

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 00-2					FOR NSF USE ONLY	
NSF 00-78					NSF PROPOSAL NUMBER	
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)					0092117	
DGE - IGERT PREPROPOSALS						
DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION	
				175104595		
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYMS(S)		
956006144						
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE			ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE			
University of California-San Diego Scripps Inst of Oceanography			University of California-San Diego Scripps Inst of Oceanography			
AWARDEE ORGANIZATION CODE (IF KNOWN)			9500 Gilman Drive			
0013177010			La Jolla, CA. 92093			
NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE			ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE			
PERFORMING ORGANIZATION CODE (IF KNOWN)						
IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.D.1 For Definitions) <input type="checkbox"/> FOR-PROFIT ORGANIZATION <input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS						
TITLE OF PROPOSED PROJECT Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.						
REQUESTED AMOUNT \$ 2,699,540		PROPOSED DURATION (1-60 MONTHS) 60 months		REQUESTED STARTING DATE 07/01/01		SHOW RELATED PREPROPOSAL NO., IF APPLICABLE
CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW						
<input type="checkbox"/> BEGINNING INVESTIGATOR (GPG 1.A.3)			<input type="checkbox"/> VERTEBRATE ANIMALS (GPG II.D.12) IACUC App. Date _____			
<input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.D.1)			<input type="checkbox"/> HUMAN SUBJECTS (GPG II.D.12)			
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION (GPG II.D.10)			Exemption Subsection _____ or IRB App. Date _____			
<input type="checkbox"/> NATIONAL ENVIRONMENTAL POLICY ACT (GPG II.D.10)			<input type="checkbox"/> INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES _____			
<input type="checkbox"/> HISTORIC PLACES (GPG II.D.10)			<input type="checkbox"/> FACILITATION FOR SCIENTISTS/ENGINEERS WITH DISABILITIES (GPG V.G.)			
<input type="checkbox"/> SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.12)			<input type="checkbox"/> RESEARCH OPPORTUNITY AWARD (GPG V.H)			
PI/PD DEPARTMENT Marine Biology Research Division			PI/PD POSTAL ADDRESS Scripps Institution of Oceanography			
PI/PD FAX NUMBER 858-534-7313			9500 Gilman Drive			
			La Jolla, CA 920930202			
			United States			
NAMES (TYPED)		High Degree	Yr of Degree	Telephone Number	Electronic Mail Address	
Nancy Knowlton		Ph.D.	1978	858-822-2486	nknowlton@ucsd.edu	
Peter W Arzberger		Ph.D.	1983	858-534-5079	parzberger@sdsc.edu	
Wolfgang H Berger		PhD	1968	858-822-2545	wberger@ucsd.edu	
Jeffrey B Graham		Ph.D.	1970	858-534-8044	jgraham@ucsd.edu	
CO-PI/PD						

CERTIFICATION PAGE

Certification for Principal Investigators and Co-Principal Investigators:

I certify to the best of my knowledge that:

- (1) the statements herein (excluding scientific hypotheses and scientific opinions) are true and complete, and
 (2) the text and graphics herein as well as any accompanying publications or other documents, unless otherwise indicated, are the original work of the signatories or individuals working under their supervision. I agree to accept responsibility for the scientific conduct of the project and to provide the required progress reports if an award is made as a result of this proposal.

I understand that the willful provision of false information or concealing a material fact in this proposal or any other communication submitted to NSF is a criminal offense (U.S.Code, Title 18, Section 1001).

Name (Typed)	Signature	Social Security No.*	Date
PI/PD Nancy Knowlton		*ON FASTLANE SUBMISSIONS* SSNs are confidential and are not displayed	
Co-PI/PD Peter W Arzberger			
Co-PI/PD Wolfgang H Berger			
Co-PI/PD Jeffrey B Graham			
Co-PI/PD			
Co-PI/PD			

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the individual applicant or the authorized official of the applicant institution is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding Federal debt status, debarment and suspension, drug-free workplace, and lobbying activities (see below), as set forth in Grant Proposal Guide (GPG), NSF 00-2. Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

In addition, if the applicant institution employs more than fifty persons, the authorized official of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of Grant Policy Manual Section 510; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflict which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Debt and Debarment Certifications

(If answer "yes" to either, please provide explanation.)

Is the organization delinquent on any Federal debt? Yes No

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency? Yes No

Certification Regarding Lobbying

This certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding \$100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding \$150,000.

Certification for Contracts, Grants, Loans and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME/TITLE (TYPED) Nancy A. F. Wilson		07/18/00
TELEPHONE NUMBER 858-534-9213	ELECTRONIC MAIL ADDRESS mcrosser@ucsd.edu	FAX NUMBER 858-534-9642

*SUBMISSION OF SOCIAL SECURITY NUMBERS IS VOLUNTARY AND WILL NOT AFFECT THE ORGANIZATION'S ELIGIBILITY FOR AN AWARD. HOWEVER, THEY ARE AN INTEGRAL PART OF THE INFORMATION SYSTEM AND ASSIST IN PROCESSING THE PROPOSAL. SSN SOLICITED UNDER NSF ACT OF 1950, AS AMENDED.

PROPOSAL NO 0092117	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03				
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT PREPROPOSALS				
PROPOSAL TITLE Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.						
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)	REVIEWER RATING
1	Dr. Peter Alpert, Department of Biology University of Massachusetts, Amherst Amherst, MA 01003-5810 palpert@bio.umass.edu	EZ0321975 Male Life Science Biological *****	09/25/00	P	P	
2	Dr. Subir K. Banerjee, Department Geology and Geophysics University of Minnesota 310 Pillsbury Drive SE Minneapolis, MN 55455- banerjee@umn.edu	000011659 Male Geological Sciences *****	09/25/00	P	P	
3	Dr. Joan F. Braddock, Institute of Arctic Biology University of Alaska Fairbanks 311 Irving I Bldg. Fairbanks, AK 99775-7000 ffjfb@uaf.edu	YY0721567 Female Ecology *****	09/25/00	P	P	
4	Dr. Lee W. Cooper, Ecology and Evolutionary Biology University of Tennessee 569 Dabney Hall Knoxville, TN 37996- lcooper1@utk.edu	AX0607339 Male Geological Sciences *****	09/25/00 09/05/00	P	R	Very Good
5	Dr. Sherry O. Farwell, Graduate Education and Research Office South Dakota School of Mines and Tech. 501 East St. Joseph Rapid City, SD 57701-3995 sherry.farwell@sdsmt.edu	HU0523082 Male Chemistry *****	09/25/00 09/23/00	P	R	Very Good
6	Dr. Maria J. Gonzalez, Department of Zoology Miami University Oxford, OH 45056- gonzalmj@muohio.edu	TB0762692 Female Environmental Biology *****	09/25/00	P	P	

PROPOSAL NO 0092117	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03				
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT PREPROPOSALS				
PROPOSAL TITLE Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.						
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)	REVIEWER RATING
7	Dr. Richard A. Hansis, Environmental Science Humboldt State University Natural Resources Arcata, CA 95521- rah14@humboldt.edu	GS0571005 Male Geography *****	09/25/00	P	P	
8	Dr. Everette Joseph, Physics and Astronomy Howard University 2355 Sixth Street, NW Washington, DC 20059-0001 ejoseph@howard.edu	QT0788729 Male Physics *****	09/25/00	P	P	
9	Dr. Gerald Matisoff, Department of Geological Science Case Western Reserve University AW Smith 110-112 Cleveland, OH 44106-7216 gxm4@po.cwru.edu	VN0317642 Male Geological Sciences *****	09/25/00	P	P	
10	Dr. Mark Meo, Science and Public Policy Program University of Oklahoma 100 E. Boyd Street, Rm. S-202 Norman, OK 73019- mmeo@ou.edu	BN0606163 Male Law *****	09/25/00	P	P	
11	Dr. Heidi M. Nepf, Civil and Environmental Engineering Massachusetts Institute of Technology Parsons Laboratory, 48-423 Cambridge, MA 02139-4307 hmnepf@MIT.EDU	MW0708990 Female Physical & Chemical Oceanography *****	09/25/00	P	P	
12	Dr. Craig W. Osenberg, Department of Zoology University of Florida 223 Bartram Hall Gainesville, FL 32611-8525 osenberg@zoo.ufl.edu	ZZ0704744 Male Ecology *****	09/25/00 09/21/00	P	R	Good

PROPOSAL NO 0092117	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03			
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT PREPROPOSALS			
PROPOSAL TITLE Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.					
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)
13	Dr. James N. Petersen, College for Engineering and Architecture Washington State University 145 Dana Hall Spokane Street Pullman, WA 99164-2719 jnp@wsu.edu	KY0788552 Male Engineering-Chemical *****	09/25/00	P	P
14	Dr. Robert A. Reves-Sohn, Marine Geology and Geophysics Woods Hole Oceanographic Institution Clark South, Rm 283, MS 24 Woods Hole, MA 02543- rsohn@whoi.edu	HG0779997 Male Geological Sciences *****	09/25/00	P	P
15	Dr. Lynn M. Walter, Department of Geological Sciences University of Michigan 425 East University St. Ann Arbor, MI 48109-1063 lmwalter@umich.edu	AD0516805 Female Geological Sciences *****	09/25/00	P	P
16	Dr. Amelia K. Ward, Department of Biological Sciences University of Alabama, Tuscaloosa Box 870206 Tuscaloosa, AL 35487- award@biology.as.ua.edu	PD0316707 Female Ecology *****	09/25/00	P	P

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

Title:Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:09/05/00

Rating:Very Good

Review:

The object of the proposed Scripps Institute of Oceanography IGERT project is to facilitate the participation of oceanography graduate students in team-based, problem-solving multidisciplinary projects that bear on significant problems of global change within the world ocean, including the linked problems of climate change, biodiversity, and environmental health. The proposal seeks to train a new generation of Ph.D. students who will receive their training outside of what is perceived as narrow disciplinary fields that are dictated by the availability of research funding to individual investigators. The specific mechanisms that will be implemented include two structured problem-solving courses that will be designed to give students exposure to information technology tools, computational resources, and a better understanding of conceptual issues relating to global change and marine ecosystem response. More practical applications of this approach will be undertaken in the second year to outline solutions to specific complex marine environmental problems. Internships with outside partners, including those in Latin America, and workshops to bring outside specialists and students to San Diego will be undertaken and will provide trainees with a more global perspective on environmental problems in marine systems.

By and large, I think this is a very solid proposal. The goal of giving graduate students an enhanced, internationally objective perspective on the problems of global change in marine systems is extremely important. However, as the PIs point out, oceanography is by definition a much more multidisciplinary endeavor than most academic departments. Even without IGERT, most Ph.D graduates of oceanographic institutes and departments in the U.S. have a relatively broad recognition of multidisciplinary approaches. For example, a biological oceanographer studying phytoplankton dynamics or distributions has to have an understanding of physical oceanography in order to make sense of the biology, and the chemistry of sea water is also governed by geological, physical, and biological processes. So Ph.D. graduates in oceanography normally have a much broader perspective than most other natural scientists on how to work across disciplinary boundaries. In addition, much of the recent large program funding for oceanographic research (e.g. WOCE, JGOFS, TOGA, ODP) has been oriented toward global change problems, and Scripps has been well-positioned to expose its students to those problems through its funded research.

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

Nevertheless, I liked a lot of what I read in the pre-proposal. Naturally strong ties to Latin American institutions will be expanded, as will be work with local partners such as the Southwest Fisheries Research Center, the San Diego Supercomputer Center and organizations with K-12 education outreach missions. This preproposal also appears to dovetail well with Scripps's organizational efforts to improve its expertise in marine biodiversity and marine conservation specifically, as well as interdisciplinary work in general. In terms of weaknesses, I don't think strengthening linkage with Latin American institutions is by itself enough to satisfy the need to improve participation of underrepresented groups such as Hispanics who must be either permanent residents or U.S. citizens, as per the IGERT guidelines. Formally involving a San Diego area community college with a high Hispanic enrollment might be a positive step to take for a full proposal, so as to give the planned K-12 outreach planned a continuity that will extend to undergraduate education.

Reviewer:

Cooper, Lee W.
Ecology and Evolutionary Biology

Email:lcooper1@utk.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

Title:Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:09/23/00

Rating:Very Good

Review:

Review of NSF-IGERT Preproposal #0092117

"Global Change and Marine Ecosystems"

Nancy Knowlton, et al., Scripps Institution of Oceanography

Summary of Proposed IGERT Project:

The proposed project is designed to establish a new model at SIO for the training of future marine scientists. Currently, graduate students at SIO follow the traditional model of working in a single research group on relatively narrow research topics and there is little institutional incentive for graduate students to acquire the personal social skills necessary for integrating their science with a broader public audience. To make this fundamental change at SIO, the authors claim that large-scale external support for a new multidisciplinary approach is required. If funded, the project will employ a team-based, problem-solving, multidisciplinary research strategy that will be guided by marine scientists from the new SIO Center for Marine Conservation and Biodiversity, computer scientists from the San Diego Supercomputing Center, fisheries experts from the Southwest Fisheries Center, marine ecologists from Centro de Investigacion Cientifica y Educacion Superior de Ensenada (CICESE), policy experts from the UCSD Institute for Global Conflict and Cooperation, and other geoscientists from SIO.

Review Comments:

This preproposal was well prepared and contains short descriptions of the proposed project that correspond to most of the specific IGERT criteria in the NSF solicitation. Positive aspects of the proposed IGERT plan include: 1) a demonstrated importance to more broadly train future marine scientists so they can understand the linkages between the diverse set of physical, chemical, climate, and human processes that influence the vulnerability of oceanic ecosystems, 2) a sound multidisciplinary research program that is driven by three general questions [What are the present and historical rates of change in the physical, chemical, and biological attributes of marine ecosystems? How are changes in climate and marine biodiversity coupled? Is humanity irrevocably changing the balance, and if so, what should be done?], 3) a training plan that involves individual problem-solving courses, creation of learning modules by the graduate students, team-based study of potential effects from global change, opportunities for summer internships and workshops at SIO and locations in

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

Latin America, and a series of half-day workshops on issues of ethics, sustainability, scientific responsibilities, diversity, etc., 4) the establishment of a competitive mini-grant program that will allow IGERT students to pursue training, equipment, or projects not available at SIO, 5) an adequate management structure consisting of the PI and a ten member steering committee, which will contain a mix of senior scientists and IGERT students, 6) an assessment plan that will involve a doctoral student in education to obtain/analyze input from the IGERT students and 7) the proposed IGERT project can be expected to benefit from the establishment and growth of the SIO Center for Marine Conservation & Biodiversity.

Despite these preceding favorable aspects, there are several concerns. First, the number of IGERT-supported students will be eight out of the thirty to thirty-five new graduate students who enroll annually at SIO. What is the future plan to integrate the multidisciplinary concept throughout the marine ecosystem program at SIO? Second, how will this new multidisciplinary approach be sustained at the conclusion of the IGERT funding? No described plan for program sustainability risks a rapid return to the more traditional SIO model as graduate students are suddenly forced to work for a single research group on narrower topics. Third, as described in the preproposal, the multidisciplinary IGERT project is designed to change graduate education and training exclusively at SIO. How might a successful change at SIO be transferred to and adopted at other research institutions and universities?

Review Summary:

My rating for this preproposal is "Very Good" and I therefore place it in category 1 (highly recommended).

Reviewer:

Farwell, Sherry O.
Graduate Education and Research Office

Email:sherry.farwell@sdsmt.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

Title:Global Change and Marine Ecosystems: Linking Climate, Biodiversity, and Environmental Health.

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:09/21/00

Rating:Good

Review:

This project brings together faculty and staff at Scripps Institution of Oceanography and the San Diego Supercomputer Center (as well as a consortium of other groups). The overall focus is on training students who can effectively address human-induced changes on marine systems. There is a strong interest in merging science and policy and in furthering ties with Latin American countries and the Hispanic community.

1. Intellectual merit and quality

a) Importance and coherence of multidisciplinary research scheme

The project lays out three general questions that define the overall scope of the project: 1) what are the rates of change of phys/chem/bio attributes of marine systems; 2) How are changes in climate and marine biodiversity coupled; 3) is humanity irrevocably changing the balance (à of what?). I liked the general nature of these questions (rather than a list of faculty research projects). However, at several points in the proposal, the need to inform policy was emphasized. From what I can tell from the CV's, none of the associated faculty have particular expertise in policy. This seems like a major issue limiting the success of the overall program.

b) Quality of major research efforts

As with other proposals, this is difficult to evaluate given the nature of the program and the limited space. The PI's are generally well-established with relatively productive research programs.

2. Broader impacts

a) Quality and innovation in graduate training (inc. communication, teamwork, leadership, ethics)

The proposal argues that the IGERT would bring a fundamental change to graduate training at SIO, by breaking students out of the "single lab" mindset. In the first year, students will enroll in problem-solving courses. A diverse set of faculty will participate.

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

In the second year, there will be a single group project tackling a much more complex problem. Both of these activities are innovative and will facilitate professional development. There's also mention of NSF-style mini-grants programs, which would further facilitate professional development.

There also will be summer internships, primarily in Latin America. These internships will develop from existing ties between SIO and programs in Latin America. My major concern here is the desire to bring in Latin American students on stipends - IGERT's rules preclude offering stipends to persons that are not citizens or permanent residents of the US. Perhaps the overhead (or other state monies) could be used to support this part of the program. It seems a very worthwhile activity.

Throughout the proposal, I found that I applauded the PI's goals and vision. However, there was little detail to convince me that the program would work. There's reference made to policy development, K-12 outreach, the participation of Latin American students. I'm not sure that I see how an IGERT can tackle all of these fronts and still have a demonstrable impact. I gather the point is to provide a diverse set of internship opportunities to the students. This is a good goal, but I worry that if each student chooses a very different option, the group will become fragmented and lose some of its cohesiveness. What can be done to ensure a high quality experience?

b) Career development

See above. The internships provide a valuable opportunity for networking and seeing "alternative" career options.

3. Logistics (organizational plan; recruitment/retention; assessment)

I'm not certain how the students are tracked through the program. Are students taken as a single cohort through the program, or will the IGERT support multiple cohorts? This should be more clearly explained in a full proposal.

I thought the recruitment plan was good; other elements of assessment and retention are adequate.

Rating: Good, based on weighting of 40 % (item 1), 55% (item 2) and 5% (item 3).

Reviewer:

Osenberg, Craig W.
Department of Zoology

Email:osenberg@zoo.ufl.edu

Suggested Reviewers:

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0092117

PI Name:Knowlton, Nancy

None

Conflict of Interest:

None

CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the individual applicant or the authorized official of the applicant institution is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, and lobbying activities (see below), as set forth in Grant Proposal Guide (GPG), NSF 03-2. Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

In addition, if the applicant institution employs more than fifty persons, the authorized official of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of Grant Policy Manual Section 510; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Drug Free Work Place Certification

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Drug Free Work Place Certification contained in Appendix A of the Grant Proposal Guide.

Debarment and Suspension Certification

(If answer "yes", please provide explanation.)

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency?

Yes

No

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Debarment and Suspension Certification contained in Appendix B of the Grant Proposal Guide.

Certification Regarding Lobbying

This certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding \$100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding \$150,000.

Certification for Contracts, Grants, Loans and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE		SIGNATURE	DATE
NAME Marian E Crosser		Electronic Signature	Oct 2 2002 4:16PM
TELEPHONE NUMBER 858-534-1293	ELECTRONIC MAIL ADDRESS mcrosser@ucsd.edu		FAX NUMBER 858-534-9642

*SUBMISSION OF SOCIAL SECURITY NUMBERS IS VOLUNTARY AND WILL NOT AFFECT THE ORGANIZATION'S ELIGIBILITY FOR AN AWARD. HOWEVER, THEY ARE AN INTEGRAL PART OF THE INFORMATION SYSTEM AND ASSIST IN PROCESSING THE PROPOSAL. SSN SOLICITED UNDER NSF ACT OF 1950, AS AMENDED.

Title: IGERT: Marine Biodiversity and Conservation

Director: Nancy Knowlton

Lead Institution: Scripps Institution of Oceanography (UCSD)

Other Participating Groups: San Diego Supercomputer Center; NOAA Fisheries/Southwest Fisheries Science Center; UCSD Graduate School of International Relations/Pacific Studies; World Wildlife Fund, Conservation International

A. Project Summary

Human beings profoundly affect many of the physical and biological processes of the planet, with consequences for the future that are poorly understood. For many years, concern has focused on terrestrial ecosystems, but the vulnerability of marine ecosystems is also now apparent. Oceans cover 70% of the earth's surface, and maintaining their physical and biological integrity is one of the greatest challenges of this century. Linkages between physical and biological processes in the sea are only beginning to be explored, and recent technical developments in genomics and informatics offer enormous promise for the future. However, identifying the magnitude and causes of environmental change is not enough: the direct and indirect socioeconomic causes of these changes must be determined, the environmental and socioeconomic consequences of alternative policy responses must be evaluated, and this information must be conveyed effectively to the public and to policymakers. To be effective participants in this process, natural scientists must be able to contribute their expertise to interdisciplinary research and policy analysis teams, and they must understand political constraints and opportunities. Similarly, social scientists must be sufficiently cognizant of the strengths and limitations of the natural sciences to work effectively with natural scientists in finding solutions. Here we propose a new type of graduate education and training whose centerpiece is a series of interdisciplinary, team-based, problem-solving experiences to foster analytical and communication skills with a global outlook. Students from different backgrounds will start during their first summer with an intensive introduction to the relevant natural and social sciences. This will be followed during the main academic year by a three-quarter course in which interdisciplinary teams of students work together on case studies and unsolved ocean-related problems facing society. Specialized course work in the natural and social sciences tailored to students' needs, as well as a bioinformatics course, will also occur during the first year. During the following summer, students will begin internships, drawing on our partnerships with non-academic institutions (both governmental and non-governmental) in the US and around the world. Students will be guided throughout their careers by experts from different disciplines, and their multidisciplinary dissertation committees will include one member from outside academia. These experiences will be supplemented by workshops on ethics, career opportunities, and communication skills. In sum, the program is designed to provide the technical expertise, policy experience, and breadth of perspective needed by future marine environmental scientists.

PROPOSAL NO 0300817	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03				
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT PREPROPOSALS				
PROPOSAL TITLE IGERT: Marine Biodiversity and Conservation						
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)	REVIEWER RATING
1	Dr. Mead A. Allison, Dept. of Earth & Environmental Sciences Tulane University Dinwiddie Hall New Orleans, LA 70118-5665 malliso@tulane.edu	ZB0730445 Male Geological Sciences *****	12/12/02	P	P	
2	Dr. Katherine A. Barbeau, Marine Research Division Scripps Institution of Oceanography University of California-San Diego 9500 Gilman Drive, 0236 La Jolla, CA 92093-0934 kbarbeau@ucsd.edu	YZ0778147 Female Physical & Chemical Oceanography *****	12/12/02	P	P	
3	Dr. David P. Billesbach, Department of Biological Systems Engineering University of Nebraska-Lincoln 25 L.W. Chase Hall Lincoln, NE 68583-0726 dbillesbach1@unl.edu	YS0732305 Male Atmospheric Sciences *****	12/12/02	P	P	
4	Dr. Andrew S. Gordon, Department of Biological Sciences Old Dominion University Norfolk, VA 23529-0266 agordon@odu.edu	PT0557505 Male Life Science Biological *****	12/12/02 12/05/02	B	R	Very Good
5	Dr. Russell G. Kerr, Department of Chemistry Florida Atlantic University Boca Raton, FL 33431-0991 rkerr@fau.edu	PG0736194 Male Chemistry *****	12/12/02 12/09/02	B	R	Excellent
6	Dr. Joanie Kleypas, Climate and Global Dynamics Division Oceanography Section National Center For Atmospheric Research 1850 Table Mesa Drive Boulder, CO 80305- kleypas@ucar.edu	PY0814716 Female Other Sciences NEC *****	12/12/02	P	P	

PROPOSAL NO 0300817	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03				
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT PREPROPOSALS				
PROPOSAL TITLE IGERT: Marine Biodiversity and Conservation						
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)	REVIEWER RATING
7	Dr. Richard Lee, Skidaway Institute of Oceanography Savannah, GA 31411- dick@skio.peachnet.edu	PG0817300 Male Other Sciences NEC *****	12/12/02 12/03/02	2	R	Very Good
8	Dr. Denise Mauzerall, Woodrow Wilson School Princeton University Princeton, NJ 08544- mauzeral@princeton.edu	NS0800418 Female Atmospheric Sciences *****	12/12/02	P	P	
9	Dr. Rachel Noble, Institute of Marine Sciences University of North Carolina at Chapel H 3431 Arendell St. Morehead City, NC 28557- rtnoble@email.unc.edu	MG0817301 Female Other Sciences NEC *****	12/12/02 12/10/02	1	R	Good
10	Dr. Donna F. Tucker, Dept. of Physics and Astronomy University of Kansas Main Campus 1251 Wescoe Hall Dr. Lawrence, KS 66045-7563 Tucker@phoenix.phsx.ukans.edu	GS0750481 Female Astronomy *****	12/12/02	P	P	
11	Dr. Cameron P. Wake, Glacier Research Group University of New Hampshire Science and Engineering Research Bldg. Durham, NH 03824- cameron.wake@unh.edu	DR0735245 Male Atmospheric Sciences *****	12/12/02	P	P	

NATIONAL SCIENCE FOUNDATION
Panel Summary Jacket Copy

Proposal:0300817

PI Name:Knowlton, Nancy

PANEL: IGERT3ESE1
INSTITUTION: University of California-San Diego Scripps Inst of Oceanography
NSF PROGRAM: Integrative Graduate Education and Research Training Program, IGERT-Preproposal
PRINCIPAL INVESTIGATOR:
PROPOSAL TITLE: IGERT: Marine Biodiversity and Conservation

PANEL SUMMARY:

Proposal # : PI Last Name: Knowlton

Proposal # : 0300817

Intellectual Merit (strengths/weaknesses):

The proposal will support the training of graduate students in marine environmental science with a focus on technical expertise, policy experience and breadth of perspective. A strong component of the proposed program is the social economics of marine biodiversity. The proposed program will center on three areas: (1) present marine biodiversity; (2) past marine biodiversity; (3) conserving marine biodiversity in the future. Would have liked to see more examples of how these three areas would be addressed for students in the proposed program, e.g., specific diversity issues for the future.

Broader Impacts (strengths/weaknesses):

Lays out a well organized and justified program for the IGERT students. This includes all students taking courses entitled Marine Biodiversity and Conservation and Interdisciplinary Team-Based Problem Solving along with summer internships. No international component is mentioned. Good linkages with other groups in biodiversity, so that internships with such groups as World Wildlife Fund, etc, will be available to IGERT students. Addresses the major themes of IGERT.

Basis for Recommendation:

This proposal pulls together a strong group at Scripps who have a strong background in marine biodiversity. The proposed program proposes a well organized graduate program. Not clear how the three research areas will foster collaboration among the participants. Also the panel would like to see more interaction with other marine biodiversity programs supported by NSF.

PANEL RECOMMENDATION: Recommended

PANEL RECOMMENDATION KEY:

DNR:Do Not Recommended, R:Recommended, HR:Highly Recommended

APPROVED BY: Lee, Richard

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity and Conservation

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program,
IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:12/05/02

Rating:Very Good

Review:

What is the intellectual merit of the proposed activity?

The theme of this proposed program; marine biodiversity and conservation, is an excellent, broad-based area on which to develop an IGERT program. Coupling the socio-economic considerations of conservation efforts with an understanding of the natural science of biodiversity addresses an obvious gap in training of traditional environmental scientists and policy-makers. The PIs, institutions, and organizations involved are outstanding and bring a clear international perspective to the program.

What are the broader impacts of the proposed activity?

The proposed training program clearly addresses all the aspects recommended by the IGERT guidelines including teamwork, communication skills, scientific ethics, and recruitment of fellows from underrepresented groups. The purpose and administration of the mini grant program are unclear to this reader.

Summary Statement

This program will train students to bridge gaps between biodiversity issues and socio-economics. The institutions, PIs and organizations that will be players in the program are a strong and balanced mix of interests and expertise.

Reviewer:

Gordon, Andrew S.
Department of Biological Sciences

Email:agordon@odu.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity and Conservation

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program,
IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:12/09/02

Rating:Excellent

Review:

What is the intellectual merit of the proposed activity?

The general scientific theme of this IGERT is to understand and learn how to maintain the physical and biological integrity of marine ecosystems in a global sense. The overall aim of the training program is to educate students so that they can combine physical and biological concepts, develop and utilize biodiversity informatics and collaborate with social scientists to enhance understanding links between environmental changes and socioeconomic cases and consequences. Scripps Institution of Oceanography is a well known marine science institute that has been long recognized for collaborations within the natural sciences. This IGERT is novel in that it brings in strong social science, policy and computer science components in a highly integrated training program.

The proposed curriculum is very attractive. There is to be a 10 week course ?preceding? Year 1 which provides an introduction to marine biodiversity and conservation. This leads in to an interdisciplinary team-based problem solving section in which students will examine case studies and thus be exposed to real-world problem solving. Each section will require both a traditional paper report as well as a non-traditional exercise to enhance communication skills such as a mock press conference or congressional testimony. In this same quarter, students will work with faculty to plan a seminar series of invited speakers that they will host the following year. These experiences are innovative, and will simultaneously develop teamwork, communication and leadership skills.

The additional interdisciplinary course work is very sensible and will clearly benefit natural science and social science students. The summer internship program will provide a valuable exposure to international settings. Various organizations have already partnered with SIO for this purpose and this component is well developed. Ethics issues will be taught in annual workshops in which speakers will address varied problems.

Recruitment is a concern of any new graduate program and this has clearly been given a lot of thought for this IGERT. Additional issues of student retention have been given due consideration and an appropriate strategy is in place. Lastly, the overall

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

management of the program seems to be highly satisfactory.

What are the broader impacts of the proposed activity?

The scientific goal of learning how to maintain the physical and biological integrity of marine ecosystems is a global issue. The innovative integration of the natural sciences with the social sciences is appropriate for this research theme, and the impact of this IGERT will be broadened by encouraging students who are not formally part of this program to participate in some of the interdisciplinary courses. Students in this program will be encouraged to exchange ideas with marine scientists from developing countries thus developing personal contacts and further broadening the impact of this program.

Summary Statement

This is an excellent IGERT proposal ? all pertinent aspects of this training program have been carefully planned and there are exciting and innovative features of the curriculum. There are outstanding faculty at Scripps for this marine subject matter and quality graduate students are certain to be attracted to this program.

Reviewer:

Kerr, Russell G.
Department of Chemistry

Email:rkerr@fau.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity and Conservation

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program,
IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:12/03/02

Rating:Very Good

Review:

What is the intellectual merit of the proposed activity?

The program will center on three areas - present marine biodiversity, past marine biodiversity and application of this knowledge to conserving marine biodiversity in the future. The discussion of these themes includes the work of the proposed participants.

What are the broader impacts of the proposed activity?

A good description is given of the path that IGERT students will follow with all students taking certain courses, including Marine Biodiversity and Conservation and Interdisciplinarry Team-Based Problem Solving, and a summer internship. Not clear if there is any international component to the proposal. Propose to work with other funded California IGERT programs. Appears to have addressed the concerns of an earlier proposal which was not funded. Management is well described. A number of partners outside of UCSD are noted which the proposal notes are committed to aiding their endeavors.

There is no mention of the large number of grants funded by NSF in Biodiversity , including several in the marine field, and how this program, if funded, would interact with this program. Many of these Marine Biodiversity grants have a graduate student component. Was there any consideration of seeing if the Biodiversity NSF program would fund the present proposal.

Summary Statement

This proposal is to support the training of graduate students in marine environmental science with "technical expertise, policy experience and breadth of perspective". The program is well laid out and justified. Would be have been useful to see more interaction with other marine diversity work which is supported by NSF. Also lack of

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

international component is a weakness since IGERT is a global program.

Reviewer:

Lee, Richard

Email:dick@skio.peachnet.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity and Conservation

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program,
IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:12/03/02

Rating:Very Good

Review:

What is the intellectual merit of the proposed activity?

The program will center on three areas - present marine biodiversity, past marine biodiversity and application of this knowledge to conserving marine biodiversity in the future. The discussion of these themes includes the work of the proposed participants.

What are the broader impacts of the proposed activity?

A good description is given of the path that IGERT students will follow with all students taking certain courses, including Marine Biodiversity and Conservation and Interdisciplinarry Team-Based Problem Solving, and a summer internship. Not clear if there is any international component to the proposal. Propose to work with other funded California IGERT programs. Appears to have addressed the concerns of an earlier proposal which was not funded. Management is well described. A number of partners outside of UCSD are noted which the proposal notes are committed to aiding their endeavors.

There is no mention of the large number of grants funded by NSF in Biodiversity , including several in the marine field, and how this program, if funded, would interact with this program. Many of these Marine Biodiversity grants have a graduate student component. Was there any consideration of seeing if the Biodiversity NSF program would fund the present proposal.

Summary Statement

This proposal is to support the training of graduate students in marine environmental science with "technical expertise, policy experience and breadth of perspective". The program is well laid out and justified. Would be have been useful to see more interaction with other marine diversity work which is supported by NSF. Also lack of

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

international component is a weakness since IGERT is a global program.

Reviewer:

Lee, Richard

Email:dick@skio.peachnet.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity and Conservation

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program,
IGERT-Preproposal

Principal Investigator:Knowlton, Nancy

Received Date:12/10/02

Rating:Good

Review:

What is the intellectual merit of the proposed activity?

The proposed work will move the fields of marine biology and chemistry, and oceanography in general by providing an internship program that is at once innovative and interdisciplinary. The team assembled to accomplish the proposed program are successful scientists in their individual fields and will certainly succeed in advancing the fields of marine biodiversity. There is certainly a need for advancing this field, but the research themes organized in this preproposal may not be the best means to go about advancing this field in an interdisciplinary fashion. With the posed research plan, the advancement of each of the individual fields of the PIs will be possible (and may be why the research themes are organized this way in the first place), but will promote minimal communication among groups. There needs to be a coherent set of research questions posed to get this group off the ground, questions that can only be answered by multidisciplinary teams of researchers. The scope of the research themes as it stands now does not necessarily warrant a highly integrative atmosphere. The fact that the research themes are not coherently designed and are vague also makes it difficult to assess how successful management and assessment of this IGERT program will be carried out.

What are the broader impacts of the proposed activity?

Students will be trained holistically to accomplish research in the field of marine biodiversity. This work will be extended to the World Wildlife Fund and Conservation International, and through internships will help advance research and conservation in developing countries. The introduction to marine biodiversity course is well thought out, but in general the approaches presented in this IGERT preproposal are typical of many graduate programs. Innovative approaches to education, leadership training, experiential and team-based learning, etc. need to be woven into this program in order to separate it from existin graduate programs. The suggested internships in Baja California, and other locations, will be great experiences for the students. It would be useful for the group to specify exacting what purpose the internships will serve, and what will be involved (field work? policy training?). The group presents several useful criteria for assessing the success of the program. This is useful information.

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0300817

PI Name:Knowlton, Nancy

Summary Statement

This proposal has a great deal of potential. The proposed research themes, although vague as presented in the preproposal, are interesting, and would serve to advance the field of marine biodiversity. The proposal would be significantly improved by revisiting the research themes, and coming up with a more coherent approach to the research being conducted by PIs and co-PIs, while providing a highly integrative atmosphere for the students. As it stands, the research themes are not necessarily multidisciplinary in nature, and may not promote the kind of integrated learning that is the keystone of the IGERT program. The team of PIs assembled for this program is good, and several other components of the program have been well thought out (like the management and assessment section). The expected resource commitments and budgets are reasonable. The components for recruitment, retention, and ethics are well written and certainly sufficient, but do not contain any necessarily new or innovative approaches to graduate education. More attention to the outreach, career development, and leadership development components for the students would be beneficial.

Suggested internship plans will be great experiences for the students, and will promote partnerships between the university and other organizations.

Reviewer:

Noble, Rachel
Institute of Marine Sciences

Email:rt noble@email.unc.edu

Suggested Reviewers:

None

Conflict of Interest:

None

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 03-2					FOR NSF USE ONLY	
NSF 02-145			04/18/03		NSF PROPOSAL NUMBER	
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)					0333444	
DGE - IGERT FULL PROPOSALS						
DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION	
				175104595		
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)		
956006144						
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE			ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE			
University of California-San Diego Scripps Inst of Oceanography			University of California-San Diego Scripps Inst of Oceanography			
AWARDEE ORGANIZATION CODE (IF KNOWN)			9500 Gilman Drive			
0013177010			La Jolla, CA. 92093			
NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE			ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE			
PERFORMING ORGANIZATION CODE (IF KNOWN)						
IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS		<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE
TITLE OF PROPOSED PROJECT IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions						
REQUESTED AMOUNT \$ 3,483,945	PROPOSED DURATION (1-60 MONTHS) 60 months		REQUESTED STARTING DATE 10/01/03		SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE	
CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW						
<input type="checkbox"/> BEGINNING INVESTIGATOR (GPG I.A)			<input type="checkbox"/> HUMAN SUBJECTS (GPG II.C.11)			
<input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)			Exemption Subsection _____ or IRB App. Date _____			
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.6)			<input type="checkbox"/> INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.9)			
<input type="checkbox"/> HISTORIC PLACES (GPG II.C.9)						
<input type="checkbox"/> SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.C.11)						
<input type="checkbox"/> VERTEBRATE ANIMALS (GPG II.C.11) IACUC App. Date _____			<input type="checkbox"/> HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.E.1)			
PI/PD DEPARTMENT Marine Biology Research Division		PI/PD POSTAL ADDRESS Scripps Institution of Oceanography				
PI/PD FAX NUMBER 858-534-7313		9500 Gilman Drive				
		La Jolla, CA 920930202				
		United States				
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address		
PI/PD NAME Nancy Knowlton	Ph.D.	1978	858-822-2486	nknowlton@ucsd.edu		
CO-PI/PD Richard T Carson	Ph.D.	1985	619-534-6319	rcarson@ucsd.edu		
CO-PI/PD Jeremy B Jackson	PhD	1971	858-822-2432	jbjackson@ucsd.edu		
CO-PI/PD Enric Sala	Ph.D	1996	858-534-9899	esala@ucsd.edu		
CO-PI/PD Michael F Tillman	PhD	1972	858-534-1293	mtellman@ucsd.edu		

CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the individual applicant or the authorized official of the applicant institution is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, and lobbying activities (see below), as set forth in Grant Proposal Guide (GPG), NSF 03-2. Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

In addition, if the applicant institution employs more than fifty persons, the authorized official of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of Grant Policy Manual Section 510; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Drug Free Work Place Certification

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Drug Free Work Place Certification contained in Appendix A of the Grant Proposal Guide.

Debarment and Suspension Certification

(If answer "yes", please provide explanation.)

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency?

Yes

No

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Debarment and Suspension Certification contained in Appendix B of the Grant Proposal Guide.

Certification Regarding Lobbying

This certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding \$100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding \$150,000.

Certification for Contracts, Grants, Loans and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE		SIGNATURE	DATE
NAME Nancy A Wilson		Electronic Signature	Apr 18 2003 5:59PM
TELEPHONE NUMBER 858-534-4571	ELECTRONIC MAIL ADDRESS nwilson@ucsd.edu	FAX NUMBER 858-534-9642	

*SUBMISSION OF SOCIAL SECURITY NUMBERS IS VOLUNTARY AND WILL NOT AFFECT THE ORGANIZATION'S ELIGIBILITY FOR AN AWARD. HOWEVER, THEY ARE AN INTEGRAL PART OF THE INFORMATION SYSTEM AND ASSIST IN PROCESSING THE PROPOSAL. SSN SOLICITED UNDER NSF ACT OF 1950, AS AMENDED.

Title: Conservation of Marine Biodiversity - Understanding Threats and Providing Solutions

Principal Investigator: Nancy Knowlton

Lead Institution: Scripps Institution of Oceanography (UCSD)

Other Core Participating Groups: UCSD Graduate School of International Relations/Pacific Studies, UCSD Department of Economics, San Diego Supercomputer Center; National Marine Fisheries Service/Southwest Fisheries Science Center

A. PROJECT SUMMARY

Human beings profoundly affect many of the physical and biological processes of the planet, with consequences for the future that are poorly understood. For many years concern focused on the land, but the degradation and vulnerability of marine ecosystems is now apparent. Identifying the magnitude and causes of environmental change is a complex task, but this alone is not enough. The environmental and socioeconomic consequences of alternative policy responses must be evaluated, and this information must be conveyed effectively to policy-makers and the public. In order to accomplish this, we propose an integrated research and training plan designed to answer the following questions for specific marine ecosystems where we have expertise:

- *How have marine ecosystems changed over time and what are the main forces influencing those dynamics?*
- *How do marine ecosystems currently function and what services do they provide?*
- *What are the policy options available for protecting and restoring marine biodiversity and ecosystem function?*
- *What information (biological and socio-economic) is needed by decision-makers and how is it best communicated to them and to the public at large?*

To be effective participants in this ambitious agenda, natural scientists must be able to work with interdisciplinary research and policy analysis teams, and understand political constraints and opportunities. Similarly, social scientists must be aware of the strengths and limitations of scientific data in order to work effectively with natural scientists. In the words of the NSF Advisory Committee for Environmental Research and Education, we need synthesizers.

To meet this need, we propose a new type of graduate training whose centerpiece is a series of interdisciplinary, team-based, problem-solving experiences to foster analytical and communication skills with a global outlook. Key novel elements of the program are:

- An intensive introductory course in the relevant natural and social sciences (1st summer)
- A year-long, case-studies course “Marine Science, Law and Policy” in which interdisciplinary teams of students work together on marine-related problems facing society (1st academic year)
- A summer internship (national or international, governmental or NGO; 2nd summer)
- Assembly of interdisciplinary teams to elaborate and coordinate research strategies for targeted ecosystems (year 2).
- “Informatics in Biodiversity” class and workshops in ethics and communication skills (years 2 & 3).
- A dissertation bridging the natural and social sciences that addresses an important marine conservation problem, with advisors from within and outside academia (years 3-5).

In sum, the program is designed to provide the technical expertise, policy experience, and breadth of perspective needed by future marine environmental scientists.

PROPOSAL NO 0333444	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03				
PRINCIPAL INVESTIGATOR Knowlton, Nancy			NSF PROGRAM IGERT FULL PROPOSALS			
PROPOSAL TITLE IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions						
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)	REVIEWER RATING
1	Dr. Michael F. Allen, Center for Conservation Biology University of California-Riverside Riverside, CA 92521-0101 michael.allen@ucr.edu	PN0326366 Male Ecology *****	06/09/03 06/07/03	1	R	Excellent
2	Dr. Nilsa A. Bosque-Perez, Dept. of Plant, Soil and Entomological University of Idaho Moscow, ID 83844-2339 nbosque@uidaho.edu	YC0796815 Female Other Sciences NEC *****	06/09/03	P	P	
3	Dr. Frederick Bowman, Health Sciences and Technology Massachusetts Institute of Technology Room E25-518 45 Carleton Street Cambridge, MA 02139-4307 hfbowman@mit.edu	YU0781609 Male Other Sciences NEC *****	06/09/03	P	P	
4	Dr. Anthony J. Brazel, Department of Geography Arizona State University Box 870104 Tempe, AZ 85287-0104 abrazel@asu.edu	PY0540613 Male Geography *****	06/09/03	P	P	
5	Dr. Judy Cushing, Department of Computer Science Evergreen State College State Campus Mail Stop: Lab 1 1003 Olympia, WA 98505-0002 judyc@evergreen.edu	XY0803277 Female Other Sciences NEC *****	06/09/03 06/08/03	B	R	Excellent
6	Dr. James D. Englehardt, Dept. of Civ., Arch., & Env. Eng. University of Miami McArthur Engineering Building, Room 321 Coral Gables, FL 33124-0630 jenglehardt@miami.edu	UY0735967 Male DATA NOT AVAILABLE *****	06/09/03 06/06/03	B	R	Excellent

PROPOSAL NO 0333444	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03			
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT FULL PROPOSALS			
PROPOSAL TITLE IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions					
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)
7	Dr. Robert Frodeman, Center for Science and Technology Policy University of Colorado at Boulder Hellemes 373 Boulder, CO 80309-0234 frodeman@colorado.edu	UG0805071 Male Geological Sciences *****	06/09/03	P	P
8	Dr. Paul D. R. Gamlin, Dept. Physiological Optics University of Alabama at Birmingham Vision Sci. Res. Ctr. 924 S. 18th St. Birmingham, AL 35205-3617 pgamlin@uab.edu	ET0615810 Male Life Science Biological *****	06/09/03	P	P
9	Dr. Steven Hall, Dept. of Biological and Agrig. Engr. Louisiana State University & Agricultura Baton Rouge, LA 70803- shall@bae.lsu.edu	SH0802828 Male Other Sciences NEC *****	06/09/03	P	P
10	Dr. David A. Kofke, Department of Chemical Engineering SUNY at Buffalo 303 Furnas Hall Buffalo, NY 14260- kofke@eng.buffalo.edu	PS0722924 Male Engineering-Chemical *****	06/09/03	P	P
11	Dr. Ron Mittler, Department of Botany Iowa State University 353 Bessey Hall Ames, IA 50011- rmittler@iastate.edu	NG0797972 Male Other Sciences NEC *****	06/09/03	P	P
12	Dr. Ingrid Padilla, Dept. of Civil Engineering University of Puerto Rico Mayaguez PO Box 9041 Mayaguez, PR 00681- Ingrid@ce.uprm.edu	KX0809385 Female Physics *****	06/09/03	2	P

PROPOSAL NO 0333444	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03			
PRINCIPAL INVESTIGATOR Knowlton, Nancy		NSF PROGRAM IGERT FULL PROPOSALS			
PROPOSAL TITLE IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions					
	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)
13	Dr. Jinsong Pei, Civil and Environmental Engineering University of Oklahoma Norman Campus Norman, OK 73019- jspei@ou.edu	KY0816959 Male Engineering-Civil *****	06/09/03	P	P
14	Dr. William Petri, Department of Biology Boston College Chestnut Hill, MA 02167- william.petri.1@bc.edu	000009591 Male Life Science Biological *****	06/09/03	P	P
15	Dr. Anna-Louise Reysenbach, Department of Biology Portland State University 1719 SW 10th Street Science Building 2 Portland, OR 97207-0751 reysenbacha@pdx.edu	HP0708247 Female Life Science Biological *****	06/09/03 06/09/03	B	R Excellent
16	Dr. Victor G. Rodgers, Dept. of Chemical & Biochemical Eng. The University of Iowa 4133 Seamens Center Iowa City, IA 52241- victor-rodgers@uiowa.edu	HK0702233 Male Engineering-Chemical *****	06/09/03	P	P
17	Dr. Jonathan H. Sharp, Graduate College of Marine Studies University of Delaware 700 Pilottown Road Lewes, DE 19958- jsharp@udel.edu	YH0504710 Male Life Science Biological *****	06/09/03	P	P
18	Dr. Sharon Y. Strauss, Section of Evolution & Ecology University of California-Davis 2320 Storer Hall Davis, CA 95616-8671 systrauss@ucdavis.edu	HH0624500 Female Ecology *****	06/09/03	P	P

PROPOSAL NO 0333444	INSTITUTION U of Cal SD Scripps Inst	PLEASE RETURN BY 09/24/03
-------------------------------	------------------------------------------------	-------------------------------------

PRINCIPAL INVESTIGATOR Knowlton, Nancy	NSF PROGRAM IGERT FULL PROPOSALS
--------------------------------------------------	--------------------------------------------

PROPOSAL TITLE IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions

	REVIEWER	NSF I.D GENDER DISCIPLINE PIN	DATE SENT RETURNED	REVIEWER (R) PANELIST (P) BOTH (B)	REVIEWED (R) NOT REVIEWED (N) COI (C) LATE (L)	REVIEWER RATING
19	Dr. Thomas L. Theis, Director, Inst. for Envr. Sci. & Policy University of Illinois at Chicago SPHW M/C 673 2121 West Taylor Street Chicago, IL 60612- theist@uic.edu	GI0144833 Male Engineering-Civil *****	06/09/03	P	P	
20	Dr. Michael R. Willig, Biological Sciences Texas Tech University Lubbock, TX 79409-3131 michael.willig@ttu.edu	BD0536794 Male Ecology *****	06/09/03	P	P	
21	Dr. Neal W. Woodbury, Chemistry and Biochemistry Department Arizona State University P.O. Box 871604 Tempe, AZ 85287-1604 NWoodbury@asu.edu	CD0617985 Male Life Science Biological *****	06/09/03	P	P	

NATIONAL SCIENCE FOUNDATION
Panel Summary Jacket Copy

Proposal:0333444

PI Name:Knowlton, Nancy

PANEL: IGERT03FB
INSTITUTION: University of California-San Diego Scripps Inst of Oceanography
NSF PROGRAM: Integrative Graduate Education and Research Training Program, IGERT Full Proposals
PRINCIPAL INVESTIGATOR:
PROPOSAL TITLE: IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions

PANEL SUMMARY:
Panel ID: IGERT03FB
PI: Nancy Knowlton
Proposal #: 0333444

Intellectual Merit (strengths/weaknesses):

The proposed program integrates biological research in marine conservation directly with economics, policy, and sociological research in a very cohesive and innovative manner that will transform graduate education. Based on scientific and social investigations, there is no doubt that this program will strengthen knowledge and understanding of marine ecosystem and the policy alternatives that shape and feed marine conservation.

Broader Impacts (strengths/weaknesses):

This program should produce a new type of Ph.D., one capable of undertaking the biological research in marine systems and directly relate that work to the economic and sociological research necessary to affect policy. It will produce experts that are well prepared in scientific issues related to marine conservation and that are also capable of providing integrated social and policy solutions to critical problems being faced by planetary marine resources.

It is envisioned that this program will serve as a model for future interdisciplinary education and that graduates of this program will be sought after in academic as well as government positions. These students will carry a very different kind of educational experience, that will likely to have a multiplier effect. Society will, therefore, benefit from the direct scientific and social research and activities of this program, as well as from the impact that it will have in shaping education and future leaders.

It is expected that this program will challenge institutional changes at the University of California - San Diego Scripps Institute of Oceanography to improve education aspects and activities of the institution. It will serve as an institution model that shows that education activities are equally important as research activities.

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0333444

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT Full Proposals

Principal Investigator:Knowlton, Nancy

Received Date:06/07/03

Rating:Excellent

Review:

What is the intellectual merit of the proposed activity?

This program focuses on creating a graduate training that integrates marine conservation, economics, and policy. The first summer of the program incorporates an intense introductory course with all the elements embedded. Years 1 and 2 are highly structured with internships, workshops, informatics, and other relevant topics. Years 3-5 consist of workshops in communications, policy and data management.

This is a leading group in marine conservation ranging from individual conservation biology to economics research. Carson developed much of this methodology and integrating him with the field researchers has the potential to dramatically change the type of student produced. This would be an important step forward. Also, focusing on informatics skills while the dissertation research is being undertaken means that the student won't forget the information before actually using it. Assuming that students survive this intense and extensive program, they should emerge with a real understanding of the policy, economic and biological aspects of conservation, something that is currently missing.

This is the only proposal of this type I have read in which economic and policy elements are integrated research programs in themselves, and that also are an integral part of the program.

My major concern is that research is not undertaken until y 3, and the program becomes, at a minimum, a 5 y one. This could be become an undesirable element of this program.

In general, this is a well-developed and important new direction for a program.

What are the broader impacts of the proposed activity?

This project will link academics in conservation biology with economic and policy experts, and with real practical conservation problems in an increasingly stressed marine system. Recent analyses such as those in the Washington Post and elsewhere have demonstrate that our marine biological resource base has been vastly over-estimated and is in serious decline. Programs such as this have the potential to produce experts capable of providing policy and answers.

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0333444

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT Full Proposals

Principal Investigator:Knowlton, Nancy

Received Date:06/08/03

Rating:Excellent

Review:

What is the intellectual merit of the proposed activity?

Intellectual merit of the proposal is extremely strong, with participation of appropriate and broad interdisciplinary disciplines to address four dynamic and timely research areas. The approach is both intellectually exciting and practical (in the sense of coherent and attainable policy implications). The PI presents a cohesive and extremely innovative redesign of graduate curricula that is applied to well-defined research of strong intellectual merit. Rather than 'tacking on' interdisciplinary activities to a traditional program, this group has critiqued traditional education, and rebuilt it from the ground up. They say that 'multi-disciplinarity is not inter-disciplinarity,' and act on that belief. Bravo!

The structured interdisciplinary learning experiences, beginning with the summer orientation and case studies, are extremely well conceived and coherent. The problem-based student-team research is especially innovative, and will likely guarantee that students take seriously the excellent core coursework that spans disciplines.

I was pleased to see recognition of not only the importance of students" using others" (public) data, but also of criticality of students learning themselves to be data providers.

I was particularly impressed that the teaching and communication courses, if offered by 'outsiders' to IGERT fellows, are co-taught with those outsiders and IGERT (domain) faculty. This co-teaching will instill content of interest to the students in those 'incidental' but important courses/workshops, and show that the researcher(s) who have the students" respect care about those topics enough to give their time.

What are the broader impacts of the proposed activity?

Likely impact of this program will be very strong. First, in a direct way it will produce excellent scientists for a 'new' age. Secondary effects are at least as important:

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0333444

PI Name:Knowlton, Nancy

- 1) This program will serve as a model for other interdisciplinary programs.
- 2) Graduates of this program will (likely) be sought after in academic as well as government positions. When they go to traditional programs, they will carry with them a very different kind of educational experience, one that is likely to have a multiplier effect. I hope to see those sparks fly.
- 3) Joint activities with other IGERT programs, and other institutions (UC Davis, UCSB, non-academic NGO"s, etc.) will provide support for students not possible in a traditional university setting; these relationships will go both ways, however, and the SIO program will positively impact those programs as well.

Summary Statement

I very strongly recommend funding this proposal. It is the strongest of the nine I have read, and the one likely to have the strongest impact, both in terms of direct and indirect effects.

Reviewer:

Cushing, Judy
Department of Computer Science

Email:judyc@evergreen.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0333444

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT Full Proposals

Principal Investigator:Knowlton, Nancy

Received Date:06/06/03

Rating:Excellent

Review:

What is the intellectual merit of the proposed activity?

This proposal is timely in addressing the urgent problem of marine ecosystem decline and restoration. The questions proposed to be addressed strike at the heart of the problem: how and why are marine ecosystems changing, how do marine ecosystems function and what services do they provide, what policy options are available, and what information and communication with policy makers and the public are needed. Scientific questions to be addressed include establishing baseline conditions (currently unknown) and the effects of fishing, disease, non-point source pollution, invasions, and global climate change. Science begins to bridge to policy in addressing not only ecosystem functions, but ecosystem services provided. Policy options will then be explored, benefiting from ongoing results of scientific investigations, and information needs will be studied. Curiously absent is a risk analysis component, as many of the questions will not be deterministic in nature.

What are the broader impacts of the proposed activity?

The investigators propose an educational experience that in a sense reverses traditional pedagogical methods in providing interdisciplinary, team-based problem identification and solution in the first year, following a summer of intensive marine coursework. This provision of practical application before theoretical analysis may better follow predominant student learning patterns. Second year involves student-led seminars, and thesis development including IGERT min-grant applications. Subsequent years involve thesis research and workshops. This innovative and insightful plan has exceptional promise to produce motivated and productive students with skills in problem identification and solution in team environments. International aspects are not emphasized strongly, and this appears appropriate considering the focus of the program. The problem of recruiting domestic graduate students is addressed through web-based efforts, collaborative with existing efforts of the Office of Graduate Research and the national IGERT recruiting effort funded by NSF. Letters of support are generally substantive, providing opportunities for practical applications and student career development.

Summary Statement

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0333444

PI Name:Knowlton, Nancy

This proposed IGERT is exceptionally well thought out and targeted with respect to marine ecosystem restoration. The research proposed appears to be of high quality, well-integrated, organized, and focused. The addition of a risk analysis component would further enhance the effort. The interdisciplinary organization is well-balanced and structured. Outreach to minority feeder programs for recruitment should be considered. The probability of success in achieving IGERT goals is exceptional.

Reviewer:

Englehardt, James D.
Dept. of Civ., Arch., & Env. Eng.

Email:jenglehardt@miami.edu

Suggested Reviewers:

None

Conflict of Interest:

None

NATIONAL SCIENCE FOUNDATION
Review (Jacket Copy)

Proposal:0333444

PI Name:Knowlton, Nancy

Title:IGERT: Marine Biodiversity - Understanding Threats and Providing Solutions

Institution:University of California-San Diego Scripps Inst of Oceanography

NSF Program:Integrative Graduate Education and Research Training Program, IGERT
Full Proposals

Principal Investigator:Knowlton, Nancy

Received Date:06/09/03

Rating:Excellent

Review:

What is the intellectual merit of the proposed activity?

The proposal is to develop a program for training students regarding conservation of marine conservation. The program will expose students to aspects of biodiversity, ecosystem function, marine policy and law.

What are the broader impacts of the proposed activity?

Marine ecosystems are under continued impact, and training students to be the next generation experts in marine policy and biodiversity is well targetted and timed. The proposal is very focused and strong, by all IGERT criteria.

Summary Statement

Reviewer:

Reysenbach, Anna-Louise
Department of Biology

Email:reysenbacha@pdx.edu

Suggested Reviewers:

None

Conflict of Interest:

None