepresented minority (UM) students pursue careers in marine science because 1) though they attract, retain, and graduate UM students in the sciences and technology well, most Majority Underrepresented Institutions (MUIs = institutions where UMs are a majority of the student population) do not have programs that introduce students to marine science professions and 2) most institutions that do (majority white colleges and universities, marine laboratories and oceanographic institutions) have not been widely successful recruiting, retaining and graduating and hiring UM students and graduates. For example, though they enroll only 13% of the African Americans who are in college, Historically Black Colleges and Universities (HBCUs) award 40% of the science degrees earned by African Americans in the U.S. (NCES). Savannah State University, an Historically Black College and University (HBCU), has built successful marine science programs at undergraduate and graduate levels with help from collaborations and partnerships with marine laboratories and oceanographic institutions. More can be done to encourage and support partnerships that result in curriculum development and research growth at MUIs and outreach development and education growth at marine laboratories.

026. Research Experiences of Undergraduates in Aquatic Sciences [S]

Organizers: Russell L. Cuhel, UWM Center for Great Lakes Studies, rcuhel@uwm.edu; Carmen Aguilar, UWM Center for Great Lakes, aguilar@uwm.edu

042. Outreach in Ocean Sciences - Taking the Ocean to the Classroom [S]

Organizers: Joachim Dengg, Institut f. Meereswissenschaften, jdengg@ifm-geomar.de; Teresa Greely, College of Marine Science, greely@marine.usf.edu

043. Techniques to Implement Real-time Scientific Concepts and Data in the K-12 Classroom and Assessing Its Sustainability [S]

Organizers: Marcianna P. Delaney, Univ. MD, Baltimore County & NASA GSFC, marci.delaney@gsfc.nasa.gov; John P. Leck, NASA GSFC Office of Education, John.P.Leck.1@gsfc.nasa.gov

077. Education and Outreach Using Ocean Observing Systems. [S, T]

Organizers: J. A. Yoder, Woods Hole Oceanographic Institution, jyoder@whoi.edu; E. L. Rom, National Science Foundation, Division of Ocean Science, lrom@nsf.gov; J.

McDonnell, Institute of Marine & Coastal Sciences, Rutgers,
mcdonnel@marine.rutgers.edu

093. The Ocean Science, Technology, and Operations Workforce [S, T]

Organizers: Tom Murphree, Naval Postgraduate School, murphree@nps.edu; Deidre Sullivan, Marine Advanced Technology Education Center, dsullivan@mpc.edu; Leslie Rosenfeld, Naval Postgraduate School, lkrosenf@nps.edu; Melbourne Briscoe, The Oceanography Society, mel@briscoe.com

114. New Directions for Funding and the Future of US Oceanographic Institutions [S, R]

Organizers: D. James Baker, Consultant, djamesbaker@comcast.net; Ray Schmitt, WHOI, rschmitt@whoi.edu; Carl Wunsch, MIT, cwunsch@ocean.mit.edu

125. Collaborative Partnerships in Ocean Science Education [S]

Organizers: Linda Duguay, University of Southern California, duguay@usc.edu; Sue Cook, CORE, Consortium for Oceanographic Research and Education, scook@coreocean.org; Blanche Meeson, NASA/Goddard Space Flight Center, blanche.w.meeson@nasa.gov

140. Response to the Ocean Commission Recommendations moting Lifelong Education [S]

Organizers: John W Farrington, Woods Hole Oceanographic Institution, jfarrington@whoi.edu; Sharon Franks, Scripps Institution of Oceanography, UCSD, sfranks@ucsd.edu; Paula Coble, University of South Florida, coble@marine.usf.edu

164. Improving Geosciences Education and Public Outreach: Sharing Strategic and Rewarding Approaches [S]

Organizers: Andrea Thorrold, Woods Hole Oceanographic, athorrold@whoi.edu; Annette deCharon, University of Maine, Darling Marine Center, annette.decharon@maine.edu; Liesl Hotaling, Stevens Institute of Technology, liesl ing@stevens.edu

174. Sharing Scientific Ocean Drilling's Greatest Hits with Educators [G, S]

Organizers: Sharon Katz Cooper, Joint Oceanographic Institutions, scooper@joiscience.org; Leslie Peart, Joint Oceanographic Institutions, lpeart@joiscience.org

181. Novel Approaches for Improving Ocean Science Literacy in K-12 Classrooms [S]

Organizers: Richard A. Tankersley, Florida Institute of Technology, rtankers@fit.edu; John Windsor, Florida Institute of Technology, jwindsor@fit.edu

195. Engaging Undergraduate and Graduate Students in Oceanography Courses [S]

Organizers: Gisele Muller-Parker, Western Washington University, Gisele.Muller-Parker@wwu.edu; Rick Keil, School of Oceanography, Univ. of Washington, rickkeil@u.washington.edu

D. New SAML initiative/proposal.

A proposal from SAML to NSF Opportunities for Expanding Diversity in Geosciences (OEDG) Program (attached) for a Track I proof of concept project involving workshops and meetings to encourage and develop more collaborative proposals from marine labs and MSIs that will lead to implementation of best practices and guiding principles that have demonstrated success in achieving the goal of increased participation and number of degrees awarded at the M.S. degrees and Ph.D. level in marine, ocean and geo-sciences (Gilligan et al. 2008)

Goals:

1. Expand awareness, exposure, and opportunities in geosciences, specifically marine and ocean sciences, at HBCUs.
2. Increase the presence of marine lab staff at HBCUs.
3. Increase the number of students from underrepresented groups taking coursework and applying for research experiences at marine laboratories.
4. Increase the presence of HBCU staff at marine labs.

Gilligan, M.G., P. G. Verity, C. B. Cook, S. B. Cook, M. G. Booth, M. E. Frischer. 2008. Building a Diverse and Innovative Ocean Workforce through Collaboration and Partnerships that Integrate Research and Education: HBCUs and Marine Laboratories. J. Geoscience Education. In Press.

Subject: FW: Updated Listing of Minority Serving Institutions

Date: Mon, 10 Mar 2008 16:53:52 -0400

From: "Rom, Elizabeth L." <elrom@nsf.gov>

To: <BENJAMIN.CUKER@HAMPTONU.EDU>, "Matthew Gilligan" <gillganm@savstate.edu>

Ben/Matt:

Thanks for all your hard work this past week at OCEANS 2008. I was impressed with the ASLOMP group! This is information that you may have already, but just in case.... It might be useful for recruiting.

Cheers, Lisa

From: Gorman, Tracy Y.

Sent: Monday, March 10, 2008 4:44 PM

To: NSF Program Officers; NSF Science Assistants; BFA BD; Grzechowiak, John K.

Cc: Korsmo, Fae L.

Subject: Updated Listing of Minority Serving Institutions

Attached for your use is an updated list of majority serving institutions (MSIs). Designation as an MSI is drawn from listings prepared by the Department of Education's Office of Civil Rights (OCR) and the enrollment data available through IPEDS Spring 2006 Survey. OCR's lists are available online at

<http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>

<<2006 List of MSIs by Institution Type.xls>>

The percentage of minority enrollment is indicated where available. Race/Ethnic categories are: (1) Black, non Hispanic; (1) American Indian or Alaska Native; (3) Asian American and Pacific Islander; (4) Hispanic; (5) white, non-Hispanic, and (6) Other. When determining MSI status, OCR excludes Asians and Pacific Islanders enrollment because IPEDS enrollment data does not disaggregate Pacific Islanders from Asians and some studies have indicated that Asians are not underrepresented in science and engineering.

The eight categories of MSIs are listed below along with a description of each.

Tracy Gorman
O/D

INSTITUTION TYPE	DESCRIPTION
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Alaska Native Serving Institutions (AK Nat)	IHEs that award associate or bachelor level degrees that have a 20 percent or greater enrollment of Alaska Native undergraduate students
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Hispanic Serving Institutions (HSI)	IHEs that award associate or bachelor level degrees that have a 25 percent or greater full-time equivalent enrollment of Hispanic undergraduate students
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Historically Black Colleges and Universities (HBCU)	Identified in the Higher Education Act of 1965, as amended, as any accredited historical college or university that was established prior to 1964, whose principal mission was, and is, the education of Black Americans
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Institutions Serving People with Disabilities (DSI)	IHEs dedicated to serving people with disabilities such as Gallaudet University, Landmark College, and National Technical Institute for the Deaf
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Native Hawaiian Serving Institutions (Nat HI)	IHEs that award associate or bachelor level degrees that have a 10 percent or greater enrollment of Native Hawaiian undergraduate students
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Pacific Islander Institutions	IHEs located in US territories in the Pacific Ocean.
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Tribal Colleges and Universities (TCU)	IHEs that are formally controlled, or have been formally sanctioned or chartered by the governing body of a federally recognized Native
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American tribe or tribes. Specifically, tribal colleges and universities are those institutions cited in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (7 U.S.C. 301 note), any other institution that qualifies for funding under the Tribally Controlled Community College Assistance Act of 1978 (25 U.S.C. 1801 et seq.), and Dine' College, authorized in the Navajo Community College Assistance Act of 1978, Public Law 95-471, title II (25 U.S.C. 640a note)

Majority Minority Serving Institutions (MMSI) IHEs that award associate or bachelor level degrees that have an aggregate undergraduate enrollment of Hispanics, Blacks or African Americans, Native Americans, and Alaska Natives exceeding 50 percent of total enrollment

TOTAL NUMBER OF ACCREDITED POSTSECONDARY MINORITY INSTITUTIONS -822

Based on conversations with Julie Morris, Ocean Science Division Director; Lisa Rom, Ocean Science education Program manger; and Jill Karsten, GEOED and OEDG program manager, such a proposal would be welcomed.

Respectfully submitted,

Matt Gilligan, Don Hockaday, Co-Chairs, SAML EdCom

Members: Wes Tunnell, Bob Vandolah, Jim Sanders, Gil McRae, Iris Anderson, Steve Jordan, Kelly Clark, Mike Orbach, Sandy Gilchrist

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Southern Association of Marine Laboratories

ASLO Student Awards 2008

American Society of Limnology and Oceanography
Ocean Sciences Meeting Orlando, FL
March 3-7, 2008

Platform Presentation Student Winners (001. ASLO Multicultural Program Student Symposium)

First Place Awards:

(\$125) **Katrina Weber**; Castanon, A. D.; Walsh, E. J.: UNPALATABILITY OF A COLONIAL ROTIFER, *SINANTHERINA SOCIALIS*, TO DRAGONFLY AND DAMSELFLY NYMPHS

(\$125) **Dominique Cowart**; Guida, S. M.; Shah, S. I.; Marsh, A. G.: EFFECTS OF AG AND TIO₂ NANOPARTICLES ON THE SURVIVAL AND METABOLISM OF ZEBRAFISH (*DANIO RERIO*) EMBRYOS

Second Place Awards:

(\$75) **Stephanie Garcia**; Maldonado, E.; Latz, M.: THE EFFECTS OF TURBULENCE ON LARVAE OF THE WHITE SEA URCHIN

(\$75) **Zahirah Salahuddin**; Ryer, C. H.: PHOTOTAXIS AND HABITAT PREFERENCE BY JUVENILE ENGLISH SOLE

Third Place Award:

(\$50) **Jeremy Williams**; Czajkowski, K.; Hayase, R.: IMPACTS OF LAND COVER AND USAGE ON WATER QUALITY IN WESTERN LAKE ERIE WATERSHEDS.

Fourth Place Award:

Lisa Arneson; Kirkpatrick, G.: FLOWCAM[®], A POTENTIAL NEW METHOD TO ANALYZE PHYTOPLANKTON ECOLOGY

Honorable Mention:

Judith Sarkodee-Adoo.; Hood, R. R.; Sexton, M.: THE EFFECTS OF TEMPERATURE ON SCYPHOMEDUSAN *CHRYSAORA QUINQUECIRRHA* SWIMMING AND MORTALITY

Sanya Compton; Pride, C.: DENSITY AND DISTRIBUTION OF BENTHIC FORMINIFERA AT FOUR STATIONS ALONG THE GEORGIA CONTINENTAL SHELF

Brian Stiell; Kjellerup, B.; Sowers, K.: THE DISTRIBUTION OF ANAEROBIC POLYCHLORINATED BIPHENYL DECHLORINATORS IN THE BALTIMORE HARBOR

ASLO, AGU, TOS, SAML Student Poster Award Winners

Benthuisen, Jessica A. THE MODIFICATION OF FRICTIONALLY DRIVEN SECONDARY CIRCULATIONS BY BUOYANCY FORCES OVER A SLOPING BOTTOM

Crespo-Medina Melitza INTERACTIONS OF CHEMOSYNTHETIC BACTERIA WITH MERCURY AT DEEP-SEA HYDROTHERMAL VENTS

Dietz, Marianne E. A MULTIPROXY APPROACH TO INVESTIGATING ECOSYSTEM CHANGE IN RESPONSE TO THE DEVELOPMENT OF MODERN AND HISTORIC LOW-OXYGEN CONDITIONS ON THE LA CONTINENTAL SHELF

Flannery, Jennifer A. A 1400 YEAR LATE HOLOCENE SEDIMENTARY RECORD LINKING GULF OF MEXICO CLIMATOLOGY TO HYDROLOGIC VARIABILITY ON THE NORTH AMERICAN CONTINENT

Gillis, Nancy K. GENETIC DIVERSITY AND POPULATION ADMIXTURE CONTRIBUTE TO ESTABLISHMENT OF MYTELLA CHARRUANA, AN INVASIVE MUSSEL

Gudmundsdottir, Ragnhildur *PSEUDOCALANUS* IN SVALBARD WATERS; DISTRIBUTION PATTERNS OF TWO SIBLING COPEPOD SPECIES

Hardee Sarah, E. HARBOR SEAL MOVEMENTS AND HOT-SPOTS IN THE GEORGIA BASIN REVEALED THROUGH THE USE OF SATELLITE-TELEMETRY.

Hristova, Hristina G. RADIATING INSTABILITY OF A MERIDIONAL BOUNDARY CURRENT

Ibarra, Sonia N. COMPARING KELP COMMUNITIES ON THE INNER AND OUTER COASTS OF SOUTHEAST ALASKA

Kirkpatrick, John B. GROSS PRODUCTION AND UNDERWAY NET COMMUNITY PRODUCTION MEASUREMENTS IN THE EQUATORIAL PACIFIC
Kwon, Eun Young THE PRESENT-DAY STRENGTH OF CARBONATE PUMP AND THE IMPACT OF ITS CHANGE ON GLOBAL CARBON CYCLING

Lockwood, Deirdre E. ECOLOGICAL CONTROLS ON THE CARBON CYCLE OF THE MEKONG RIVER

Mendoza, Wilson G. ANALYSIS AND DETECTION OF BREVETOXIN ANALOGS IN MARINE SEDIMENTS: A NEW BIOMARKER?

Muehllehner, Nancy RISING CO₂ DISPROPORTIONATELY AFFECTS EXTENSION RATES VERSUS MASS DEPOSITION RATES IN REEF CORALS

Okazaki, Remy FLORIDA BAY CORALS: RESILIENT TO STRESS?

Polansky, Lara DETERMINING THE ROLE OF KARENIA BREVIS BLOOMS IN EMERGENCY DEPARTMENT RESPIRATORY DIAGNOSES ADMISSIONS IN SARASOTA COUNTY, FLORIDA

Rueda-Roa, Digna T. WHAT DRIVES UNUSUAL UPWELLING PATTERNS IN THE SOUTHEASTERN CARIBBEAN SEA? ANALYSIS OF LOCAL AND REMO SENSING DATA

Sasaki, Yoshi N. DECADEAL SEA LEVEL VARIABILITY IN THE SOUTH PACIFIC IN A GLOBAL EDDY-RESOLVING OCEAN MODEL HINDCAST

Stuckey, Matthew HIGH RESOLUTION RECONSTRUCTIONS OF SEA SURFACE TEMPERATURES FROM PACIFIC GEODUCK GROWTH INCREMENT CHRONOLOGIES

Valdmets, Kristi EFFECT OF CALIBRATION UNCERTAINTY TO REMOTE SENSING REFLECTANCE VALIDATION

Zhang, Xiaoqian SEA BREEZE DRIVEN OCEAN RESPONSE ON A STRATIFIED CONTINENTAL SHELF AT THE CRITICAL LATITUDE

ASLO, AGU, TOS, SAML Student Presentation Award Winners

Altieri, Katie E. IN-CLOUD PHOTOCHEMISTRY OF WATER SOLUBLE ORGANIC GASES AND ITS RELEVANCE TO ATMOSPHERIC DOC/DON DEPOSITION

Bennett, Kathleen C. TAKING INQUIRY INTO THE FIELD: CURRICULUM DEVELOPMENT FOR ELEMENTARY MARINE SCIENCE. EXAMPLES FROM THE GK12 'LEARNING ABOUT WHERE WE LIVE' PROJECT.

Bradley, Christina J. DEVELOPMENT OF ESCAPE AND FREEZE RESPONSES IN JUVENILE COPEPODS

Chen, Shih-Nah AXIAL WIND EFFECTS ON STRATIFICATION AND LONGITUDINAL SALT TRANSPORT IN IDEALIZED, PARTIALLY MIXED ESTUARIES

Cui, Xuehua EFFECTS OF PREY AND ENVIRONMENTAL VARIATION ON SPATIAL DISTRIBUTION AND TEMPORAL VARIABILITY OF GROUND FISH IN THE NORTHERN BERING SEA

Halverson Mark J. TIDES AND SALINITY IN THE FRASER RIVER PLUME

Hougham, Andrea L. SALT MARSH GROUNDWATER DYNAMICS DELINEATED USING GROUNDWATER TEMPERATURE AS A TRACER

Jean-Olivier, Irisson CONSEQUENCES OF INCREASED MOBILITY AND QUICKER DEVELOPMENT IN WARMER WATERS ON THE DISPERSAL TRAJECTORIES OF FISH LARVAE

Kelly, Amy E. LEAD CONCENTRATIONS AND ISOTOPIC RATIOS IN CORALS AND WATER NEAR BERMUDA, 1780-2000 A.D.

Moore Eric A. STRONTIUM BUDGET FOR THE FLY RIVER, PAPUA NEW GUINEA

Russo, Clementina R. MEASURING SUSPENDED SEDIMENT CONCENTRATION USING HIGH RESOLUTION CURRENT METERS

Steen, Andrew D. DEGRADATION RATES OF EXTRACELLULAR ENZYMES IN POLAR AND SUBTROPICAL SEAWATER: IMPLICATIONS FOR BIOAVAILABILITY OF HIGH MOLECULAR WEIGHT ORGANIC CARBON

Stefanova, Natalia I. ESTIMATING VERTICAL EDDY VISCOSITY IN THE PACIFIC EQUATORIAL UNDERCURRENT

Waterman, Stephanie N. EDDY-MEAN FLOW INTERACTIONS IN WESTERN BOUNDARY CURRENT JETS

Williams, Eleanor "THE ROLE OF FRESHWATER ADVECTION, SUBPOLAR CIRCULATION AND ICE IN SPRING PHYTOPLANKTON BLOOMS IN THE LABRADOR SEA"

NAML Proposal to NOAA
Draft 4
(11/12/07)

The Ernest Everett Just National Medal of Excellence

Purpose:

To honor a visiting researcher who has made outstanding contributions as a result of their work at marine laboratories.

Rationale:

Born in Charleston, South Carolina in 1883, Dr. Ernest Everett Just was an early ecological developmental biologist (Byrnes and Eckberg 2006) whose short life was remarkable for the scope and nature of his accomplishments, awards, and scientific contributions during a time when doors were closed and obstacles abundant for African Americans in the U.S. (Manning 1983). Replete with triumph and tragedy, his life is an inspiration for young scientists. Marine laboratories in the U.S. and in Europe provided space and resources to Just as a visiting scientist and served as intellectual refuges where he could concentrate on scientific investigation and scholarship. Today, members of the National Association of Marine Laboratories (NAML) host many visiting scientists each year. It is altogether fitting that NAML contribute to the development of a national award to recognize the accomplishments and life of E.E. Just and honor outstanding visiting scientists at marine laboratories for their abundant and important contributions.

Frequency and Venue:

The Medal will be presented by the National Association of Marine Laboratories and the National Oceanic and Atmospheric Administration biennially in Washington D.C.

Eligibility:

To be eligible:

1. A nominee must qualify as a visiting researcher at a marine laboratory. A visiting researcher is primarily defined as a non-permanent employee, including a Post-Doctoral Fellow, or unpaid visitor of the host institution residing at the host institution through a temporary arrangement.
2. The body of work done at the host institution or work completed while under temporary employment with the host institution must comprise the bulk of the nominee's scholarly contributions being considered for the award.

3. A nominee must be a U.S. citizen or permanent resident who has applied for citizenship.

Nomination and Selection Process:

Awards Committee: The NAML Board of Directors will establish a standing committee of the corporation, named the Awards Committee. Members of the Committee will be appointed by the Board.

Responsibilities of the Awards Committee will include:

1. Fundraising;
2. Developing the nominations process;
3. Developing the selection process;
4. Soliciting nominees;
5. Evaluating and recommending candidates for the award to the NAML Board for approval.

Selection Criteria:

The Awards Committee will consider:

1. The impact of an individual's work.
2. The nature, significance or influence of the work in a field or on scientific thought.
3. Unusually distinguished service in the general advancement of science.
4. Recognition by peers within the scientific community.
5. Innovations in scholarship or research.

Budget and Award/Administrative Costs:

The budget for producing and presenting the award is proposed at \$14,000 biennially. This will include a \$10,000 honorarium and \$4,000 for administrative costs, including:

1. Cost to produce the medal;
2. Transportation and lodging costs for award recipient to attend the award ceremony in Washington, D.C.; and
3. Other administrative costs accrued.

Any contract or award from NOAA to NAML for administration of the The E.E. Just National Medal of Excellence will be to the designated NAML fiscal agent located at the Marine Biological Laboratory (MBL), Woods Hole, MA.

Contacts:

The Ernest Everett Just National Medal of Excellence Subgroup of the NAML Education and Diversity Committee

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References:

Byrnes, M.W. and W.R. Eckberg. 2006. Ernest Everett Just (1883-1941): An early ecological developmental biologist. *Developmental Biology*. 296(1-11).

Manning, K. R. 1983. *Black Apollo of Science: The Life of Ernest Everett Just*. Oxford University Press: New York, New York. 397 p.

Wynes CE.

Ernest Everett Just: marine biologist, man extraordinaire.

South Stud. 1984;23(1):60-70.

Cohen, S.S. 1985. Some Struggles Of Jacques Loeb, Albert Mathews, and Ernest Just at the Marine Biological Laboratory. *Biological Bulletin* 168 (3)1985 :127-136.

Cohen S.S. 1986. Balancing science and history: a problem of scientific biography.

"Black Apollo of science: the life of Ernest Everett Just." By Kenneth R.

Manning. Essay review. *Hist. Philos. Life Sci.* 1986;8() :121-8.



National Association of Marine Laboratories

February 29, 2008

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Ms. Louisa Koch
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Dear Ms. Koch:

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COMMITTEE ON PUBLIC POLICY**

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Thank you very much for your letter of September 13, 2007 in which you requested advice from the National Association of Marine Laboratories (NAML) related to ocean, coastal and Great Lakes education.

NAML – through its Education and Diversity Committee – has developed the enclosed “white paper” outlining NAML’s role in ocean education along with a number of recommendations for NOAA to consider as it moves ahead to execute its new Congressional mandate in the area of education.

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The individual members of NAML – who are experienced and engaged in a number of ocean education activities – stand ready to use our experience and connections with students, faculty, and our neighboring communities to assist NOAA in carrying out its mandate in education.

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We appreciate very much the opportunity to provide these recommendations and look forward to continuing to work with you and your office as these programs move forward. We would be pleased to meet with you to discuss these recommendations in more detail if that would be helpful. Please let me know if you would like for me to arrange another meeting for you with our membership.

Sincerely,

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Dr. James G. Sanders
President
National Association of Marine Laboratories

Ocean Literate America

A Whitepaper in Support of

**The National Oceanic and Atmospheric Administration's
Ocean Education Mission**

Submitted by:

The National Association of Marine Laboratories



February 29, 2008

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I. Oceans and Science Education

The scores of U.S. students in science and math are being eclipsed by those of students in other industrialized countries. This stark reality was driven home by the recent release of the Program for International Student Assessment's report of science, reading and mathematics tests given to 15 year olds from 30 industrialized countries. U.S. students ranked 17th in science and 24th in math scores. "Our students' performance today is the best indicator of America's global competitiveness tomorrow," said Raymond Scheppach, executive director of the National Governors Association.

The fundamental necessity to develop effective approaches that improve science education and link advances in science with education has emerged as a critically important issue over the past two decades. This need was noted in the report of the Research to Applications Task Force of the Ocean Research and Resources Advisory Panel (ORRAP) and been reported in an increasing number of documents including *Science for All Americans* (AAAS, 1990), *NSF in a Changing World* (NSF, 1995), *Geoscience Education: A Recommended Strategy* (NSF, 1997) and *NSF Geosciences Beyond 2000* (NSF, 2000). A major step in promoting the link between research and education was the establishment of "Criterion Two" or "Broader Impacts" as an important metric to judge proposals submitted to NSF that made the development of education and outreach activities and materials integral components of research proposals.

The oceans – and by "oceans" we mean in this document oceans, coastal areas, and the Great Lakes – have been recognized as an extremely effective arena for science education. This effectiveness is due, in large part, to the inherent interdisciplinary nature provided by the three-dimensional fluid coupling of physical, geological, chemical and biological attributes (Farrington, 1990), the broad general interest of the general public in these areas, and the fact that over 50 percent of the U.S. population lives in coastal areas. The challenges of working in the alien underwater world also require the application and innovation of technologies, further making the study of the oceans engaging for science, technology, engineering and mathematics (STEM) education (Humphris, 2001).

The role of the oceans in our daily lives is more evident everyday and forms the foundation of what is considered to be an ocean literate populace. The recent Ocean Literacy Initiative states: "Ocean literacy is an understanding of the ocean's influence on you and your influence on the ocean." From climate change, to healthy and adequate drinking water, to coastal buffers, to safe seafood and recreation, the range and value of the goods and services the ocean provides is becoming clearer. The need for an ocean literate society has been widely recognized and recent calls to action have shown us the way forward. Notable among these efforts are the following:

A. The Commission Reports

The landmark 2004 report of the U.S. Commission on Ocean Policy, *An Ocean Blueprint for the 21st Century*, dedicated an entire chapter entitled “Promoting Lifelong Ocean Education” to a broad suite of topics including: 1) Strengthening the Nation’s Ocean Awareness, 2) Building a Collaborative Ocean Education Network, 3) Incorporating Oceans into K-12 Education, 4) Investing in Higher Education and the Future Ocean Workforce, and 5) Bringing the Ocean and Coasts to All Americans. The chapter included seventeen recommendations to implement these elements. Similarly, the 2003 Pew Ocean Commission’s report *America’s Living Oceans: Charting a Course for Sea Change* included similar recommendations to “broaden ocean education and awareness through a commitment to teach and learn about our oceans, at all levels of society.”

A follow-up to the two commissions’ efforts, the Joint Ocean Commission Initiative (JOCI), noted in its report *From Sea to Shining Sea: Policies for Ocean Science Reform*, “An increased investment in ocean-related education will play a key role in stimulating a new generation of engineers and scientists who will help this nation maintain its technological lead in an increasingly competitive world while also helping to establish a new ocean stewardship ethic.” Despite its overall score of D+ for Ocean Research, Science and Education, the Joint Ocean Commission’s 2006 Ocean Report Card noted the formation of a “New interagency working group leading development of national strategy on ocean education.”

B. U.S. Ocean Action Plan

On December 17, 2004 the Bush Administration released the U.S. Ocean Action Plan in response to the U.S. Ocean Commission Report. The Plan laid out a new structure for ocean governance that included establishment of a new Committee on Ocean Policy and an Interagency Committee on Ocean Science and Resource Management Integration comprised of the Joint Subcommittee on Ocean Science and Technology, the Subcommittee on Integrated Management of Ocean Resources, and an expanded version of the Ocean Research Advisory Panel. The Action Plan also included support for lifelong ocean education and recognized an expanded authority for NOAA for education and outreach as outlined in the 2005 Consolidated Appropriations Act. The Plan also supported the Ocean Science Initiative at the Smithsonian Institution and expanded the Coastal America Learning Center Network.

C. U.S. Competitiveness and Science and Mathematics Education – The American Competitiveness Initiative

In 2005 the Congress requested the assistance of the National Academies of Science (NAS) to identify what steps should be taken to ensure the preeminence of America’s science and technology enterprise. The Academies responded with the landmark report entitled, “Rising Above the Gathering Storm,” which, among other issues focused on: 1) K–12 education (*10,000 Teachers, 10 Million Minds*), 2) research (*Sowing the Seeds*), 3) higher education (*Best and Brightest*), and 4) economic policy (*Incentives for Innovation*) and suggested 20 steps to implement these recommendations.

Among the recommendations to improve K-12 education were to: 1) recruit 10,000 new science and mathematics teachers by providing four-year scholarships, 2) improve the capacity of a quarter of a million existing teachers through a variety of successful methods including summer institutes, master's programs, and Advanced Placement (AP) and International Baccalaureate (IB) training programs, and 3) prepare more middle and high school students to pursue degrees in science, engineering or mathematics through AP and IB courses.

One of the other four most important action items to ensure future U.S. competitiveness focused on higher education and ways to continue U.S. leadership in science research is to attract the best and brightest from within the U.S. and around to world. Among the incentives to reach this goal were: 1) providing 25,000 new 4-year competitive undergraduate scholarships each year to U.S. citizens attending U.S. institutions, 2) funding 5,000 new graduate fellowships each year in "areas of national need," 3) encouraging employers to make continuing education available to practicing scientists and engineers, and 4) improving visa processing for international students.

In response to the Academies' report the Bush Administration developed the American Competitiveness Initiative (ACI) and included increased funding levels for mathematics and the physical sciences in its fiscal year 2008 and 2009 budget requests. The core elements of the ACI were codified into law by the America COMPETES Act (Public Law 110-69) in August, 2007.

D. The Conference on Ocean Literacy

The Conference on Ocean Literacy (CoOL) was a watershed event in ocean education held on June 7-8, 2006 in Washington, DC. A total of twelve federal and non-federal sponsors supported the event intended to be a next step in developing a national strategy for ocean literacy, following the recommendations of the U.S. Ocean Commission's Report and the President's Ocean Action Plan. The two day event featured five plenary sessions and five moderated panels. The report of the Conference set forth a number of key recommendations including:

Formal Education: Creating Ocean-Literate Students

- Get involved at all levels
- Focus on teachers
- Connect to Earth system science, environmental education, and other science education initiatives
- Scale up to reach larger audiences of teachers and students
- Engage and coordinate efforts of the Federal government

Informal Education: Creating an Ocean-Literate Society

- Create and deliver unified messages

Building an Innovative Workforce through Diversity

- Ask the right questions
- Link marine laboratories and minority serving institutions
- Include community colleges
- Develop an Excellence in Science award

Regional Approaches to Ocean Literacy

- Strengthen regional networks
- Develop coordinated messages on the relevance and importance of the world's ocean, coasts, and watersheds – including the Great Lakes

II. NOAA and Ocean Science Education

The National Oceanic and Atmospheric Administration (NOAA) is widely recognized as one of our nation's leading supporters of ocean research and monitoring, particularly in the realm of applied science to meet specific management goals, many established through Congressional requirements. Despite having developed a number of educational programs through its line offices, NOAA as an agency was only recently authorized by Congress to support ocean education as a result of the enactment of the America COMPETES Act. This Act gives NOAA broad latitude to "conduct, develop, support, promote, and coordinate formal and informal educational activities at all levels to enhance public awareness and understanding of ocean, coastal, Great Lakes, and atmospheric science and stewardship by the general public and other coastal stakeholders, including underrepresented groups in ocean and atmospheric science and policy careers. In conducting those activities, the Administrator shall build upon the educational programs and activities of the agency." Furthermore, the Act charges: "The Administrator, appropriate National Oceanic and Atmospheric Administration programs, ocean atmospheric science and education experts, and interested members of the public shall develop a science education plan setting forth education goals and strategies for the Administration, as well as programmatic actions to carry out such goals and priorities over the next 20 years, and evaluate and update such plan every 5 years."

III. The National Association of Marine Laboratories' (NAML) Role in Ocean Education

NAML is a nonprofit organization of about 100 members employing more than 10,000 scientists, engineers, and professionals and representing ocean, coastal and Great Lakes laboratories nationwide. NAML labs support the conduct of high quality ocean, coastal and Great Lakes research and education in the natural and social sciences and the effective use of that science for decision-making on important issues facing our country. Many NAML labs are co-located with, or linked to, NOAA laboratories. The location of the labs on the diverse mosaic of habitats along the coasts makes them natural "windows on the sea," bringing the excitement of the oceans and Great Lakes to all Americans.

A. NAML's Education and Outreach Mission

NAML's education mission is two-fold: to provide enhanced ocean-related education so that all citizens recognize the role of the oceans, coasts, and Great Lakes in their own lives and the impacts they themselves have on these environments; and to provide formal research and training opportunities at K-12, college, and post-graduate levels to ensure a technically-qualified, and ethnically diverse workforce capable of solving problems and answering questions related to the protection, restoration, and management of coastal and ocean resources, climate variability, and society's needs.

Within this broad education and outreach mission, NAML Laboratories strive to:

- enhance public understanding of ocean, coastal and Great Lakes issues and the impact those issues have on society;
- interest more K-16 students in science, technology, engineering and math—the STEM disciplines so vitally important to the future economic competitiveness of this country;
- provide superior teacher training in the STEM disciplines;
- involve K-16 students and teachers in research, education, and outreach projects; and
- share success stories across the NAML network to maximize the impact of our programs at the local, state, regional, national, and international levels.

B. NAML Labs as Centers for Ocean Education

As a network of marine laboratories that embrace ocean education and outreach as well as research, NAML is informally linked to other federal and non-federal ocean education networks (e.g. Sea Grant, NSF-sponsored Centers for Ocean Science Education Excellence, NSF-sponsored Research Experiences for Undergraduates/Research Experiences for Teacher programs, public aquaria and zoos). NAML is positioned to build more formal linkages and strengthen the national networks. As “windows on the sea” the NAML labs provide natural laboratories and classrooms for experiential education recognized as a critical means to engage learners (Agassiz's Legacy, Gladfelter, 2002; Klug et al. 2004).

C. NAML Education and Diversity Committee

In 2007 NAML established its Education and Diversity Committee (EDC). The EDC is charged with advising NAML on issues pertaining to education and diversity as they relate to ocean, coastal and Great Lakes research and education. Activities include but are not limited to: guiding NAML's annual public policy agenda so that it includes the appropriate education and diversity elements; monitoring reports, workshops and other events, and ensuring that NAML participates when appropriate; taking the lead on drafting official comment to education and diversity related reports, etc. on behalf of NAML; and any other activities that may arise. The EDC is tasked with recognizing and promoting the unique role that coastal laboratories play in conducting education, outreach, and public service.

Though only recently established, the EDC has been active in developing working groups that include outside experts to address important challenges in ocean education including future workforce needs and participation by underrepresented groups. One of the initial working groups developed a proposal for the Ernest Everett Just National Medal of Excellence. Through this award, NAML and its partners will bring national attention to a noted scientist of color who worked with marine life at marine laboratories. The award is intended to recognize the contributions made by visiting researchers at marine labs and by recognizing the pioneering efforts of E.E. Just, increase participation of and leadership by individuals from underrepresented groups in ocean science, education, and policy. This proposal was recently approved at NAML's Biennial Meeting in October 2007. The NOAA Education Office can support this effort and the award through its many education programs and by helping to find other federal and non-federal partners to support this initiative.

The Biennial meeting also provided the opportunity to develop stronger relationships with the NSF Louis Stokes Alliances for Minority Participation through discussions with program director Dr. James Hicks.

Another NAML EDC working group has focused on the development of this NOAA Education whitepaper. Members of this working group are listed in Appendix A.

IV. Moving Forward – a NOAA and NAML Education Strategy

Below are specific recommendations for collaboration between NOAA, NAML and others to increase ocean science literacy that is widely recognized as a key to our nation's competitiveness, security and quality of life.

A. Taking Advantage of the NAML Network to Increase Educational and Training Opportunities for all Citizens

With approximately 100 laboratories in every coastal and Great Lakes state, and several foreign countries, and over 10,000 employees, NAML has an unsurpassed capability to reach the public, teachers, students, and decision makers. Although a national organization NAML is sub-divided into three regional groups (Northeast and Great Lakes, Southern, and Western associations) and thus provides a structure by which it is possible to develop and test the implementation of initiatives at various spatial scales. We believe that NOAA could take advantage of the capability of this network and use the expertise and experience of NAML laboratory scientists and staff to advance ocean literacy in multiple ways, ranging from improving the teaching of STEM subjects in formal education to advancing the public's general understanding of ocean issues. The coastal locations of individual NAML labs and the regional networks provide an ideal vehicle for program development, implementation and evaluation. The distribution of NAML labs at most coastal states allows them to interact with educators at the critical state level to ensure that teaching resources and lesson plans can be aligned with the state science education frameworks and standards.

Current educational initiatives at NAML labs are diverse, ranging from formal course offerings for undergraduate and graduate students, to programs directed at K-12 students and teachers, to more informal activities that involve the general public, citizen science programs and groups such as Elderhostel and Lifelong Learning. NAML labs are active participants and often host the regional competitions of the National Ocean Partnership Program-sponsored National Ocean Sciences Bowl. As mentioned above, NAML labs are also involved with COSEEs, the National Marine Educators Association and the National Science Teachers Association. Some of these programs and partnerships could serve as models or opportunities for increased NOAA-NAML interactions.

There are some obvious strong connections that can be made between current NOAA educational programs and NAML Labs that would be mutually beneficial. These interactions could be developed at local, regional and national scales with many NOAA programs that have established valuable educational components that together with the NOAA Office of Education make up an important set of activities designed to enhance overall ocean literacy. The following provides a listing of some of these education programs and ideas to better link these programs to the NAML network.

Sea Grant

As a national network of 32 programs representing over 300 universities and all coastal and Great Lakes states and several U.S. territories, Sea Grant already maintains ties to most of the NAML laboratories. As part of its education agenda, NAML will urge individual labs to seek out Sea Grant's university extension specialists, communication experts and educators to explore innovative mechanisms for collaboration.

Office of Ocean Education

- The Educational Partnership Program (EPP) in the Office of Education (OEd) is successfully addressing the CoOL report recommendation to link marine laboratories (federal research facilities) with minority serving institutions (MSIs) to help ensure that the ocean science workforce benefits from diverse backgrounds and perspectives. Through its Education and Diversity Committee, NAML offers to provide input and proposes to work more closely with OEd to expand such linkages across more marine labs and MSIs. This key strategy should be expanded (Gilligan et al. in press).
- OEd also supports the Ernest F. Hollings Undergraduate Scholar Program that supports students pursuing careers in science, engineering, policy, management or education. NAML proposes to work with NOAA's OEd to provide opportunities for placement of Hollings scholars at NAML labs.
- Finally the OEd sponsors an annual extramural Environmental Literacy Grants Program that supports educators to develop new methods and materials to increase ocean literacy in formal and informal learning settings. NAML's Committee on Public Policy strongly supports this and all of NOAA's extramural, competitive grant programs.

NOAA Education Council

NAML proposes to meet with NOAA's Education Counsel to identify the most appropriate NOAA Education programs to form real partnerships to meet our mutual education goals.

NOAA Field Programs and NAML Laboratories

There is considerable geographic co-location and proximity of NAML labs with many of NOAA's programs, including National Estuarine Research Reserve sites, National Marine Sanctuary Field Offices, National Marine Fisheries Science Centers and National Undersea Research Centers. NAML will urge these field stations to become active participants in NAML and to meet with NOAA program leaders to explore meaningful opportunities for collaboration.

Teacher at Sea Program

These at-sea opportunities currently are available on NOAA ships. NAML proposes to coordinate with NOAA's Office of Marine and Aviation Operations (OMAO) to possibly provide greater teacher at sea opportunities through lab-sponsored/implemented research cruises using laboratory and university research vessels.

Ocean Exploration and Research

NOAA's Ocean Exploration and Research (OER) program is the result of the administrative merger of the National Undersea Research Program (NURP) and the Office of Ocean Exploration (OE). Both programs have utilized the engaging nature of underwater exploration, technologies imagery and data to develop educational programs and products. NURP is implemented through a network of six regional Centers mostly located at state universities and many co-located at NAML labs, and have utilized their field locations to provide teacher research experiences, student hands-on activities, ocean observing education programs and live Webcasts featuring video from remotely operated vehicles and the Aquarius, the world's only underwater laboratory. OE has developed an award-winning website that features sponsored expeditions and highlights accompanying lesson plans that "Teach Ocean Science Through Ocean Exploration." NAML labs and the regional NURP Centers represent a natural partnership to develop teaching resources and provide learning and outreach opportunities.

B. Fund the Implementation of the Recommendations of the Conference on Ocean Literacy

In many ways the Conference on Ocean Literacy (CoOL) represented the culmination of years of evolution and recognition of the tremendous opportunities and challenges to meeting the goal of an ocean literate society. The recommendations set forth span the range of venues for ocean education from formal to informal and for learners from K to gray. To make headway towards ocean literacy will require tangible steps to implement the recommendations of the CoOL report. NAML proposes that NOAA support a workshop or series of workshops to prioritize and identify the most effective initiatives to implement the recommendations of the CoOL report and to determine how NAML scientists and educators can play a role in furthering these ideas. NAML is prepared to collaborate with NOAA and other relevant Federal entities to hold the workshop(s) and provide NOAA with a summary of the outcomes and recommendations from these workshops. We believe that the results of these workshops should help NOAA revise its education programming so that new competitive, merit-based extramural programs are developed that provide financial support for creative proposals that will implement the recommendations of the Conference on Ocean Literacy.

C. Provide Advice and Assistance on an Ongoing Basis

NAML members are also prepared to increase their participation by serving in both formal and informal advisory capacities to NOAA's Office of Education. A number of individual NAML members already serve on different federal ocean-related advisory groups, such as the Ocean Research and Resources Advisory Panel (ORRAP), the NOAA Science Advisory Board (and related working groups), etc. NAML has established a committee to provide recommendations and nominations of its members for such federal advisory committees and we encourage the NOAA Office of Education to use NAML's membership in whatever ways might be helpful for planning and execution of NOAA's ocean education programming. NAML's Public Policy Agenda strongly supports the extramural programs within NOAA, including the Office of Education's competitive grants program. NAML will also continue to invite members of

NOAA's leadership to attend its Biennial Meetings to foster the exchange of ideas and explore avenues for collaboration.

D. Participate in the Development and Review of NOAA's Education Plan

NAML is prepared to assist in the development and provide input on drafts of the new NOAA Education Plan, similar to suggestions made by NAML to the draft Ocean Research Priorities Plan, to assist NOAA in developing clear goals and metrics to measure the success of its education programs. We understand that NOAA has asked the National Research Council and its Board on Science Education to assemble a study committee to review NOAA's education programs. Through its EDC, NAML is prepared to assist that committee if invited.

V. Summary

This whitepaper has sought to highlight the evolution of U.S. ocean science education in the past decade, provide a snapshot of the investments made by NOAA in ocean science education, and exhibit the breadth of the educational infrastructure represented by the network of NAML laboratories. All of these represent a confluence of ideas and energy that together can be an agent for change to advance the goal of an ocean literate America. We are eager to offer the services of our Education and Diversity Committee to collaborate with the NOAA Education Office to explore the ideas presented above to identify the programs and strategies that would allow NAML Laboratories to become integral parts of the NOAA Education Mission. Following receipt and review of this document, members of NAML's EDC propose to meet with NOAA's Office of Education and other NOAA ocean science education leaders to develop a roadmap for moving forward.

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Appendix A - Members of NAML's NOAA Education Whitepaper Working Group

(* Education and Diversity Committee members, ** Chair of Committee)

Name	NAML Institution
Matthew Gilligan**	Savannah State University
Ivar Babb*	University of Connecticut
George Boehlert*	Oregon State University
Kelly Clark*	Morgan State University
Michael DeLuca	Rutgers University
Sandra Gilchrest*	New College of Florida
J. Frederick Grassle*	Rutgers University
Don Hockaday	University of Texas – Pan American
Jan Hodder*	University of Oregon
Eric Lacy	Medical University of South Carolina
Jo-Ann Leong*	Hawaii Institute of Marine Biology
Janice McDonnell	Rutgers University
Anthony Michaels*	University of Southern California
Wendy Naus	Lewis-Burke Associates LLC
Miguel Nevarez*	University of Texas – Pan American
Shirley Pomponi	Florida Atlantic University
Jeffrey Reutter	Ohio State University
James Sanders*	Skidaway Institute of Oceanography
Ron Sizemore*	University of North Carolina – Wilmington
Joel Widder	Lewis-Burke Associates LLC
James Yoder	Woods Hole Oceanographic Institute

Opportunities for Enhancing Diversity in the Geosciences (OEDG)

Program Solicitation

NSF 04-590

Replaces Document(s):

NSF 02-104



National Science Foundation

Directorate for Geosciences
Division of Atmospheric Sciences
Division of Earth Sciences
Division of Ocean Sciences

Letter of Intent Due Date(s) *(required)*:

September 14, 2004

September 14, 2006

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

October 18, 2004

October 18, 2006

REVISION NOTES

- Letters of Intent are now required.
- The anticipated funding amount has been increased from \$2.0 million in FY 2003 and \$4.0 million in FY 2004, to \$4.6 million in FY 2005 and \$4.6 million in FY 2006. As in the past, proposals to the OEDG Program will be solicited every other year.
- Proposals may be submitted for consideration under one of the two Tracks described in this solicitation. An individual may be a Principal Investigator on only one proposal submitted per competition to the OEDG Program, regardless of which Track the proposal is submitted under. Proposals to Track 2 must include data demonstrating the effectiveness of prior efforts directly related to the proposed project.
- Proposal Preparation Instructions have been revised and clarified.
- Budgets for proposals submitted under both Track 1 and Track 2 must include funds to support attendance of the Principal Investigator at meetings for OEDG Principal Investigators that will be held every other year, beginning in 2005, in Washington, DC.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Opportunities for Enhancing Diversity in the Geosciences (OEDG)

Synopsis of Program:

The Directorate for Geosciences of the National Science Foundation supports research and education in the atmospheric, earth, and ocean sciences. The **Opportunities for Enhancing Diversity in the Geosciences** (OEDG) program is designed to address the fact that certain groups are underrepresented in the geosciences relative to the proportions of those groups in the general population. The primary goal of the OEDG program is to increase participation in the geosciences by African Americans, Hispanic Americans, Native Americans (American Indians and Alaskan Natives), Native Pacific Islanders (Polynesians or Micronesians), and persons with disabilities. A secondary goal of the program is to increase the perceived relevance of the geosciences among broad and diverse segments of the population. The OEDG program supports activities that will increase the number of members of underrepresented groups that:

- Are involved in formal pre-college geoscience education programs;
- Pursue bachelor, master, and doctoral degrees in the geosciences;
- Enter geoscience careers; and
- Participate in informal geoscience education programs.

The OEDG program consists of two tracks, *Track 1: Proof-of-Concept Projects*, and *Track 2: Full-Scale Projects*.

Track 1: Proof-of-Concept Projects - This track supports short-term activities. Track 1 projects include activities that will occur only one time, as well as those that are intended as the testing phase of an anticipated long-term *Full-Scale Project*.

Track 2: Full-Scale Projects - This track supports longer-term activities that will identify and promote pathways to geoscience careers among members of underrepresented groups.

Proposals to the OEDG competition are solicited every other year. The next competition will be held in FY 2006.

Cognizant Program Officer(s):

- Jill L. Karsten, Program Director for Diversity and Education, 705 N, telephone: (703) 292-7718, fax: (703) 292-9042, email: jkarsten@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 42 (of the awards, 35 awards are anticipated in Track 1, and 7 awards are anticipated in Track 2)

Anticipated Funding Amount: \$9,200,000 - (\$4,600,000 is anticipated in both FY 2005 and FY 2006, pending availability of funds)

Eligibility Information

Organization Limit:

None Specified

PI Limit:

An individual may be a Principal Investigator on only one proposal submitted per competition to the OEDG Program, regardless of which Track the proposal is submitted under.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Letter of Intent Due Date(s) (required):**

September 14, 2004

September 14, 2006

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

October 18, 2004

October 18, 2006

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The National Science Foundation (NSF) has an express mandate from Congress to promote the full use of human resources in science and engineering. The *Science and Engineering Equal Opportunities Act of 1980* gives NSF broad authority to assist in “full development and use of the science and engineering talents of men and women, equally, of all ethnic, racial, and economic backgrounds.” Statistical data (see [GEO Education and Diversity](#)) confirm the underrepresentation of certain groups in science and engineering in general, and in the geosciences in particular. African Americans, Hispanic Americans, Native Americans (American Indians and Alaskan Natives), Native Pacific Islanders (Polynesians or Micronesians), and persons with disabilities represent about one-quarter of the general population, but earned only 16% of the total number of bachelor’s degrees granted in science, technology, engineering and mathematics (STEM) fields in 2001. The geosciences have the lowest diversity of any of the STEM disciplines. In 2001, only 7% of students graduating from bachelor’s-level geoscience degree programs were from underrepresented groups. In the same year, only 5% of M.S. and 2% of Ph.D. graduates in the geosciences were members of underrepresented groups. In contrast, members of underrepresented groups earned 11% of the master’s degrees and 7% of the doctorate degrees awarded in all STEM fields combined in 2001.

II. PROGRAM DESCRIPTION

The Directorate for Geosciences of the National Science Foundation supports research and education in the Earth, ocean, and atmospheric sciences. The primary goal of the **Opportunities for Enhancing Diversity in the Geosciences** (OEDG)

program is to increase participation in the geosciences by African Americans, Hispanics/Latinos/Chicanos, Native Americans (American Indians and Alaskan Natives), Native Pacific Islanders (Polynesians or Micronesians), and persons with disabilities. An important but secondary goal is to strengthen understanding of geoscience and its relevance to modern society among broad and diverse segments of the population. The ultimate goal of the OEDG program is to bring more members of underrepresented groups into geoscience disciplines.

Specifically, the OEDG program supports activities that increase the number of members of underrepresented groups that:

- Are involved in formal pre-college geoscience education programs;
- Pursue bachelor's, master's, and doctoral degrees in the geosciences;
- Enter geoscience careers; and
- Participate in informal geoscience education programs.

Proposals to the OEDG program should be firmly grounded in the results of current research about the participation of underrepresented groups in STEM fields in general, and the geosciences in particular.

The OEDG program consists of two tracks, *Track 1: Proof-of-Concept Projects*, and *Track 2: Full-Scale Projects*. Proposals to either track may include activities that will establish or enhance of geoscience education and research capabilities in Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions (HSIs), Minority-Serving Institutions (MSIs) and Tribal Colleges and Universities (TCUs).

Track 1: Proof-of-Concept Projects: This track supports short-term activities, including those that will occur only once, or are intended to be the testing phase of an anticipated long-term *Full-Scale Project*. Track 1 projects may test innovative mechanisms for increasing the participation of members of underrepresented groups in the geosciences. Alternatively, Track 1 projects may test the effectiveness of strategies that have been successful in a different geographic region, with a different target audience, at a different educational level, in a different academic discipline, or in a different venue (e.g., at a museum rather than in an after-school program). Track 1 awards support projects with durations of up to two years. The maximum award under Track 1 is \$100,000, with appropriate justification. The average award size under Track 1 is anticipated to be \$50,000 - \$75,000. Track 1 awards are eligible for renewal.

Track 2: Full-Scale Projects: This track supports long-term activities that will identify and promote pathways to geoscience careers among members of underrepresented groups. Track 2 projects should either develop or make use of existing networks to improve access and retention in the geosciences by members of underrepresented groups. The networks should:

- Mentor members of underrepresented groups and communicate ways in which specific individuals can prepare themselves to enroll in college-level degree programs in the geosciences and subsequently pursue graduate degrees and careers in the geosciences or related fields;
- Expose students, families, and communities to the geosciences in culturally sensitive, locally relevant, age-appropriate, and pedagogically sound ways;
- Ensure that members of underrepresented groups receive information about career opportunities in the geosciences and related fields; and
- Provide the support necessary to ensure the success of members of underrepresented groups in the geosciences.

The effectiveness of networks in contributing to the success of underrepresented minority students in STEM disciplines has been demonstrated by the organizations that are part of the Louis Stokes Alliances for Minority Participation (LSAMP) program at NSF. Networks supported by the LSAMP program include two- and four-year degree-granting higher education institutions, businesses and industries, national research laboratories, and local, state, and federal government agencies. Proposals to the OEDG program that describe activities that will coordinate with and enhance an existing LSAMP network are strongly encouraged. Proposals involving networks that are not currently part of an LSAMP are also encouraged.

OEDG networks may be composed of institutions and agencies such as (but not limited to) K-12 schools and/or districts, two-year colleges, four-year colleges and universities, graduate-degree granting institutions, informal education facilities or groups, businesses and industries, and government agencies. The composition of any individual network will be determined by the characteristics of the target audience that will be served by the network. The Project Management Team (Principal Investigators plus Other Senior Personnel) assembled for Track 2 projects should include professionals with expertise in geoscience, education, *and* issues related to diversity in STEM disciplines.

Networks should be prepared to facilitate access to the geosciences among members of underrepresented groups. For example, a network composed of a four-year college or university, a community college, a school district, and a corporation might partner to encourage students to make the transition from high school to college, major in a geoscience discipline, obtain a bachelor's degree, and begin a career in the geosciences. Other networks consisting of community colleges, four-year colleges, and graduate degree granting universities might partner to increase the number of M.S. and Ph.D. degrees in the geosciences earned by members of underrepresented groups. After-school and community outreach programs targeting

families might be the focus of a network composed of a school district, and an informal education organization. A graduate degree granting university might partner with an HBCU to develop a summer research internship program in the geosciences. These examples are not intended to restrict proposers to specific types of networks or activities, but rather to clarify what is meant by the term 'network'. In all proposals, one institution must be identified as the Lead Institution. The Lead Institution will have primary responsibility for all aspects of the project.

Track 2 proposals will only be considered for funding when the proposal clearly demonstrates that the proposed approach will be effective in increasing the participation of underrepresented groups in the geosciences. Proposers may use the results of prior projects (including those funded by NSF) to demonstrate their capability. Track 2 awards support projects for up to five years. The maximum award under Track 2 is \$2 million, but the average award size is expected to be on the order of \$1 million. The five-year maximum duration of Track 2 awards is intended to allow networks sufficient time to either find other support for their project or make the project self-sustaining.

Additional Information:

Before submitting to the OEDG program, proposers should review the abstracts of funded projects. The abstracts are available online at <http://www.nsf.gov/geo/diversity/>.

Proposers may also find one or more of the following documents to be of interest:

1. [Report of the Geosciences Diversity Workshop, August 2000](http://www.nsf.gov/geo/diversity/): National Science Foundation (available at: <http://www.nsf.gov/geo/diversity/>).
2. [Strategy to Increase Diversity in the Geosciences](http://www.nsf.gov/geo/diversity/): National Science Foundation Publication NSF 01-53 (available at: <http://www.nsf.gov/geo/diversity/>).
3. [In Pursuit of a Diverse Science, Technology, Engineering, and Mathematics Workforce; Recommended Research Priorities to Enhance Participation by Underrepresented Minorities](http://ehrweb.aaas.org/index.shtml): American Association for the Advancement of Science (available at: <http://ehrweb.aaas.org/index.shtml>).
4. [New Career Paths for Students with Disabilities](http://ehrweb.aaas.org/index.shtml): American Association for the Advancement of Science (available at: <http://ehrweb.aaas.org/index.shtml>).
5. [Land of Plenty: Diversity as America's Competitive Edge in Science, Engineering and Technology](http://www.nsf.gov/od/cawmset/): Report of the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (available at: <http://www.nsf.gov/od/cawmset/>).
6. [CEOSE 2002 Biennial Report to Congress](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=ceose2002rpt): National Science Foundation, Committee on Equal Opportunities in Science and Engineering (available at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=ceose2002rpt).
7. [Geoscience Education: A Recommended Strategy](http://www.nsf.gov/geo/adgeo/geoedu/97_171.jsp): National Science Foundation Publication NSF 97-171 (available at: http://www.nsf.gov/geo/adgeo/geoedu/97_171.jsp).
8. [Blueprint for Change: Report from the National Conference on the Revolution in Earth and Space Science Education](http://www.earthscienceedrevolution.org/): TERC (available at: <http://www.earthscienceedrevolution.org/>).
9. [Science Education Resource Center at Carleton College](http://serc.carleton.edu/): (<http://serc.carleton.edu/>).
10. [Shaping the Future of Undergraduate Earth Science Education; Innovation and Change Using an Earth System Approach](http://www.agu.org/sci_soc/spheres/): American Geophysical Union (available at: http://www.agu.org/sci_soc/spheres/).

III. AWARD INFORMATION

Anticipated funding for the OEDG Program is expected to be \$4.6 million in FY 2005 and \$4.6 million in FY2006.

A total of 42 awards are anticipated. Of these 42 awards, 35 are anticipated under Track 1, and 7 are anticipated under Track 2.

Track 1 awards are for a maximum duration of 2 years. The maximum allowable funding request under Track 1 is \$100,000, but the average award size is expected to be on the order of \$50,000 - \$75,000.

Track 2 awards are for a maximum duration of 5 years. The maximum allowable funding request under Track 2 is \$2 million, but the average award size is expected to be on the order of \$1 million.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

None Specified

PI Limit:

An individual may be a Principal Investigator on only one proposal submitted per competition to the OEDG Program, regardless of which Track the proposal is submitted under.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Additional Eligibility Info:

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

An individual may be a Principal Investigator on only one proposal submitted per competition to the OEDG Program, regardless of which Track the proposal is submitted under.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (*required*):

Letters of Intent must be submitted via email to Dr. Jill Karsten (jkarsten@nsf.gov), Program Director for Diversity and Education, Directorate for Geosciences, National Science Foundation.

Letters must include the following information.

- Name and affiliation of Principal Investigator
- Identify Project for consideration under Track 1 or Track 2
- Name(s) and affiliation(s) of Co-Principal Investigators

- Name(s) and affiliation(s) of Other Senior Personnel
- Name(s) of other participating organizations - for example: school districts, research consortia, or museums, etc.
- Brief description of the proposed project
- Characteristics of target audience

Letter of Intent Management Conditions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- SPO Submission is Not Required when submitting Letters of Intent
- Submission of multiple Letters of Intent are Not allowed

Full Proposal Instructions: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines specified in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-PUBS (7827) or by e-mail from pubs@nsf.gov.

Specific guidance below supplements the GPG's general guidance and modifies some requirements.

Advice to Proposal Writers

GEO staff often provide informal guidance to proposers about potential projects. The advice most frequently sought about proposal writing in general has been collected in *A Guide for Proposal Writing (NSF 04-016)*. For examples of OEDG-funded projects, refer to the OEDG Website: <http://www.nsf.gov/geo/diversity/>.

Formal Proposal Preparation

Cover Sheet

The proposal title should include informative key words that indicate, for example, the target audience and the approach of the proposed project. The proposal title should also indicate whether the proposal should be considered under Track 1 or Track 2.

Project Summary

The Project Summary is the first statement that reviewers and NSF staff will read about a proposed project, and it sets the context in which the rest of the proposal will be read. Thus, the summary should be a clear, concise, self-contained description of the project. It should be informative to people working in the same or related fields, and insofar as possible, understandable to a scientifically literate reader. It should not contain extraneous descriptions of an institution, department, or Principal Investigator (PI). In no more than 250 words the summary should describe:

- The problem(s) being addressed by the proposal;
- The objectives and expected outcomes, including any tangible products;
- How the objectives will be accomplished;
- Characteristics of audience(s) targeted by the project;
- Notable collaborations; and
- Themes addressed in a significant way (such as teacher preparation, faculty development, capacity-building, community outreach, use of technology, research experiences, mentoring, etc.).

All Project Summaries MUST include separate statements addressing the National Science Board (NSB) approved review criteria of Intellectual Merit and Broader Impacts, or the proposal will be returned without review.

Project Description, including Results from Prior NSF Support

Text in this section must be single-spaced (6 lines per 2.5 cm). The format must be clear and legible. Use no less than 2.5-cm margins and a standard font that is no smaller than 12 point in size. No Project Description

may exceed 15 single-spaced pages in length.

The Project Description should address the criteria used by reviewers to judge the merit of the proposal. NSF's two general merit review criteria (Intellectual Merit and Broader Impacts) often lead to questions, including the examples that follow, during the review process. A proposal need not explicitly answer each of the questions below, these examples are meant to help proposal writers understand the types of issues that may be considered during the review process.

Examples of Reviewers' Questions Related to Intellectual Merit:

Does the project have the potential to increase understanding of the geosciences by members of underrepresented groups?

Are the goals and objectives, and the plans and procedures for achieving them worthwhile, well developed, and realistic?

Is the rationale for including particular activities or undertaking particular development tasks clearly articulated?

Does the project design consider the background, preparation, and experience of the target audience?

Is the project informed by research on teaching and learning, the efforts of others, and literature relevant to diversity?

Are plans for evaluation of the project appropriate and adequate for the project's size and scope and will the evaluation appropriately inform project development?

Is the project led by and supported by capable and qualified personnel who have recent and relevant experience in education, research, or the workplace?

Is the project supported by adequate facilities, resources, and institutional commitment?

Examples of Reviewers' Questions Related to Broader Impacts:

Are the proposed activities consistent with the proposing institutions' long-term goals?

To what extent will the results of the project contribute information that will help the geoscience community at large identify successful (and unsuccessful) practices related to increasing diversity in the geosciences?

Will the project evaluation inform others through communication of results?

Are the results of the project likely to be exportable to other institutions?

What is the potential for the project to develop connections with industry?

Will the project result in a significant increase in diversity in the geosciences?

Does the project involve MSIs, HBCUs, HSIs, or TCUs?

Will the project provide increased access to the geosciences by persons with disabilities?

Will the project result in significant involvement of communities and/or families?

Will the project significantly improve the quality and quantity of pre-college geoscience instruction in schools with large numbers of students from underrepresented groups?

Will the project involve significant numbers of underrepresented minorities in informal geoscience programs?

The Project Description in proposals submitted to both Track 1 and 2 should contain:

1. **Results from Prior NSF Support:** If the prospective PI or Co-PI(s) has received support from NSF pertaining to diversity-enhancing or geoscience-education efforts in the past five years, briefly describe the earlier project(s) and the outcomes of those projects. Provide sufficient detail to permit a reviewer to reach an informed conclusion regarding the value of the results achieved. Include the NSF award number, amount and period of support, title of the project, a summary of the results of the completed work, and a list of publications and formal presentations that acknowledged the NSF award (do not submit copies with the proposal). Note that the PI and all Co-PIs must submit a Final Project Report for any completed NSF-funded project before a new grant can be awarded.
2. **Goals and Objectives:** Describe the goals clearly and concisely. Relate the goal to local or national needs and recent trends as appropriate.
3. **Detailed Project Plan:** This should be the longest section of the Project Description. Describe the project's features, clearly delineating the need or problem that will be addressed and the research base on which the project builds, what will be done during the project, how the expected outcomes will be achieved, the timetable for executing the project, and the facilities and resources available for realizing the project's objectives. Where appropriate, include evidence of past successes that support the methods proposed. Such evidence may come from the current literature or from other projects conducted by the proposers. Note that reviewers are not required to access URLs, and they may not have access to the internet during the review process. Therefore, all essential materials should be submitted in written format. The literature cited in the bibliography should reflect an understanding of the state of knowledge related to diversity in science, engineering, mathematics, and technology (STEM) generally, and in the geosciences particularly. Appropriate literature about research on teaching and learning should be cited. Any literature cited should be clearly and specifically related to the proposed project, and it should be clear to reviewers how referenced information played a role in the design of the project.
4. **Experience and Capability of the Principal Investigator(s):** Briefly describe the experience and capability of the PI(s). Include a brief description of the rationale for including specific personnel and institutions. State the role of each and cite the expertise that each will contribute to the project.
5. **Evaluation Plan:** The OEDG Program as a whole is evaluated by a contractor to the National Science Foundation. This contractor works with OEDG awardees to collect data and identify best practices. Track 1 proposers need not submit a detailed evaluation plan, but must be prepared to work with the contractor to collect and report information as necessary. Track 2 proposers must also be prepared to work with the contractor. Track 2 proposers should additionally include a detailed evaluation plan in their proposal. The detailed evaluation plan should describe the criteria that will be used to evaluate the project and how the project impacts diversity in the geosciences. The process for collecting and analyzing information should be described. A timeline for evaluation activities should be included. The qualifications of the individuals who will perform the evaluation tasks should be described. The objectivity and credibility of the evaluation team should be made evident to reviewers. The following references may be helpful in designing an evaluation plan:
 - [The 2002 User-Friendly Handbook for Project Evaluation \(NSF 02-057\)](#).
 - [User Friendly Handbook for Mixed Method Evaluations \(NSF 97-153\)](#).
 - [Online Evaluation Resource Library](#).
 - [Field-tested Learning Assessment Guide \(FLAG\)](#).
6. **Dissemination of Results:** Describe plans to communicate the results of the project to others in the geosciences, STEM, and education communities, both during and after the project, and to disseminate any tangible products that may be produced. Identify the audiences that will be reached through dissemination efforts, and the means of dissemination (e.g., faculty development workshops, journal articles, conference presentations, the Digital Library for Earth System Education {DLESE}, presentations to industry, press releases, etc.). It is anticipated that the data

collected for the evaluation component of Track 2 projects will form the basis of scholarly publications.

Budget and Budget Justification

The amounts indicated on the budget forms should include only the amounts requested from NSF. Text for the budget justification is limited to a maximum of 3 pages.

For a proposal involving multiple organizations, the budget justification should include the amount each organization will receive from the grant.

For Track 2 projects, the results of the project should be used to cultivate sources of additional or long-term support outside of NSF. Collaborations with industry are encouraged. Plans for long-term sustainability and institutionalization of programs should be identified.

NSF funds may not be used to support expenditures that would have been undertaken in the absence of an award, such as the cost of activities that are considered part of a faculty member's normal duties.

Preparation of Instrumentation Budget Items and Justification - If instrumentation is required for the project, the need for the instrumentation should be clearly justified as part of the Budget Justification. Reviewers must be able to recognize the function of any requested instrumentation. Many manufacturers routinely offer educational or institutional discounts. When preparing the budget, contact manufacturers or distributors to obtain discounted prices. If research instrumentation or equipment is requested in a proposal to the OEDG program, the proposal should include plans for maintenance and technical support of the instrumentation after the end of the award period.

Participant Support Costs - Note that indirect costs may not be charged on participant support costs.

Workshops - The proposal may include participant support costs for subsistence (lodging and meals) during workshops. In addition, funds may be requested for stipends for participants. Requests for such stipends must be specific and fully justified. No tuition or other fees may be charged to workshop participants. The host institution is expected to provide the facilities and instrumentation necessary to conduct the workshop, therefore NSF will not ordinarily support permanent instrumentation or new facilities. The host institution is also expected to cover expenses incurred by their own faculty participants.

Other Participant Support Costs - Participant support costs necessary for the success of the project should be included in the budget. The total cost per participant varies with the type of participant and the type of activity. For example, to ensure participation by teachers, it may be necessary to pay for substitute teachers while the targeted teachers participate in the project. Similarly, to ensure participation in summer research programs by students who are members of underrepresented groups, it may be necessary to provide stipends that are competitive with wages received by students who obtain full-time summer employment.

Collaborative Proposals

Collaborative Proposals (see the Collaborative Proposals section of the [GPG](#)) may be submitted either as a single proposal or as simultaneously submitted proposals from different organizations. In the latter case, the collaborating organizations must exactly follow the instructions for electronic submission specified in GPG. The project titles of the collaborative proposals must be identical and must begin with the words "Collaborative Project," and the *combined* budgets of the related proposals should conform to the award size limits specified in this solicitation.

Special Information (Track 2 proposals only)

Proposals to Track 2 must include the results of evaluation of prior, related project(s) that can be used to demonstrate that the proposed project has a high probability of success. The goals of prior project(s) and the method(s) used to measure success at achieving goals must be clearly identified and explained. Both quantitative and qualitative data may be included and discussed. Track 2 proposals that lack documentation of the effectiveness of prior efforts will be returned without review.

Proposers are reminded to identify the program solicitation number (Populated with NSF Number at Clearance) in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

Budget Preparation Instructions:

At least one Principal Investigator from each funded project is required to attend OEDG PI meetings held every other year, beginning in 2005, in Washington, DC. At these meetings, PIs discuss the basic components of their projects and work with a professional evaluator to implement and improve their evaluation strategies and identify key strengths and weaknesses in their projects. The PI meeting should be viewed as an opportunity for PIs to obtain assistance with the evaluation component of their project and to share information about their experiences with other OEDG PIs. The results of these meetings are anticipated to lead to identification of a set of "best practices" related to increasing diversity in the geosciences that can be shared with the geoscience and STEM communities at large via DLESE.

C. Due Dates

- **Letter of Intent Due Date(s) (required):**

September 14, 2004

September 14, 2006

- **Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):**

October 18, 2004

October 18, 2006

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this program solicitation through use of the NSF FastLane system. Detailed instructions regarding the technical aspects of proposal preparation and submission via FastLane are available at: <http://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the [Grant Proposal Guide](#) for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or

persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

Is the project team capable of successfully carrying out the stated goals?

Is there evidence of institutional commitment to achieving and realizing the goals of the proposal?

Does the project have the potential to increase the diversity of geoscience students, or increase understanding of the relevance of the geosciences among broad, diverse segments of the population?

For Track 2 proposals, does the project team have prior experience planning and managing successful programs directed toward increasing diversity in the geosciences?

For Track 2 proposals, is there evidence that the project will become self-sustaining or be sustained by funding from sources other than NSF at the end of the funding period?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/general_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

Special Award Conditions:

Principal Investigators will participate in meetings held every other year, beginning in 2005, in Washington, DC. Awardees will collect data as necessary to evaluate the success of each particular project and the OEDG program as a whole.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

The awardee will report data as requested by NSF to assess the effectiveness of the project. Data collected for each project will be determined by the nature of the project but will likely include: numbers of individuals served, types of experiences provided, results of evaluations, and results of longitudinal tracking.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Jill L. Karsten, Program Director for Diversity and Education, 705 N, telephone: (703) 292-7718, fax: (703) 292-9042, email: jkarsten@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Brian E. Dawson, Information Technology Specialist, 705 N, telephone: (703) 292-4727, fax: (703) 292-9042, email: bdawson@nsf.gov

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service) is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

Related Programs:

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center): (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**
 - Send an e-mail to: pubs@nsf.gov
 - or telephone: (703) 292-7827

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of

qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
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