

NSF ADVANCE: SEEDS at the University of Miami

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We propose to increase diversity in the scientific workforce of the University of Miami (UM) through our SEEDS (Scientists and Engineers Expanding Diversity and Success) initiative. Our two main objectives will be: 1) to implement innovative and proven programs for faculty recruitment and retention and 2) to use these to leverage a larger institutional commitment that will assure continuity and permanence of institutional change. A significant institutional commitment has been promised in concert with this proposal. UM has committed to establish a University-level SEEDS office as a focus for diversity programs across all three UM campuses, establish a Best Practices Committee to assess equity in policies, fund an Interactive Theatre initiative to help educate academic populations in diversity issues, and sponsor a comprehensive climate survey to identify gender and ethnicity issues at UM. The SEEDS office will orchestrate initiatives, develop a comprehensive website and work with the Best Practices Committee to educate departments, department chairs and search committees on diversity issues, efforts that would be funded by UM. An NSF award would fund seven programs described below; an award would also legitimize SEEDS' endeavors and thereby greatly amplify the scope of the award.

Proposed activities capitalize on a critical period of faculty replacement and expansion at UM, when catalyzing recruitment and retention initiatives can significantly increase faculty diversity. The opportunity is substantial: UM now has 302 SEM faculty and anticipates more than 100 tenure-track SEM faculty searches in the next five years. Our strategies draw from an extensive literature on gender and race equity in science and engineering to effectively recruit women and underrepresented minorities actively. Proposed programs include five based on proven programs: SEEDS Networking, Senior Scholar Lectureships, Career Workshops, "You Choose" Leadership Opportunities and Mentoring Across Differences, and two novel programs: "Early Career Research Conferences" and "Working From Within For Departmental Transformation".

UM is located in Miami, the gateway to the Americas, where the Hispanic success story is palpable at every turn, and where our undergraduates are 27% Hispanic and 10% African-American. However, our Science, Engineering and Mathematics faculty, with only 5% underrepresented minorities, fails to represent either our student or our community populations. We thus have a substantial eagerness for recruiting and retaining women of color. Because Miami is particularly attractive for Hispanic peoples and since several of our research fields have a strong pipeline representation of Hispanic women, we expect a good measure of success in our efforts to learn about, celebrate, promote, recruit and retain Hispanic women.

Intellectual merit: SEEDS innovatively combines a focus on underrepresented minorities with proven and novel programs to both broadly engage an entire university community, and focally transform target departments. Novel "Early Career Research Conferences" showcase young women and underrepresented minority scientists in cutting edge research conferences, thereby directly promoting their careers and highlighting them for local and national searches. A novel "Working from Within" program combines an initiative to educate department chairs with an administrative advocacy and financial support of selected women faculty leaders who are armed with a "Transformational Toolkit" to remedy specific concerns within their own departments.

Broader impact: SEEDS will alleviate isolation, foster career development, educate the academic community and infuse changes in hiring and promotion institution-wide with a high probability of improved climate as well as increased hiring and retention of women and underrepresented scientists during a critical period of faculty expansion.

1.0 UNIVERSITY OF MIAMI

1.1 Introduction:

The University of Miami (UM) is at a critical point where catalyzing recruitment and retention can significantly increase faculty diversity and alter the institutional climate for women and underrepresented minorities (URMs). UM has begun a wide-ranging renaissance. Under President Donna Shalala's leadership, a new team of top administrators, from Provost, Deans (including Deans of Arts and Sciences, Engineering and Medicine hired within the last three years) to department Chairs has been assembled, all committed to effecting the changes in climate and structures that are essential to recruit and retain excellent women and URM scientists. The strong commitment of these leaders is significant since buy-in by senior administrators is a vital predictor of successful institutional transformation (Stewart et al. 2002, MIT 1999, Valin 1999). It is not coincidental that President Donna Shalala, the leader of UM's new initiatives, was chair of the recent report "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering" (Shalala 2006) sponsored by the National Academy of Sciences, National Academy of Engineering and the Institute of Medicine. This report provided the data demonstrating that "*It is not lack of talent, but unintentional biases and outmoded institutional structures that are hindering the access and advancement of women*". President Donna Shalala's leadership and unusual degree of national visibility will have a catalytic effect on our efforts at the University of Miami and beyond our own campuses and assure that we can successfully put into place innovative measures and established programs that prior ADVANCE awards have shown to effectively improve the institutional climate and the recruitment and retention of women.

The opportunity for creating profound institutional change is substantial. In the next five years, UM expects to fill more than 100 tenure-track positions in SEM areas (Science, Engineering and Math) which are the top priority for UM investments. To meet this opportunity, UM is proposing an integrated approach to institutional transformation that will yield tangible positive results for women and minority scientists and engineers. SEEDS (Scientists and Engineers Expanding Diversity and Success) is a multilayered initiative that will employ a range of programs to directly address our central issues, typical of private research universities, such as the decentralized structures that have led to isolation and prevented spread of effective change. Serious institutional commitment is evidenced by UM's agreement to mount a climate survey and fund an interactive theatre initiative as a major climate educational tool, a Best Practices Committee and a SEEDS office that will orchestrate and disseminate diversity initiatives.

1.2 Development of this proposal

This proposal was developed through an interactive process among faculty and leadership of all three UM campuses. Dean Michael Halleran of Arts and Sciences initiated the proposal and each SEM dean nominated faculty to the Steering Committee. The committee led focus groups, commissioned data compilation using guidelines in the ADVANCE reporting toolkit and benchmarks six years before and after President Shalala joined UM, researched prior and current UM studies and programs and examined initiatives and outcomes of prior ADVANCE awards.

1.3 History and current status

UM is a private research university, with its SEM disciplines spread across three campuses and four schools: Arts and Sciences and Engineering on the Coral Gables campus, Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) at the Virginia Key campus and the Miller School of Medicine in downtown Miami. As in many private universities, the campuses

and schools previously operated as separate entities, with many records including salaries treated as confidential and with many procedures that are far from the gender-neutral policy ideals of being *transparent, uniform and assisted* (University of Michigan Handbook on Best Practices). Indeed, a focus group participant characterized UM policies as *Opaque, Disparate and Obstructive*. In a recent UM opinion survey, women responded significantly more negatively to assertions that sexual harassment at departmental, college and university levels is not tolerated, a classic indicator that men and women perceive the UM environment differently.

UM faculty demographics have been largely white and male and fail to match our undergraduate population or pool demographics. Our 841 SEM graduate students are 51% women; our 2619 SEM undergraduates are 54% women. Excluding international students and unknowns, SEM undergraduates are 27% Hispanic, 9% African-American and less than 1% Native American, while our SEM faculty has only 5% URMs, predominately male Hispanic immigrants. Although faculty representation of women in SEM fields is still below the national average, it has risen by 5% since President Donna Shalala joined UM in 2001 (figure 1 below). Despite this rise, most departmental representations fall into Kanter's (1977) class as "female token" (red); a few have reached the critical mass Kanter calls "female minority" (green italics); only one has reached a "balanced representation" (blue bold face). Representation below 15-20% in a unit heightens women's visibility and fuels barriers to advance (Etzkowitz et al. 1994).

Despite the recent increase in SEM women faculty to 50, improved retention and promotion

Figure 1: UM Tenure Track Women in SEM						
	1995		2001		2007	
	#	%	#	%	#	%
College of Arts and Science						
Biology	3	13%	2	8%	6	25%
Chemistry	1	7%	1	8%	1	10%
Computer Science	0	0%	0	0%	0	0%
Geological Sciences	0	0%	0	0%	2	33%
Math	2	6%	1	5%	1	5%
Physics	0	0%	0	0%	1	6%
Total	6	7%	4	5%	11	13%
School of Engineering						
Biomed Eng	0	0%	1	14%	1	11%
Civil Eng	2	20%	1	10%	2	20%
Electrical & Computer	0	0%	1	6%	1	6%
Industrial Eng	1	13%	0	0%	0	0%
Mechanical Eng	0	0%	0	0%	0	0%
Total	3	7%	3	6%	4	7%
Rosenstiel School of Marine and Atmospheric Sciences						
Applied Mar. Phys	0	0%	0	0%	0	0%
Marine & Atm Chem	1	20%	1	11%	1	13%
Marine Affairs & Policy	2	33%	2	33%	1	17%
Marine Bio & Fisheries	1	12%	2	12%	7	33%
Marine Geo	2	15%	2	17%	1	8%
Meteor & Phys Ocean	2	8%	2	13%	3	16%
Total	8	13%	9	13%	13	17%
School of Medicine, Basic Sciences						
Biochem. & MolrBio	3	19%	1	6%	3	17%
Cell Bio & Anatomy	4	21%	3	20%	2	17%
Mol & Cell Pharm	2	14%	4	31%	8	47%
Micro and Immuno	4	21%	4	20%	4	18%
Physiol and Biophys	2	12%	2	13%	4	27%
Total	15	18%	14	17%	21	25%
Grand Total	34	11%	31	11%	50	16%

has been less notable. As is the case nationally, major gains lie in the most junior ranks: women assistant professors doubled from a plateau of 16% in 1995 and 2001 to a high of 32% in 2007 (18 women). In contrast, women associate professors actually fell from 18% to 15% to 13%, (10 women) as the proportion of women full professors rose from 7% (in both 1995 and 2001) to 13% (22 women). The associate professor pool appears depleted by those moving to full professor positions, but not proportionally replenished from junior levels. Indeed, although numbers are small, retention shows a gender bias. In a cohort analysis of the 10 women and 53 men hired into tenure track positions between 1992 and 1999, 47% of men and only 30% of women achieved tenure, a far larger disparity than the 4% average nationally (Shalala 2006).

Representation of women and URMs in UM leadership positions has long failed to reflect even our low proportion of SEM women, but with the advent of new leadership has achieved small increases. SEM faculty holding one of the 50 available positions of Dean, Assistant and Associate Dean, Department Chair, or Academic Program Director rose from one woman (2%) and no minorities in 1995, to two women (4%) and no minorities in 2001, to current values of seven women (14%) and four minorities (8%) in 2007. Of the minorities, two are women and both hold positions which, while worthy, lie outside the mainstream administrative hierarchy, as Directors of Hispanic Faculty in Civil Engineering and in Microbiology and Immunology. Clearly both promotion and leadership advancement are subject to impediments.

1.4 Recent institutional progress

Leadership at the highest levels of UM have initiated diversity projects. The new Dean of the Miller Medical School, Pascal Goldschmidt, appointed Sheri Keitz as Dean of Diversity and mandated URM initiatives for the Medical campus. The new Dean of Arts and Sciences, Michael Halleran, has instituted significant changes, for instance, making the tenure process more transparent by hosting yearly tenure workshops, reinforcing breadth in searches and requiring a mentoring plan for all College junior faculty. He has increased tenure-line faculty of color by four and women by three (from seven to 10), tripled the number of women serving as department chairs (from one to three, out of 29), funded a summer research program for URMs and women and instigated this proposal. All four Deans of SEM schools are Co-PD's indicating their agreement with SEEDS endeavors and their solid commitment to institutional transformation. Likewise, the Provost and President are demonstrating their commitment to diversity hires by facilitating spousal hires and allotting interim funding for departments to hire diversity targets of opportunity. The Faculty Senate recommended a parental leave policy that was activated in 2003. The Senate has also established a Committee on Women and Minorities that commissioned studies of faculty demographics and salary, a major undertaking when all salaries are privileged information. In 2002, salary reviews of Coral Gables and RSMAS campuses listed 27 women and URM faculty whose salary was more than 10% lower than average for rank and department. The Provost subsequently adjusted a dozen of these salaries. Analysis of medical school salaries is ongoing. In 2003, the Faculty Senate recommended establishing a UM-wide mentoring program and performing a climate survey, but no action has been taken.

The National Academy study, *Beyond Bias and Barriers* (Shalala 2006), identified factors that affect attrition of women faculty, several of which are being addressed at UM, although often in a piece-meal fashion. Tenure policies and practices were revised in the College and this year the Medical School tenure clock was increased from seven to nine years. Salaries are competitive at SEM entry-levels, but Faculty Senate surveys show many senior salaries lagging behind corresponding national averages. Last year, the Provost instituted significant housing assistance, in which UM will cover up to 50% of a mortgage, a program essential to recruitment

in our expensive South Florida setting. It has been difficult to assess whether the quality of office and laboratory space is fairly distributed, since space had not been measured or inventoried in decades, despite renovations and redistributions. This year, space was surveyed across UM, which will allow our climate survey to assess space relative to gender and race/ethnicity. Mentoring programs have been initiated for junior faculty in the College but are otherwise largely absent. Professional development programs are sparse, except for an occasional grant-writing workshop. Two professional skills workshops are available for SEM graduate students and postdocs, led by one of our SEEDS faculty, Mary Lou King. According to our focus groups neither opportunities for collaboration nor levels of research support appear as available for women as they are for men. Spouse or partner hiring was rare before President Shalala joined UM, but is now managed on an ad hoc basis. Child-care options are available on two of the three campuses, but are limited and expensive and information on alternatives is not systematically provided. Benefits were considered adequate in a recent UM opinion survey. Start-up packages appear competitive but have not been assessed with regard to gender or race/ethnicity. No programs address the administrative burden, the opportunity to serve on important committees or the department and workplace environment. Indeed, climate issues have not been the focus of any UM program. The progress made so far is heartening, but nonetheless highlights the need for an overarching program and systematic initiatives that target recruitment, retention and climate.

2.0 PROGRAMS TO BE FUNDED BY UM

The Provost has agreed to establish a SEEDS office at the University level, mount a sophisticated climate survey and initiate an interactive theatre program. Even if this proposal is not funded, we believe these activities will take place at some level, showing a sincere commitment to diversity. What would be absent or greatly reduced are climate and program analyses by a SEEDS sociology team, seven proposed NSF programs and, most important, key legitimization of SEEDS by an NSF award.

2.1 Creating an overarching diversity program, SEEDS

“The increases in the representation of women and minorities don’t just “happen,” but result from specific pressures, policies, and positive initiatives designed to increase the hiring of women or minorities;... when these pressures abate or expire, hiring progress stops or even reverses.”
Hopkins, 2006

While UM has a great need for diversity programs, our guiding principle, established by the recent National Academy report (Shalala 2006), is that *“Stand alone programs do not succeed.”* Past efforts to increase the representation of women at UM have been stand alone: they have been fragmented across schools and departments, with no easy way for “best practices” to be maintained or shared. In planning for this proposal, we found initiatives that had been attenuated by their invisibility outside their frame of reference. A mentoring program in Medicine begun two decades ago had a life of only a few years. Various Faculty Senate reports on women and minorities are virtually inaccessible and have minimally impacted policies. To succeed, programs must be valued and supported by University leadership, widely disseminated and fostered by dedicated, valued and persistent leaders who have prestige at the University level. Those leaders will comprise the SEEDS office.

SEEDS leaders will ameliorate both the invisibility of diversity programs and the isolation that was the most-identified negative by women faculty across UM. SEEDS will put into place creative and active measures to improve recruitment, retention and climate that build upon new and known strategies to reduce barriers to advancement and leadership. To remedy current

fragmentation, SEEDS will administer the NSF programs in this proposal and disseminate resources and information on all UM diversity initiatives widely via a listserv and a diversity website. These collective efforts are expected to assure more significant progress than is possible without an ADVANCE award. SEEDS will change the face of UM and aid recruitment of women and URMs by creating a public persona that celebrates diversity as an essential component of excellence.

The key senior personnel of SEEDS are highly respected faculty who have established leadership in both SEM and diversity issues and who can orchestrate grass-roots support. The SEEDS Steering Committee is headed by Dean of Arts and Sciences **Michael Halleran**. The Director of SEEDS will be **Kathryn Tosney**, Professor and new Biology Chair, who had direct experience with NSF-ADVANCE at the University of Michigan. On the Steering Committee **Robert Johnson**, Professor and Chair of Sociology, leads our Assessment Team and will mentor a graduate student researcher who will be funded by NSF. The committee also contains six senior SEM women faculty who will also comprise Implementation Committees for each campus: for RSMAS, **Rana Fine**, Professor of Marine and Atmospheric Chemistry and **Susan Sponaule**, Associate Professor of Marine Biology and Fisheries; for the Medical School, **Sheri Keitz**, Professor of Medicine and Dean of Diversity for the Miller Medical School and **Mary Lou King**, Professor of Cell Biology and Anatomy; for the Coral Gables campus, **Jacqueline Dixon**, Professor of Geology and Senior Associate Dean of the College of Arts and Sciences and **Helena Solo-Gabriele**, Professor of Civil Architectural and Environmental Engineering and Associate Dean for Research. The four SEM Deans, **Michael Halleran**, Arts and Sciences, **James Tien**, Engineering, **Otis Brown**, RSMAS, **Pascal Goldschmidt** Miller School of Medicine and the Director of Seeds, **Kathryn Tosney** are co-PDs and comprise an Executive Committee that gives SEEDS direct presence at the UM decision-making level and assures that policies and programs will be implemented. The Executive Committee will meet quarterly and the Steering Committee monthly to assess and modulate ongoing programs.

SEEDS' Faculty Senate liaison is **Victoria Mitrani**, Professor of Nursing and Health Studies and Center of Excellence for Hispanic Health Disparities Research and Chair of the Faculty Senate Committee on Women and Diversity. Outside evaluation is led by Professor **Pamela Raymond**, formerly Associate Provost and co-PI of University of Michigan's NSF-ADVANCE program. A Best Practices Committee of senior men and women will assess policies, beginning with those in Arts and Sciences and five test departments (below) for transparency, language and practices that subtly disadvantage women or URMs. This committee and SEEDS will educate chairs and search committees on gender-equitable hiring practices, diversity and climate issues. Members of Steering and Best Practices Committees receive service incentives.

2.2 Interactive theatre

"...interactive theater is so useful in part because it creates community among faculty audiences. As they share dismay at the challenges presented by the theatre scenarios, faculty recognize the barriers to be inclusive. As they engage in the group-problem solving sessions that follow the sketch, faculty learn from each other about ways they can transform the culture..."

Kaplan et al. 2006

Interactive theatre is an immensely powerful education tool. University of Michigan's interactive theatre group, "CRLT Players" was the first to address climate issues that bar success for women and minorities in their tenure skit, "The Fence." Its success as a tool is shown by the integration of CRLT Player performances into many other ADVANCE programs. UM will develop its own theatre group, to enable a broader usage at UM. Jennifer Burke, Assistant Professor of Theatre

Arts, will provide oversight and direction. To develop a skit, she will use approaches described in LaVaque-Manty et al. (2007), view CRLT performances and interact with the CRLT director, Dr. Jeffery Steiger. SEEDS will consult on the culture of science, critique initial skits, supply test audiences using the SEEDS Networking program and then work with deans to target administrative groups (chairs, tenure committees, Faculty Senate, etc.) which represent the cross-departmental audiences that are best equipped to respond with productive discussions (Stewart et al. 2002). To assess progress and fine-tune performances, we will use post-performance questionnaires and qualitative questions, as in Stewart et al. (2002).

2.3 Climate survey

The goal of the climate study was to observe how women and men scientists and engineers experience their working environments. **Abigail Stewart, 2002**

A climate survey, based with permission on the one used at the University of Michigan (Stewart 2002), will be performed in the first year. This survey is crucial because it will identify particular problems and inequities right in the home institution. Such results provide a more convincing argument for change than mere administrative mandates, because they produce something scientists respect: *relevant data*. The survey will be supplemented by individual interviews and focus groups to further identify common threads and special issues. Analysis for publication, as described at the end of this proposal, will employ a graduate student funded by NSF and mentored by Professor and Chair Robert Johnson. The survey is designed to provide a baseline measure of climate and to suggest where specific programs need to be applied.

2.4 SEEDS facilitation of diversity recruitment

Recruiting is unequivocally of central importance. Recruiting women and URMs is crucial to maintain a national scientific workforce (Shalala 2006; Jackson 2004) and is thus a priority for all SEM departments (Nelson 2007, 2005; Shalala 2006; NSF 2004). Moreover, the best solution to a chilly climate is to increase representation of women to a critical mass and tipping point that in turn directly promotes climate change (Gladwell 2000; Pettigrew and Martin 1987).

The best recruiting window is during our current period of expansion and SEEDS will be available to all SEM searches from the onset, with a strong focus on five test departments in the “Working from Within” program (below). To enhance recruitment, SEEDS will focus on dissemination of best practices and tools that can increase the pool of qualified candidates, encourage impartial selection of candidates through knowledge of recommendation biases (Trix and Psenka 2003, Steinpreis et al. 1999; Weneras and Wold 1997), facilitate negotiations with the awareness that women tend not to negotiate (Babcock and Laschever 2003) and achieve equity in offers, from salary to space to teaching/service assignments. SEEDS will also provide resources to facilitate access to diverse pools of applicants, for instance assuring that searches better coordinate with UM’s Office of Faculty Affairs program that funds visits to minority institutions to identify faculty candidates. In addition, several professional societies have strong advocacy groups such as The Society for Developmental Biology (see Gilbert and Rader 2001), COACH (Committee for Advancing Women Chemists), Organization for Tropical Ecology, Society for Cell Biology, Society of Woman Engineers, National Society of Black Engineers, Society of Hispanic Professional Engineers, Association for Women in Science, etc. Steering Committee individuals also belong to professional networks that can help identify candidates, particularly Hispanic women. The SEEDS director will work with search chairs at all stages and be available to attend the first search meeting in target departments, facilitate spousal hires and interview women and URMs who decline offers, to identify correctable issues in recruiting.

3.0 PROPOSED: SEVEN SEEDS PROGRAMS TO BE FUNDED BY NSF

“Broad-based activities that work to influence large numbers of faculty by building a stronger community have excellent potential for achieving institutional transformation” Lee Harle 2007

Broad-based activities are needed to create and support a community that successfully counteracts feelings of isolation, lack of collegial respect and the discrimination that is a covert product of longstanding social structures and unexamined stereotypes (Stewart et al. 2007, Shalala 2006; Callister 2006; Bielby, 2000). We are proposing that NSF directly support programs that engage the entire UM community. These six programs are the consensus requests of the Steering Committee and focus groups. The long-term goal is building a community that will aid retention, foster career success and leadership and develop a gender- and ethnicity-neutral climate. Short-term goals are profiling successful women to provide role models and networking opportunities, developing a suite of networking and mentoring activities to address the varied needs of junior and senior faculty and different research environments and offering career workshops and leadership opportunities to foster competitiveness and leadership.

We also propose a seventh, quite focused program, a *“Working from Within”* transformation of five target departments. In each department, a resident Implementation Committee faculty will be armed with advocacy and support from SEEDS and will work from within her department, using her own *“Transformational Toolkit”* composed of special initiatives and subsets of the other six NSF programs that she will customize to meet local concerns. This program is intended to encompass additional departments as Implementation faculty rotate out and new faculty rotate in. While some parts of the seven proposed SEEDS programs have been used at other institutions (and were selected for UM precisely because of their proven worth), we believe that 3.2, Early Career Research Conferences and 3.7, Working from Within, are innovative as is the application of all seven programs to UM with an emphasis on URMs.

3.1 SEEDS Distinguished Lectureships

Short term goal: provide outstanding senior women and URMS as role models and networking opportunities. Assessment criteria: questionnaires after events, attendance, faculty interviews.

These lectureships will bring prominent women and URM scientists to UM and thereby provide role models and professional networking opportunities for all our faculty and students, men and women. Special emphasis will be placed on inviting women of color, particularly Hispanic women. These lectureships provide an interim measure that supplements our current dearth of faculty of color: we will "borrow" role models. We will invite prominent Hispanic and African-American women for seminars and other SEEDS activities. Some may even become targets of opportunity. Many prominent Hispanic SEM women are from Latin and South America and as this award would not pay foreign travel, their visits will be support by UM. These lectures will be extensively promoted by SEEDS. They will include a reception for networking opportunities, a smaller dinner with faculty and a working lunch venue with faculty and students in which the lecturer talks about her career. We expect to offer one lecture each year at each of the four SEM schools within UM and attract audiences that span the entire University.

3.2 SEEDS Early Career Scientists Conferences

Short term goal: showcase junior women and URMs; provide candidates for open faculty searches Assessment criteria: Initial questionnaire to assess conference; follow-up questionnaire in one year to assess indices of career progress; number of invited speakers and other participants subsequently hired at UM or elsewhere

This program synergistically combines two endeavors: 1) inviting young women and URM

scientists to campus to make connections outside the usual recruiting process (a successful ADVANCE program at Virginia Tech) and 2) expanding the common Senior Lectureship method of celebrating excellence by showcasing women and URMs in a research conference at the *onset* of their careers. The principle is to host a scientific conference each year in a cutting-edge research area that is the focus of upcoming searches. The conference will be anchored by one or two prominent senior keynote speakers and all other men and women will be chosen from abstracts submitted by young assistant professors and senior postdocs. Each conference will take place over two days and incorporate a poster session to profile research of postdocs and graduate students and a workshop on a career issue such as effective job-hunting, poster design or negotiation. The attendance list will also provide additional faculty candidates. This endeavor broadens search pools significantly, at a critical time before search committees select candidates.

Impact is increased by choosing a research topic that is cutting-edge, thus engendering excitement both locally and nationally. Cutting-edge research is often interdisciplinary, and interdisciplinary areas appear to disproportionately attract women (Shalala 2006) and often have a decent pipeline representation of URMs, particularly Hispanic women, who will be targeted for invitations. Interdisciplinary conferences also maximize impact as they target multiple departments that have active searches. In year one Coral Gables and RSMAS will co-host “Eco-Devo,” an emerging field that asks how the ecology alters developmental programs to create new phenotypes. In year two, Civil Engineering, Environmental Science, Geochemistry and RSMAS will co-host a “Global Environmental Change” conference; in year three, Mathematics and Biology as well as RSMAS and medical school departments will co-host a “Mathematical Biology” conference. We expect this initiative to become self-sustaining since, once we establish a record of hosting such conferences, these venues should contend well for awards that support small meetings. These conferences will promote the careers of young women and URM scientists directly and also have a high potential to enrich our recruitment.

3.3 SEEDS Networking

Short term goal: alleviate isolation, increase access to career information; raise awareness of diversity issues; promote collaborations Assessment criteria: attendance; post-meeting questionnaire; self-reported development of collaborations.

Women at UM are extremely isolated even on the same campus and have little contact across campuses. They are eager to interact. Indeed a Steering Committee member noted that a major joy of building our SEEDS initiative was the opportunity to talk with other women. UM seriously needs networking opportunities. Networking is an efficient and cost-effective community-building program in which faculty experience near-immediate benefits (Harle 2007). It is a crucial key to alleviating isolation and its adverse consequences. Women are simply left out of informal communication networks, with reduced opportunities to compare experiences, seek help in non-judgmental interactions, gain peer support, or build a professional network (e.g. Kuck et al. 2004). Networks also help us learn about issues that impact other fields and other races differentially and raise our sensitivity to one another. Networks that cross disciplines, power hierarchies and boundaries of gender and race build connections that advance careers.

It is important to encourage multiple networks, each with goals addressing the needs of target populations (Rankin and Nielson 2005) and to supply resources for hosting speakers, creating retreats and simply socializing in an environment that does not trivialize women’s concerns. SEEDS will plan and host three events in the first year: an initial dinner event where all UM women SEM faculty will simply meet one another in a social setting and be encouraged to share information about their work, departments and career concerns; networking lunches with

administrators on each campus; and a combined event with women faculty in both science and non-science fields. At each event we will ask participants to identify desired activities, which will inform planning of subsequent events. SEEDS will also target new hires, URM and women isolated in departments with few or no other women and help them connect outside their own departments to acquire information and develop support networks. At year-end a cross-UM event with a keynote speaker will provide a mechanism to inform the community about SEEDS advances and resources. This program is expected to create overlapping and interactive cohorts of women both within each campus and across the three campuses.

3.4 SEEDS Career Workshops

Short term goal: increase researcher competitiveness. Assessment criteria: attendance; questionnaires after workshop; assess career effects in individual interviews.

Abundant studies show that women are left out of informal communication networks and that such marginalization decreases their access to career skills (e.g. Kuck et al. 2004). It is clearly crucial to assuage this insufficiency by more formal instruction in focused career workshops. Despite these studies, a significant minority of women polled said they would refuse to go to “women only” workshops, possibly from fears of being negatively profiled. On the other hand, improving the quality of professional development programs for *all* faculty has proven effective in addressing culture and climate issues (Fried et al. 1996). We thus propose a series of workshops on career issues, most of which will be open to all faculty; many will also be open to postdocs and students. Increasing skills globally will sustain our entire community.

An exception to a policy of broad inclusion must be made for women URM, who are beset by the double jeopardy of being both female and minority (Turner 2002). As shown by Bell and Nkomo (2001), many women of color feel that white women have a cultural bias that causes difficulties for women of color and that including them in broader groups blurs their special interests. Accordingly, every third workshop will focus on women of color. We anticipate as many as four workshops each year if we combine NSF support with co-sponsoring by other agents. The precise workshops chosen will be dictated by ongoing analysis and community demand, but likely workshops are in the figure below.

- Writing workshop by Dr. Judith Swan from Princeton (see Gopen and Swan 1990)
- Grant Writer’s Workshop, Drs. Stephen Russell and David Morrison, co-sponsored by the Vice Provost for Research; <http://www.grantcentral.com>
- Workshop focusing on women of color; topic to be selected by and organized in consultation with the target population. For instance, they might chose to focus on family/career balance, or have a grant writing workshop followed by one-on-one consultations.
- A series of leadership and negotiation workshops offered by Drs. Barbara Butterfield and Jane Tucker; <http://www.humaned.com>

3.5 SEEDS Mentoring Across Differences

Short term goal: alleviate isolation, give guidance and support. Assessment criteria: assess mentee CV for career progress; confidential interviews at year end to assess interaction quality

Mentoring is clearly an asset to career advancement as it helps women and URM obtain important career information that men receive in informal networks that exclude women (Rosser 2004). Mentoring Across Differences will combine local and exterior mentoring to address career and gender/URM issues both within and outside the parochial environment. SEEDS will solicit women interested in mentoring or being mentored and will offer opportunities to participate at networking meetings and on our website. SEEDS will help pair assistant and associate professor women with at least one full professor mentor from UM and one outside their

school or outside UM and host a working lunch meeting on each campus for mentors/protégés to discuss mentoring and common interests. For senior women, SEEDS will help assemble a development committee composed of three senior individuals: one in their department, one at UM and one outside UM. Mentors and protégés will receive an information packet on mutual responsibilities and ways to gain maximum benefit from mentoring. Men will be included as mentors, since women often lack connections to leaders with insider knowledge, who are disproportionately men (Rosser 2004). Having an expanded mentoring system, across the differences of department, school, research area, country and even gender and race, is expected to teach us about one another and increase the horizons and resources available to protégés.

3.6 SEEDS “You Choose” Leadership Opportunities Fund

Short term goal: increase access to leadership opportunities. Assessment criteria: numbers of awards; winners’ description of award utility; follow-ups to assess leadership activities.

Many national opportunities are available for intensive leadership training and many will be profiled on our website. Each year two women will be selected from applicants for support to attend the national leadership-training workshop of their choice. Monetary support will require the recipient to describe helpful lessons learned at the annual UM-wide networking meeting. The leadership fund will also award smaller *You Choose* grants of up to \$1000 to selected applicants for career and leadership opportunities that they identify and justify. These may be travel supplements to international meetings to increase prominence, visits to establish collaborations, etc. As a correlate, SEEDS will sponsor an Awards and Leadership Committee to nominate women for university and outside awards and positions merited by their accomplishments.

3.7 SEEDS Working from Within: Transforming Climate in Five Departments.

Short term goals: increase representation of women and URMs’ productivity, funding and job satisfaction in five departments. Assessments: questionnaires from search candidates and from faculty at year-end; faculty CVs; UM teaching data; interviews with chairs and faculty.

Our strategy to transform targeted departments is based on the dual concepts that upper level administration, particularly chairs, are crucial to a positive climate (Stewart et al. 2002; MIT 1999; Valin 1999) and that intervention works best when at least one committed person resides within the unit (Walton 2006). SEEDS will work with the chair and an Implementation Committee faculty will *Work from Within* to assure dissemination and discussion of issues and focused progress on local issues. In this way, the lonely voice of one or a few women in a department will gain crucial advocacy and higher level support. Moreover, each woman will have a budget to develop her own *Transformational Toolkit*. This toolkit will sometimes comprise novel efforts and will sometimes comprise subsets of the six NSF programs above that she reshapes to meet prevailing challenges and opportunities in her department. This strong focus on departments is crucial because academic women spend most of their time in departments, where they consistently report stereotyping, marginalization, exclusion and inequities in teaching and service loads, space, equipment and salaries (Trower and Chait 2002; Turner 2002; MIT 1999; Sandler 1991). Even a 1% detriment in salary or promotion processes or other career factors can, like compound interest, profoundly affect chances for success and leadership (Tomaskovic-Devey et al. 2005; Martell et al. 1996).

SEEDS will focus on educating chairs in target departments, to help them learn how practices can bar success and offer them sample strategies and transparent and uniform policies that enable professional advancement. SEEDS will offer brief events (e.g. 2.2, Interactive Theater) to identify diversity issues, discourage unconscious actions and identify negative effects

of gender stereotypes. Resources will include climate survey data and materials from the Best Practices Committee and successful programs (e.g. ADEPT, University of Washington program for chairs, WISELI programs). Chairs will be held accountable for diversity goals in their annual reports to the deans; such accountability reduces biases against women and URMs (Foschi 1996; Tetlock 1983). The five departments are drawn from all four SEM schools:

College of Arts and Sciences Dean: Michael Halleran, newly hired in 2005, Co-PD **Biology** currently has 25 faculty (including two Hispanic men and six women), serves the largest undergraduate major (900 students) and hosts strong undergraduate diversity programs funded by NSF and HHMI. For ongoing and future assessment, this department provides a useful contrast with the other departments as the chair and the worker-from-within are the same person, Kathryn Tosney. Biology has substantial recruitment opportunities: in the next five years, its strategic plan calls for a dozen new hires in fields that have good female and Hispanic representation (Developmental Biology, Cell Biology, Tropical Ecology). Under its new leadership, the department has recently reached a critical mass of women (25%) but new hiring could counter these gains or further a goal of reaching a balanced representation. Retention is a serious challenge. Biology has a poor record of promotion: only one of eight previous hires achieved tenure and several faculty are now stalled in the associate rank. Climate has been frigid and departmental policies lack transparency or uniformity; indeed none are in written form.

Recruitment initiatives will use the practices that SEEDS will teach to other chairs (see 2.4, SEEDS Facilitation of Diversity Recruitment) such as framing searches broadly, head-hunting at professional meetings and through networking and expanding invitation lists to assure qualified women and URMs are interviewed. Biology will co-host with a RSMAS department an Early Career Conference (3.2) to specifically target women and URMs. The *Transformational Toolkit* will be devoted to remedying the severe retention problems of junior faculty. It will fund a working lunch each term for mentors and protégés to support a modified Mentoring Across Differences program (3.5) that establishes “zone” mentoring (three mentors, one each for research and teaching and one at a distance), a Networking event (3.3) each term to foster peer networking, purchase of the lab management book *At the Helm* (Baker 2002) for all junior faculty and modified Career Workshops (3.4) in which the chair or invited speakers lead monthly pedagogy workshops and grant-writing/brainstorming sessions. Efforts to enhance leadership and advance of mid-rank and senior faculty will encompass yearly coaching, reviews and workload adjustments, encouragement to write grants and take sabbaticals, nomination for honors and prestigious positions and small “You Choose” (3.6) type grants funded by a Biology endowment. Climate initiatives will include developing *written* policies that are gender-, race- and family-friendly, employing “small wins” family-friendly interventions (Kaufman and Kerr 1993) such as changing seminars to noon venues and holding a faculty meeting each term addressing an issue such as mentoring.

Geological Sciences Transformation will be led by Professor Jacqueline Dixon, Senior Associate Dean, who will implement many of the same programs. This department is small, with six faculty including two women (33%), one of whom will be unfortunately leaving at the end of the year due to spousal hiring issues. Geological Science’s strategic plan calls for hiring four faculty in the next five years. Recruitment and retention initiatives will focus on spousal hiring with the novel approach of hiring in pairs, with at least one of the two positions of unspecified specialty.

College of Engineering Dean: James Tien, newly hired in 2007, Co-PD

Civil Architectural and Environmental Engineering Although only 19.3% of undergraduate degrees in Engineering are awarded to women, far below the 56% representation of women in undergraduate ranks nationally, UM awards the seventh highest number of BS degrees to women (Gibbons 2007). Despite this success, only four (7.3%) of the 55 faculty in the Engineering school are female: one professor, one associate professor and two assistant professors. Half this number is contained in the Civil Architectural and Environmental Engineering department, giving it the only critical mass of women among the five engineering departments. The College of Engineering is thus marred by a strong under-representation of female faculty members. These low numbers are due to the limited number of female faculty recruits coupled with poor retention. Transformation will be led by Helena Solo-Gabriele, Professor and Associate Dean for Research. Recruitment initiatives: The College of Engineering anticipates seven retirements within two years, giving a major opportunity to reform and diversify the engineering faculty. This department will co-host an Early Career Scientists Conference (see 3.2). Retention and climate: The tiny number of women in the school necessitates applying the *Transformational Toolkit* toward networking (3.3) and mentoring (3.4) events that cross other SEM disciplines and link nationally and internationally, as well as local career workshops (3.5) .

Rosenstiel School of Marine and Atmospheric Sciences (RSMAS): Dean: Otis Brown, Co-PD

RSMAS is predominantly a graduate school that also manages an undergraduate major. It operates like a research institute, with heavy research and external funding demands. The two target departments are distinguished by different representations of women and different hiring practices. Retention is an issue of common concern, exacerbated by the loss of a young woman star who recently moved elsewhere and by the rigors of the grant funding climate that strongly impacts researchers who derive much of their salaries from grants. RSMAS has achieved a 17% representation of women (13). It is the only school that has long had cross-departmental monthly meetings of women faculty.

Both “Working from Within” women will begin to address two school-specific issues. First, RSMAS is the only UM campus without child-care facilities. Both will work with our Faculty Senate Liaison, Victoria Mitrani, to have the Senate initiate a feasibility study for establishing childcare facilities on the RSMAS campus, possibly in cooperation with other marine oriented organizations on Virginia Key (AOML/NOAA, SEMFS, Mast Academy, Seaquarium). Second, structural elements at RSMAS have in the past prevented faculty from taking sabbaticals and thus promoted faculty burn-out. Both women will work with the administration to develop creative methods to provide post-tenure relief for research-heavy positions; this advance will benefit women faculty in particular but will also benefit men.

Marine Biology and Fisheries has seven women (33%) and typically hires faculty at the untenured level. Transformation will be directed by Associate Professor Sue Sponaugle. In this department, a high proportion of untenured women necessitates that the *Transformation Toolkit* focus on retention. A junior mentoring program will have funding for peer mentoring events (3.5) as well as yearly networking (3.3) and career workshops (3.4). In the first year, this department will co-host with Biology an Early Scientists Research Conference (3.2).

Marine and Atmospheric Chemistry This department has only one woman (17%), Professor Rana Fine, who will direct this transformation. As this department has had successful hires mainly at mid-rank, future recruiting will focus on women and in particular URM targets of opportunity. Dr. Fine has a strong connection to Hispanic scientific communities in the Americas through being on the Scientific Advisory Committee for the InterAmerican Institute for Global Change Research (IAI). IAI has expressed an interest in working with UM via workshops that

will facilitate identifying suitable candidates. One goal for the *Transformational Toolkit* is to develop an international mentoring program (3.5) to supplement UM's present lack of role models for our large Hispanic undergraduate and graduate populations. This effort will take advantage of the Provost's commitment of support for international women and URM scholars for scholarly- (3.1) and career-issue (3.4) visits. In the second year, this department will co-host with IAI and other departments the cross-school Early Career Scientists Conference (see 3.4).

The Miller School of Medicine: Dean: Pascal Goldschmidt, newly hired in 2006, Co-PD

In the medical school, our proposal focuses on basic science departments. Our initiatives will be implemented as part of the overall diversity plan for the school of medicine that is under the guidance of the medical school's new Dean of Diversity, Dr. Sheri Keitz. The medical school has strong links to the Hispanic community. It has trained more Hispanic doctors than any other state (only Puerto Rico has trained more) and was recently awarded a Health Leadership Award by the National Hispanic Medical Association. Dr. Keitz has developed a strategic Diversity plan and implementation timetable for the medical school that includes several elements supported by the medical school that parallel and reinforce the proposed NSF programs; e.g. a women's lunch series, educational programs for mentors and protégés, a best practices program and Forum for Achieving Diversity with a prominent keynote speaker and diversity training workshops for targeted audiences such as student organizations, department and search committee chairs. Dr. Keitz is a member of the SEEDS Steering Committee, assuring sharing of effective strategies.

Cell Biology and Anatomy: Transformation will be directed by Professor Mary Lou King. This basic science department has two women (17%) and is currently negotiating with a woman scientist to serve as chair. Significant recruitment opportunities are expected, but their magnitude will be determined by the prospective chair's negotiations. The basic science focus group identified major interests in climate and retention issues, particularly our planned climate survey (2.3) and interactive theatre initiative (2.2) and development of best practices for basic science medical school departments. The *Transformation Toolkit* will fund a modified mentoring program for both junior and senior women with incentives for mentors including a lunch meeting when all mentors and protégés meet to work on teaching, research and networking (3.5) and a series of intensive workshops (3.4), e.g. on grant writing with follow-up one-on-one mentoring, on the successful path to tenure and on manuscript writing. A committee will be developed to nominate mid-rank and senior women as ELAM (Executive Leadership in Academic Medicine) candidates to the Dean of the Medical School or other woman leadership programs focused on women who have a Ph.D. and to encourage basic science women to apply for "You Choose" awards (3.6).

4.0 TIMELINE

During the Fall 2008 term, we will establish the NSF-SEEDS program. Early in the first year of funding, we will set up the Best Practices Committee and SEEDS website. During the first year we will host four networking events, at least two career workshops, initiate mentoring interactions and "Working from Within", announce competitions for leadership opportunities and "You Choose" awards, mount an early Career Conference in Summer term (to precede recruiting season), begin collection and analysis of climate survey results, assess programs and progress and plan for year two. Thereafter, yearly efforts will contain all the elements described above with, for instance, an Early Career Conference scheduled just before the search season for the relevant departments. The Interactive Theatre will develop a skit in year one, test it with SEEDS networking audiences and thereafter be scheduled with cross-departmental groups. The

outside evaluator will be invited two months before the end of each funding period to assure thorough assessment before we prepare our annual report.

5.0 ASSESSMENT, SELF-STUDY AND EXTERNAL EVALUATION

"We are trying to change the world at the same time that we are trying to monitor it."

Rankin et al. 2007

Our evaluation will assess for NSF indicators and analyze our climate survey and programs. UM's Planning and Institutional Research department headed by Vice President Mary Sapp will gather the quantitative institutional data for the climate study and data for NSF indicators (using guidelines in the NSF-ADVANCE reporting toolkit; see Toolkit 2005) as in the figure below:

- Number and percent of women in tenure-line positions by rank and department
- Tenure promotion outcomes by gender
- Years in rank by gender
- Time at institution and attrition by gender
- Number of women in science and engineering who are in non-tenure track positions (teaching and research)
- Number and percent of women scientists and engineers in administrative positions as compared to men
- Number of women science and engineering faculty in endowed/named chairs.
- Number and percent of women science and engineering faculty in endowed/named chairs
- Salary of SEM faculty by gender (controlling for department, rank, years in rank)
- Space allocation of SEM faculty by gender (with additional controls such as department, etc.)
- Start-up packages of newly hired SEM faculty by gender (with other controls such as field/department, rank)

Quantitative climate survey data will be gathered by highly trained and paid interviewers, but respondents will have the option to complete self-administered surveys if they wish. After consultation with climate survey researchers and reference to the results from the University of Michigan's climate survey, a modified structured interview will be designed to tap into the most useful and relevant issues, including the scales of gender stereotyping, ethnic/religious stereotyping, tolerant environment positive environment, gender egalitarian atmosphere, scholarly isolation, felt surveillance, perceived tokenism, perceived fairness of administration, career satisfaction and other experiences. We will also be sensitive to the issues of subtle and covert sexism (Swim et. al. 1995; Swim et al. 1997; Swim and Cohen 2004) and racism (Benokraitis and Feagin 1986; McConahay 1986; Sears 1988; Bobo 1988). To minimize the bias of interviewer fatigue we will try to keep interviews shorter than 30 minutes. The sample will consist of (a) all female tenure track and research faculty in SEM departments and fields in research institutions or centers at the Coral Gables campus, RSMAS and the Miller School of Medicine (b) a random sample of male faculty members in these same settings, (c) and all faculty in the social sciences. It is anticipated that the sample will have an n approximately equal to 1,000. These faculty members will be contacted by mail prior to the interview informing them about the study so that later when they are contacted by an interviewer by phone to set up an appointment they will know the study is legitimate.

Qualitative data for the climate survey will be obtained of three faculty groups: in focus groups of (a) surveyed faculty invited to participate by interviewers who will ask them after the interview and (b) other faculty members contacted by mail or email and SEEDS faculty for interviews of (c) exiting faculty and (d) search candidates. The focus groups will be open-ended and semi-structured questionnaire sessions conducted by a sociology graduate student trained in qualitative research methods. The focus groups will be recorded and the recordings transcribed, after which the recordings will be destroyed. The interviews of exiting faculty and search candidates will be informal and not recorded to avoid intimidating vulnerable individuals (especially search candidates). None of these data will be analyzed or presented or published

until the subjects have left UM and/or the job search is finalized.

The institutional, climate survey and focus group data will form the baseline for assessment, self-study and evaluation. From baseline data we will identify areas of concern such as inequities in mandated indicators from the institutional data, evidence of covert or subtle discrimination or career dissatisfaction from the climate survey, or strong negative feedback from focus groups and SEEDS program participants. Rigorous records of programming and participation will be kept, coded and form the basis for evaluation of each as an intervention. To additionally document the effect of these interventions a brief follow-up survey will be conducted in three years, which will focus on areas of concern uncovered by analyses of the baseline survey data. It will be administered to program participants and non-program participants from the baseline data. Before the interview, the interviewer will know who participated in what programs and that data will be preloaded into the interview record. Thus we will have direct evidence of the impact of the program on its participants and whether there were any spillover effects on non-participants as an indicator of institutional climate change. We will also look for changes in the mandated indicators, especially those identified as areas of concern at baseline.

The Assessment Team, Robert Johnson and a graduate student, will analyze data from the climate study, follow-up survey and all programs and prepare reports and publications. This analysis will comprise the student's thesis. The data gathering enterprise has a strong **Research Experience Opportunities component**: ten undergraduates each term who will be taking data will be trained in human subjects research, ethics, methods, data, computer assisted telephone interviewing software, survey goals, hypotheses, etc. All data will be analyzed or sorted by gender, race and department except in those cases where the identity of the subject may be known or obvious from this breakdown (e.g. where only one member of the department is a woman or specific URM or combination thereof). In these cases, data may be aggregated across multiple departments with similar profiles, or across multiple races for male to female comparisons. We will seek approval from the IRB for exempt status of all data collection and analysis that will be used only for institutional advancement. We will seek IRB approval for any research planned for general dissemination or presentation or publication.

Some programs require specialized evaluation, as briefly noted in each entry above. Analysis and immediate feedback from questionnaires will be used to fine-tune programs. For instance, to assess SEEDS efforts on recruitment, we will chart the composition of each SEM department's candidate list by gender and race and note who received and who accepted offers. Each candidate will receive a questionnaire and phone interview to understand factors contributing to their decisions. For retention, we will continue our cohort analysis of tenure achievement and attrition, supplemented with questionnaires and interviews.

6.0 Summary: SEEDS as an initiative that marshals multi-level actions

This proposal enables actions by dedicated leaders that effectively cross academic hierarchies, from deans and chairs with their administrative mandates that affect policies and climate, to grass-roots leaders working from within to assure that change is focused on real local needs. Combining broad programs with focal interventions is expect to engender the most effective recruitment and retention and the most lasting institutional and climate changes.

ACHIEVEMENTS UNDER PRIOR SUPPORT *K Tosney Regulation of functionally distinct adhesions and neuronal motility* #0519386, 08/01/05 to 07/31/09 We are identifying components and regulation of two functionally distinct adhesions crucial to cellular motility. Publications are expected at the end of the project, which has two undergrad and two grad students; one grad student is African American.

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