Appendix 1

List of Workshop Participants Organized by Working Groups

RESEARCH WORKING GROUP

IGERT Principal Investigators

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ACADEMIC INSTITUTIONS WORKING GROUP

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Dr. Luther S. Williams
Provost and Vice President for Academic Affairs
Tuskegee University

Appendix 2

Workshop Agenda

DAY 1: TUESDAY MAY 20, 2008

1:30 pm – 2:30 pm **Session I : Welcome**

Speakers

Dr. Kathie L. Olsen
Deputy Director, National Science Foundation

Dr. Wanda E. Ward
Acting Deputy Assistant Director, Education and Human Resources Directorate

Ms. Carol F. Stoel
Acting Division Director, Division of Graduate Education

Dr. Carol Van Hartesveldt
Program Director, IGERT

2:30 pm – 2:45 pm **Meeting Overview and Anticipated Outcome(s)**

Summary report on the Institutional Impacts of Interdisciplinary Research and Graduate Education and the role of IGERT. Report to include what has been accomplished to date; what still needs to be done; how will it get accomplished and the metrics required for monitoring progress and outcomes. Topics to be discussed are embodied in the breakout groups.

Dr. Judith Giordan
Program Director, IGERT

2:45 pm – 3:00 pm **BREAK and repositioning**

3:00 pm – 5:00 pm **Session II: Concurrent Working Breakout Session**

Determining the progress and impacts made to date; what works and doesn't; opportunities, challenges and options going forward and metrics for success of interdisciplinary research and graduate education on:

Session IIa and b: Faculty
Session IIc and d: Graduate Students
Session IIe and f: Research
Session IIg and h: Institutions

Work Introductions of participants
Definition of work plan, timing, roles and responsibilities
Kick-off of work per templates provided

5:00 pm – 6:00 pm **Session III: Cross-Group Interaction (includes break)**

Work Cross-group comparison and discussion – Faculty/Admin on same topics
Cross-group discussion and comparison – Faculty/Admin on different topics

6:30 pm – 9:30 pm **Session IV: Working Dinner with Speaker**

Host **Dr. Cora Marrett**
Assistant Director, Directorate for Education and Human Resources

Speaker **The Honorable Vernon J. Ehlers**
Ranking Member
Subcommittee on Research and Science
Committee on Science and Technology
House of Representatives

Working groups to be seated together for dinner to continue work from Session II and incorporate speaker comments into their thinking.

Work Incorporate remarks of speaker into thought process for group
Address template questions and issues per group
Define work plan for next day

DAY 2: WEDNESDAY MAY 21, 2008

8:00 am – 8:15 am **Session V: Welcome and Agenda Overview**
Carol Van Hartesveldt/Judith Giordan

8:30 am – 1:00 pm **Session II (continued): Concurrent Working Breakout Session**
includes light refreshments during the morning at 9:30 and a working lunch (box)
(Pick up lunch and return to working sessions)

Session IIa and b: Faculty
Session IIc and d: Graduate Students
Session IIe and f: Research
Session IIg and h: Institutions

Work Address template questions and issues
Determine ways for gaining additional input

9:30 am – 9:45 am **Break**

1:00 pm – 2:00 pm **Session II (continued): Concurrent Working Breakout Session**

Session IIa and b: Faculty
Session IIc and d: Graduate Students
Session IIe and f: Research
Session IIg and h: Institutions

Work Begin summary of work accomplished
Define next steps when back at institutions for finalizing input summary to NSF in accordance with timelines
Determine roles and responsibilities for follow-up and next steps
Develop report out for Session VI (to follow immediately)

2:00 pm – 2:15 pm **Break**

2:15 pm – 3:30 pm **Session VI: Next Steps from Session II** (Breakout Session Chairs)

Wrap-up Carol Van Hartesveldt

Appendix 3

Question Templates for Working Groups

Research

Please Explicitly Address

- What are the barriers, if any, to transformative interdisciplinary scientific advancements and what should be done to eliminate these barriers?
- How should/could traditional disciplines respond to newly emerging interdisciplinary research areas?
- What role, if any, has interdisciplinary research played in aiding advancements within single disciplines?
- Which interest groups (both internal and external to the university) are most impacted by transformational interdisciplinary research advancements, and how can this impact be assessed?
- How can interdisciplinary research play a role in bridging between researchers at minority serving institutions (MSIs) and non-MSI institutions?
- How have the federal funding agencies responded to new interdisciplinary science? Do the current funding mechanisms work at the various agencies to which you apply? Do some handle funding of transformative interdisciplinary research better than others? What are some of the models that should be followed and why?

Moving Into Future

Please Explicitly Address

- What will be the role of interdisciplinary scientific, technology, engineering and mathematics (STEM) research, and its impact on society, into the future?
- How should the value of such transformative interdisciplinary research, and its impact on society, be measured or assessed today and into the future?
- What factors will influence the emergence /growth of interdisciplinary STEM research into the future?

For Your Consideration

Please Explicitly Address

- In your collective view, what is the potential economic value of interdisciplinary discoveries, and what criteria are you using to develop this view?
- Should the potential economic value of interdisciplinary discoveries play a role, if at all, in shifting research towards interdisciplinary themes?

Faculty

Please Explicitly Address

- How have or should hiring practices for faculty change as a consequence of the evolution of research paradigms toward questions of greater complexity and broader scope (e.g., interdisciplinary or multi-disciplinary; cross department; cross college; cross institution; other)?
- What do faculty view as the value of interdisciplinary research and collaborations to their careers and why?
- What do faculty view as the challenges of inter-disciplinary research and collaborations to their careers and why?
- What are the incentives or disincentives for faculty to adopt interdisciplinary perspectives:
  - In graduate education?
  - In their own research?
- What measures could be/should be used to determine the level of value or success for faculty adopting/participating in interdisciplinary:
  - Research efforts?
  - Graduate education?

Moving Into Future

Please Explicitly Address

- What mechanisms do you believe should be developed or implemented – and by whom – to support faculty adoption of interdisciplinary perspectives in:
  - Their own research now and into the future?
  - Graduate education now and into the future?

For Your Consideration

Please Explicitly Address

- Are there universities that have addressed overarching faculty questions successfully? If so, how have they been addressed? Will these questions change into the future or remain the same? Will these methods of addressing overarching faculty questions remain the same into the future or will these methods need to change?
- What will be the impact, if any, on the faculty pipeline for the future as current faculty retire and new potential faculty have a combination of traditional as well as interdisciplinary training?
- Have faculty hires who have had interdisciplinary training been successful in your university setting?
- Please discuss the relative ease or challenge for inter-disciplinary interactions among faculty as a function of the disciplines involved.

Graduate Students

Please Explicitly Address

- What do you see as the impact that interdisciplinary research/science/engineering has had and will have on graduate education?
- What mechanisms has your institution adopted to allow or promote student flexibility in their graduate education or research?
- How are your graduate students prepared to do the interdisciplinary research of the future?
- How can we broaden the participation by underrepresented groups in science, technology, engineering, and mathematics (STEM) graduate education? What role, if any, can/does interdisciplinary STEM graduate training play in achieving this goal?
- How does one define "transformative graduate training"? What elements must be involved for it to be successful? What would be the objective measures for success for such training?
- How has interdisciplinary training impacted the ability/ease of graduate students to get:
  - Their PhD degrees?
  - A position after attaining their degree?
- What measures or methods of evaluation and assessment could be/should be used to determine the impact of and value from interdisciplinary graduate education:
  - For graduate students?
  - On the careers of graduates?

Moving Into Future

Please Explicitly Address

- How is interdisciplinary training important for the careers of the future?
- What should the science, technology, engineering, and mathematics (STEM) graduate training for the 21st century encompass?
- What mechanisms need to be developed, changed or added, if any, to graduate STEM training for the 21st century as compared with current training?
- What is the value of/what role should traineeship programs play for 21st century global science and the economy?

For Your Consideration

Please Explicitly Address

- How should institution policies for acceptance of graduate students change into the future?
  - Is there a mandate for change?
  - Should the numbers of students being accepted increase, decrease, stay the same? Please share the reasons for your responses.
- What role, if any, should career and job opportunities for graduates play in affecting acceptance policies for graduate students?
- What is the value/relative importance of attracting U.S. citizens/permanent residents into graduate training in STEM fields?
- As pertains to graduate STEM training, please discuss the relative ease or challenge for interdisciplinary interactions as a function of disciplines.

Institutions

Please Explicitly Address

- From your overall perspective, in institutions, what is the magnitude and scope of:
  - Interdisciplinary research?
  - Interdisciplinary graduate education?
- At your institution, how do you measure magnitude and scope and assess the value of:
  - Interdisciplinary research?
  - Interdisciplinary graduate education?
- Have changes taken place within or between structures representing the traditional disciplines due to emerging interdisciplinary interactions, and if so, how?
- What are the incentives or disincentives for change due to interdisciplinary research and education and what mechanisms do you believe should be developed or implemented by institutions to maximize these opportunities?
- Which personnel groups are impacted by institutional changes due to interdisciplinary advancements, and how can this impact be assessed (e.g., groups other than faculty and students)?
- What is the role, if any, of interdisciplinary traineeship programs in catalyzing institutional change?

Moving Into Future

Please Explicitly Address

- How should/will interdisciplinary research/science/engineering affect how your institution does business in the future?
- What should/will your response be to the ways interdisciplinary research/science/engineering will affect how your institution does business in the future for your institution? For your faculty? For your graduate students?

For Your Consideration

Please Explicitly Address

- What role, if any, do centers/research institutes and other such supra-departmental structures play in supporting interdisciplinary research and education?
- How does the size or type of institution, if in any way, impact the institution's ability to embrace and use to greatest benefit:
  - Interdisciplinary research?
  - Interdisciplinary graduate education?
- Are there models for interdisciplinary research and/or graduate education that have been developed internationally and could/should be applied in the U.S.?

Appendix 4

Overview of Work Process