Minority Students Pursuing Higher Degrees of Success in Ocean Sciences Program (MS PHD'S in Ocean Sciences Program): A Pilot Project

SUMMARY OF EVALUATION FINDINGS

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The formative evaluation of the *2003 Minority Students Pursuing Higher Degrees in Ocean Sciences Program (MS PHD'S in Ocean Sciences Program)* consists of an analysis of four data sets. Each data set is aligned to document progress in the achievement of the following program goals:

GOAL 1: The *MS PHD'S in Ocean Sciences Program* will successfully market, recruit, select, and engage underrepresented student and non-student participants with interest/ involvement in Ocean Sciences;

GOAL 2: The *MS PHD'S in Ocean Sciences Program* will provide meaningful engagement for participants as determined by quantitative analysis of user-feedback;

GOAL 3: The *MS PHD'S in Ocean Sciences Program* will provide meaningful engagement for participants as determined by qualitative analysis of user-feedback; and

GOAL 4: The *MS PHD'S in Ocean Sciences Program* will develop a constituent base adequate to demonstrate evidence of interest, value, need and sustainability in its vision, mission, goals and activities.

The discussion of each program goal is segmented into three components:

- presentation of data
- interpretation of data
- evaluation of data.

Data within GOAL 2 are logged as percentage of total response (student and non-student combined). Data in Appendix 1 and Appendix 2 document both actual number of responses and percentage within single participant categories. Appendix 1 portrays student response to survey questions and Appendix 2 portrays non-student response to the same set of questions.

Data are presented in quantitative and qualitative formats. These data, when combined, present a more complete picture of participant response and program impact. When warranted, evaluator notes are inserted to identify of extenuating circumstances or exceptional conditions that contributed to the level of participant response.

A formative assessment for each goal is placed at the end of data and the interpretation thereof. The summation is introduced with the restatement of the goal and concluded with evidence of compliance. This document contains a compilation of summaries for each goal as detailed in the *Minority Students Pursuing Higher Degrees in Ocean Sciences Program (MS PHD'S) Formative Evaluation available at msphds.marine.usf.edu.*

GOAL 1: The *MS PHD'S in Ocean Sciences Program* will successfully market, recruit, select, and engage underrepresented student and non-student participants with interest/involvement in Ocean Sciences

The *MS PHD'S in Ocean Sciences Program* was successful in establishing a constituent group that not only represented diversity in gender and ethnicity, but also in nationality. Among the forty-two participants were twenty-four (24) females and eighteen (18) males. Ethnic and cultural diversity were reflected by involvement of nineteen (19) African American, five (5) Puerto Rican, one (1) American Indian, two (2) Multiethnic/ Multicultural, one (1) Native Hawaiian/Pacific Islander, and twelve (12) Caucasian/White participants.

The *MS PHD'S in Ocean Sciences Program* marketed, recruited, selected and engaged twenty-two students participants and twenty (20) non-students as participants within its virtual community and on-site week-long experience. Among student participants were two (2) high school students, six (6) undergraduates, eleven (11) graduate students, one (1) post-doctoral researcher, and two (2) graduate school applicants.

In addition, the *MS PHD'S in Ocean Sciences Program* marketed, recruited, selected and engaged twenty non-student participants to serve as either *MS PHD'S in Ocean Sciences Program* mentors or JGOFS Meeting mentors. Non-student participants included eleven (11) university faculty, seven (7) research scientists, and two (2) program officers. Fourteen mentors were US citizens. The remaining six mentors (6) were citizens of Bangladesh, Canada, Cameroon, Germany, New Zealand, and Norway, respectively.

Student and non-student participants evidenced interest/involvement in fourteen (14) disciplines within ocean sciences. Seventeen (17) were involved in oceanography, eleven (11) in marine sciences, four (4) in environmental science, four (4) in geology, four (4) in hydrology. Other participants indicated interest among the following disciplines: atmospheric science, limnology, meteorology, marine ecology, geochemistry, fisheries, marine geology, and science education.

Among disciplinary specialties, biological was selected by seventeen (17); chemical by eight (8); geological by five (5), and; physical was selected by four (4) participants. When asked to identify environmental specialty, sixteen (16) participants selected coastal ocean, fourteen (14) deep ocean, twelve (12) estuaries, and four (4) selected open ocean. The remaining participants selected one of the following areas of environmental specialty: freshwater/wetlands, marine wetlands, coral reef, physical atmosphere, environmental geology, sediments, engineering, ecosystems, and policy and management.

Evaluative data support the fact that the *MS PHD'S in Ocean Sciences Program* successfully achieved GOAL 1. The *MS PHD'S in Ocean Sciences Program* has successfully marketed, recruited, selected, and engaged underrepresented student and non-student participants with interest/involvement in ocean sciences.

GOAL 2: The *MS PHD'S in Ocean Sciences Program* will provide meaningful engagement for participants as determined by quantitative analyses of user-feedback

Student and non-student participants were asked to respond to a series of eighteen (18) questions in order to gauge levels of their reflections on the *MS PHD'S* experience. Each survey item was constructed as an affirmative/positive statement. Participants were given a response range on a Likert Scale from a left of 0 (disagree) to 4(strongly agree) and a right extreme of 5 (not applicable).

For the purpose of this formative evaluation, a thresh hold of 70% affirmation from both student and non-student participants, as evidenced by respondent choice of "agree" or "strongly agree," is interpreted as validation of the statement. Exceptions to this interpretation are detailed for individual items. Survey items addressed nine (9) components of the *MS PHD'S in Ocean Sciences Program*. Those components and subsets are listed below. Following each component topic is an alpha listing in parenthesis. This listing identifies the survey item that aligned with the component topic.

1) *MS PHD'S website (aa):* Eighty-seven percent (87%) either agreed or strongly agreed that the *MS PHD'S* website provided adequate details regarding the vision and goals of the *MS PHD'S* initiative.
2) *Program vision and goals (a):* Ninety-two percent (92%) either agreed or strongly agreed that they understood the vision and goals of the *MS PHD'S in Ocean Sciences Program*.
3) *Program utility (b):* Ninety-four percent (94%) either agreed or strongly agreed that there was a definite need for the *MS PHD'S in Ocean Sciences Program*.
4) *Program content (c):* Ninety-one percent (91%) either agreed or strongly agreed that the *MS PHD'S* experience assisted participants in developing a clearer understanding of strategies and activities required to achieve their academic and professional goals.
5) *Program organization and structure (i):* Seventy-one percent (71%) either agreed or strongly agreed that the 2003 *MS PHD'S* experience was well organized and kept participants focused on achieving program goals.
6) *Program outcomes (o):* Clarification and advancement of participant academic and professional goals

A combined total of student and non-student responses revealed that forty-eight percent (48%) either agreed or strongly agreed that some of their personal, academic, and or professional goals were clarified and/or reached through the *MS PHD'S* experience.

(Evaluator's Note: In looking at student response alone, disaggregated data document that seventeen (17) students responded to this survey item. Of those responses, thirteen (13), 76% either agreed or strongly agreed with the statement. Two (2) students selected "unsure" and two selected, "not applicable." Although 15% of the mentors selected the "strongly agree" response, it was anticipated that the majority of the non-student participants would select either disagree (13%) or "not applicable" because they have already established their career paths.)

a. Alignment of agenda with participant research/professional/academic interest (k)

Seventy-six percent (76%) either agreed or strongly agreed that the *MS PHD'S* agenda included information directly connected to participant research/professional/academic interest.

b. Networking with federal/organizational representatives (d)

Ninety-two (92%) either agreed or strongly agreed that the Brown bag sessions provided participants with opportunities to learn from and network with federal and organization representatives.

c. Networking among peers (f)

Eighty-six percent (86%) either agreed or strongly agreed that the *MS PHD'S* experience facilitated networking among peers (Undergraduate/Master/Doctoral/Post-Doctoral).

d. Networking with faculty/researchers (h)

Ninety-eight percent (98%) either agreed or strongly agreed that the *MS PHD'S* experience facilitated participant-to-faculty/researcher networking.

e. Community building activities (m)

Seventy-six percent (76%) either agreed or strongly agreed that the *MS PHD'S* community-building activities helped participants to feel comfortable and welcome.

(Evaluator's Note: Combined percentage includes responses from JGOFS Meeting Mentors. These mentors did not participate in community building activities. Their interaction with students was limited to the JGOFS meeting site. Community building activities were conducted at the hotel, restaurant, and during tours to NASA facilities. Non-student participant response reflected 3% "disagree," 5% "unsure," and 5% "not applicable." Seventeen students responded to this survey item. Thirteen (13), 76%, either agreed or strongly agreed that the MS

PHD'S community-building activities helped participants to feel comfortable and welcome. Three students (3) responded as "unsure" and one (1) as "not applicable.")

7) NASA information and opportunities

(Evaluator's Note: Information about NASA was presented to participants within two venues: Brown bag discussions and during tours to Wallops and Goddard facilities. Although JGOFS Meeting mentors and MS PHD'S in Ocean Sciences Program mentors attended Brown bag discussions, only the MS PHD'S in Ocean Sciences Program mentors went on the tours. Within the non-student category are responses from both JGOFS and MS PHD'S mentors. This factor accounts for the larger than average number of "unsure," "disagree," and "not applicable" responses to NASA related survey items. Therefore, additional data is inserted from Appendix 1: Disaggregated Data by Respondent Category: Student to document student response to the survey item.)

Impact of research and innovations in Aerospace technology on quality of life (e)

Sixty-eight percent (68%) of combined non-student and student responses either agreed or strongly agreed that the *MS PHD'S* experience provided an awareness and understanding of how NASA's research and innovations in aerospace technology affect and improve the quality of life for all citizens.

A look at student response alone revealed that 82% either agreed or strongly agreed that the *MS PHD'S* experience provided an awareness and understanding of how NASA's research and innovations in aerospace technology affect and improve the quality of life for all citizens. Two (2) students responded as "unsure" and one student as "not applicable."

a) Pre-employment scientific and technical programs (g)

Seventy-five percent (75%) of combined non-student and student responses either agreed or strongly agreed that the *MS PHD'S* experience provided an awareness and understanding of opportunities for participation in NASA pre-employment scientific and technical programs.

Student response indicated that 94% either agreed or strongly agreed that the *MS PHD'S* experience provided an awareness and understanding of opportunities for participation in NASA pre-employment scientific and technical programs.

b) Academic and research opportunities (j)

Eighty-two percent (82%) of combined non-student and student responses (and 88% student participants alone) either agreed or strongly agreed that the *MS PHD'S* experience increased the participants' awareness and understanding of opportunities to participate in NASA-related work, and/or develop NASA-related academic or research capabilities.

c) Careers in science, technology, engineering or mathematics (n)

Fifty-eight percent (58%) of combined non-student and student responses either agreed or strongly agreed that the *MS PHD'S* experience provided an awareness of programs/products that attract diverse student to NASA careers in science, technology, engineering, or mathematics. Twenty-six percent (26%) of combined responses reflected "unsure."

Thirty-five percent (35%) of student participants responded as "unsure", 58% as either "agree" or "strongly agree," and 6% as "disagree."

d) Interest in taking NASA- related subjects. (p)

Sixty-eight percent (68%) of combined non-student and student responses either agreed or strongly agreed that the *MS PHD'S* experience increased interest in taking academic courses in NASA-related subjects.

Twenty-four percent (24%) of student participants either agreed or strongly agreed with this statement whereas 53% selected "unsure" and 6% disagreed with the statement.

8) Mentor/mentee commitment and follow-up activities (l)

Seventy-eight percent (78%) of combined non-student and student responses either agreed or strongly agreed that mentors and mentees has established specific commitments and follow-up activities.

9) Participant interest in future participation (q)

Seventy-eight percent (78%) of combined non-student and student responses either agreed or strongly agreed with the statement, "I would be interested in participating in future *MS PHD'S in Ocean Sciences Program* activities.

Eight-six percent (86%) of students responses affirmed continued interest in future participation in *MS PHD'S in Ocean Sciences Program* activities.

This segment of the survey contained eighteen (18) items. Combined participant response rated fourteen (14) of the items above the thresh hold of 70%. These responses ranged from a high of 98% to a

low of 71%. Of the four survey items that were rated lower than 70%, evaluator notes cited impacting conditions that influenced the ratings.

Overall, evaluative data support the fact that the *MS PHD'S in Ocean Sciences Program* successfully achieved GOAL 2: The *MS PHD'S in Ocean Sciences Program* provided meaningful engagement for participants as determined by quantitative analyses of user-feedback.

GOAL 3: The *MS PHD'S in Ocean Sciences Program* will provide meaningful engagement for participants as determined by user-feedback qualitative analysis

Program participants responded to three (3) open ended questions to further gauge the impact of the *MS PHD'S* experience. The questions were formatted to align with Action Research methodology. This method of inquiry produced evaluative, diagnostic and prescriptive data. The process, based on a constructivist approach, asked participants to reflect on the following questions:

1. What was the most beneficial aspect of the *MS PHD'S in Ocean Sciences Program* experience and JGOFS Meeting?
2. What was the least beneficial aspect of the *MS PHD'S in Ocean Sciences Program* experience and JGOFS Meeting?
3. How could the *MS PHD'S in Ocean Sciences Program* be improved?

Each question and accompanied set of responses was included in the Formative Evaluation. Responses were labeled with two identification tags: alpha and participant category. Alpha tags ("a" through "ii") allowed the reader to identify a single respondent's comments on each of the three questions. Each respondent did not comment on all three items. In order to maintain sequence and parallel in response, the code "nc" was used to indicate that a respondent did enter a comment on a particular item.

Participant category tags were placed at the end of each comment to aid the reader in distinguishing non-student and student responses. The following tags are used to identify respondents:

rs- Research Scientists
pr- Post-doctoral Researcher
po- Program Officer
uf- University/College Faculty
gp- Graduate Student Participant
gsa-Graduate School Applicant
up- Undergraduate Student Participant

The qualitative data required little analysis. The explicit formatting of the questions permitted the data to self-assess through reflection and recommendation. However, a brief formative evaluative summary was placed at the end of the section.

The following issues appeared as recurrent concerns throughout the responses:

1. Interest in scheduling more time for mentors and mentees to meet together
2. Closer alignment of mentee research/academic interest with that of the assigned mentor
3. Interest in scheduling more "down time" for participants
4. Subdividing student participants according to academic interest and educational level in order to tailor presentations to better align with needs and interests
5. Scheduling "elective" sessions in order for participants to self-select sessions to attend

Participant comments and recommendations focused on agenda structure, content and process. Diversity of interest is reflected on the number of program elements that were entered by some participants as "most beneficial," yet others entered the same element as "least beneficial." Attention to the five issues listed above will serve to enhance future *MS PHD'S in Ocean Sciences Programs.*

Two underlying themes dominated the qualitative data:

- **Appreciation of the opportunity to participate**
- **Advocacy for the continuation of the *MS PHD'S in Ocean Sciences Program*.**

Overall, evaluative data support the fact that the *MS PHD'S in Ocean Sciences Program* successfully achieved GOAL 3. The *MS PHD'S in Ocean Sciences Program* provided meaningful engagement for participants as determined by user-feedback qualitative analysis.

GOAL 4: The *MS PHD'S in Ocean Sciences Program* will develop a constituent base adequate to demonstrate evidence of interest, value, need and sustainability

For the purpose of this formative evaluation, a thresh hold of 70% affirmation from both student and non-student participants, as evidenced by respondent choice of "yes," is interpreted as validation of the statement.

Forty (40) participants responded to the question, "Would you recommend the *MS PHD'S in Ocean Sciences Program* to other students?" Each student participant and each non-student participant checked "yes" as their response. This survey item yielded the first 100% response. Both student and non-student participants affirmed that they would recommend the *MS PHD'S in Ocean Sciences Program* to other students.

Thirty-nine (39) participants responded to the question, "Would you recommend the *MS PHD'S in Ocean Sciences Program* to other scientists?" Of student response, 94% selected "yes" and 100% of non-student participant respondents selected "yes." Combined response of 97% served as a strong indication that student and non-student participants would recommend the *MS PHD'S in Ocean Sciences Program* to other scientists.

Thirty-nine (39) participants responded to the question, "Would you like to be contacted about future *MS PHD'S in Ocean Sciences Program* activities?" Student response reflected a "yes" rating of 88%. Non-student participant response yielded a 95% "yes". Combined response of 92% confirms continuing interest among constituents in future *MS PHD'S in Ocean Sciences Program* activities.

Evaluative data support the fact that the *MS PHD'S in Ocean Sciences Program* successfully achieved GOAL 4. The *MS PHD'S in Ocean Sciences Program* has developed a constituent base adequate to demonstrate evidence of interest, value, need and sustainability.