

UD ADVANCE Provost’s INSTITUTE: W2L (Women faculty To Leadership)

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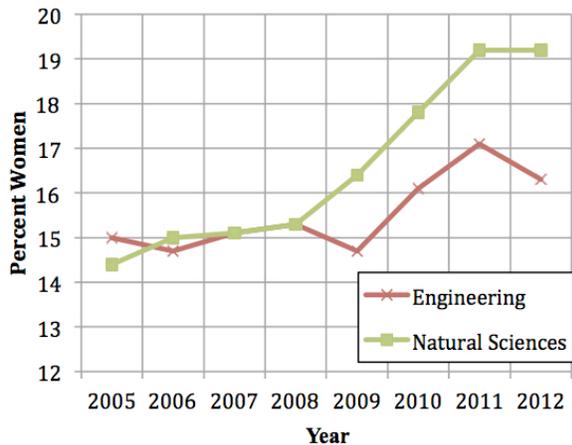
I. I. Results of Prior NSF Support: ADVANCE PAID HRD-# 819993 (Resources for Recruitment and Retention (RRR) of Women Faculty in STEM fields at the University of Delaware; 8/1/08-7/31/12, \$307,936, no cost extension to 7/31/13). PI:Chajes, co-PIs: Apple, Cook, Scantlebury.

The proposed goal of this grant was to develop and present workshops, adapted from the Universities of Michigan (STRIDE) and Wisconsin-Madison (WISELI), to educate University of Delaware (UD) STEM faculty in the College of Engineering (COE) and the four College of Arts & Sciences (A&S) natural sciences (NS) departments (math, physics, biology, and chemistry) on best practices for faculty recruitment and for mentoring of junior faculty. Fifteen senior faculty, balanced by gender and college, comprised the UD ADVANCE Core Faculty. They met to review research on barriers to women’s career success in STEM fields, with attention to research on implicit bias, then developed and led presentations of two workshops: (1) Best Practices in *Faculty Recruitment*, aimed toward faculty search committee members; and (2) *Mentoring the Mentors*, aimed toward senior faculty who are assigned as procedural mentors to junior faculty. Both workshops include a module on implicit bias. Workshops were presented annually.

Our ADVANCE initiative was singled out in the Middle States 2011 Accreditation Evaluation Report of UD: “The University [of Delaware] has properly focused on growing the percentage of women faculty in science and engineering, and [UD’s] NSF ADVANCE grant has begun to make progress” [53]. Since the start of the workshops, retention and promotion rates of female *junior faculty* in the targeted departments have been encouraging; in the academic years ‘10-11 through ‘12-13 no pre-tenure women faculty left the ADVANCE-supported STEM departments, and promotion rates were high. We also report a significant increase in women hired into tenured/tenure-track (t/t) faculty positions in the targeted departments: during the two years before the start of the workshops, women represented 14% of new t/t

hires in COE, during the following 2 years, women represented 31% of new hires. The overall percentage of t/t women faculty in COE jumped from 13% in ‘09-‘10 to 17% in ‘10-‘11. Over the same time frame the percent women t/t faculty in A&S NS went from 17% (‘09-‘10) to 18% (‘10-‘11) (Fig. 1).

Figure 1. Increase in t/t Women Faculty in targeted UD STEM Departments, ‘05-‘12



Institutionalization: Although the funding period has ended, we have continued to present workshops with continued support through: UD’s President’s Diversity Initiative (PDI); the Provost’s office (institutionalized support for a faculty associate to the Provost); and the COE Dean’s office. Additionally, with strong support from the UD Development Office – to a large extent due to our successful results from the UD ADVANCE NSF PAID grant – we were able to bring in funding for

two junior women professorships in the COE (one endowed, one a recent Clare Boothe Luce grant); as well as an endowment from an alumnus for UD’s Women in Engineering (WIE) program.

Products/Dissemination: The website [86] contains products including: brochures on mentoring of junior faculty and on best practices in recruiting; a mentoring checklist; sample workshop and presentation slides. Project results were also disseminated through presentations at ADVANCE PI

meetings; 2012 Women in Engineering Proactive Network (WEPAN) meeting; 2010 Society of Women Engineers (SWE) national convention; and at several institutions as invited talks or panels.

Broader Impacts include the increased representation of women faculty in UD STEM departments, shown in Fig. 1. As a PAID project, we broadened the impact of work carried out at other ADVANCE institutions by adapting their material for use at UD. We further adapted materials and presentations, by invitation, for other institutions (Delaware State University, Delaware County Community College in PA, Cleveland State University, UD College of Earth, Ocean, and Environment) and for use by COACH [22]. A formal mentoring program for assistant professors developed and instituted within the ADVANCE-targeted UD departments is now being adopted by the university.

Intellectual Merit: As stated in the original proposal, “The successful implementation of this program will result in excellence in hiring and in diverse perspectives brought to STEM research areas.” Indeed, as Fig. 1 shows, this was accomplished.

II. Introduction: The work under our PAID grant accomplished localized change in selected STEM departments. It shows that education and attention paid to recruiting and mentoring at the assistant-professor level can effect change in the percentage of women faculty hired and promoted. However, it did not -- and was not designed to -- accomplish institutional transformation. The University of Delaware now proposes to establish the **UD ADVANCE Provost’s Institute: Women faculty to Leadership (W2L)**. W2L goals and objectives are to:

Goal 1: Increase the representation of women faculty in all STEM and social science departments.

Goal 2: Increase the number of STEM women faculty in leadership positions.

Objective 1: Improve departmental microclimates for women faculty, especially women of color.

Objective 2: Educate, mentor, and support women STEM faculty, especially women post-tenure and women of color.

Objective 3: Increase transparency of policies, procedure, and practices that affect faculty careers and enhance institutional data gathering, analysis, and presentation.

Objective 4: Coordinate and draw attention to actions and discussions of diversity around campus.

A. Institutional Context, Data, and Institutional Need: Founded in 1743, UD is a mid-sized, East Coast, suburban campus nestled between Washington D.C and New York City. It has 21,856 students and 1,128 full-time t/t and non-tt faculty who are distributed among seven colleges: Agriculture & Natural Resources (Ag&NR), Arts & Sciences (A&S), Business & Economics, Earth, Ocean, & Environment (CEOE), Education & Human Development, Engineering (COE), and Health Sciences. UD is a public institution with a private charter, the largest university and the primary doctoral granting institution in the state. It shares similarities with other flagship state institutions, yet is smaller than most and does not have a law or medical school. At the doctoral level, 72% of the programmatic offerings are in STEM disciplines (hereafter, this means the colleges of AG&NR, A&S Natural Sciences (A&S,NS), CEOE, COE) and social sciences (hereafter A&S,SS) [92], making UD something of a niche school.

A Carnegie Research University with very high research activity, UD is investing heavily in the growth of high-profile STEM research. Just completed in the central part of campus is a 194,000 square-foot Integrated Science and Engineering Laboratory, housing state-of-the-art research and teaching facilities. Under construction adjacent to campus is a 272-acre Science, Technology, and Advanced Research (STAR) Campus; STAR Campus research will focus on energy, environment, national security and defense, life science, and health science. The COE recently added a biomedical engineering program. Faculty hiring plans mirror this growth in STEM. The administration projects that one-third of the UD faculty will retire and be replaced over the next ten years, underscoring the timeliness of this opportunity.

A unionized university, UD has been the recipient of significant corporate attention. The corporate culture is reflected in its president, a former dean of the Wharton School of Business, who has initiated a business-driven model for UD’s budget and administrative structure. Our unionized status and corporate

environment provide sometimes conflicting bottom-up and top-down leadership; but both have voiced a commitment to diversity -- voices that are important as we work to institutionalize positive change.

While UD has been successful in recent years in hiring and retaining junior women faculty in select STEM departments (Fig. 1), institutional data indicate a need for improvement across disciplines in the representation of women faculty [94]. The percent women t/tt faculty across campus was 34.2% in 2012, below the national average of 38.1% for doctoral-granting institutions [20]. Moreover, there is tremendous variation across disciplines. As shown in Table 1, UD t/tt women faculty are well represented in the social sciences (40.6% of the faculty), but not in the natural sciences or engineering (23.7% and 15.7% of the total faculty, respectively). For reference, in that same year, 2012, the national average for women t/tt faculty in colleges of engineering was 14% [113]; at the University of Washington it was 20%. [48]. While UD percentages of women among the t/tt faculty in COE were above the national average in 2012, that position is unstable due to the small numbers of women faculty.

Table 1 also shows that in many fields women are represented almost equally with men at the assistant professor level, but are underrepresented at higher ranks. In 2012 the proportion of women among *assistant* professors at UD, aggregated across all disciplines, was near parity (49.4%), and had been for the previous five years. The same year, the percentage of female *associate* professors fell short of parity (39.2%), but had increased slowly (average annual increase of 1.08%) over the previous 5 years. These figures suggest that UD is doing well overall in hiring women and that some women are achieving tenure.

Table 1. Number and percent of t/tt Female Faculty, by Rank, Selected UD Colleges/sub-colleges 2012

College	Rank						All Ranks		National
	Full		Associate		Assistant		# F	% F	All Ranks
	# F	% F	#	% F	# F	% F			
*Ag & NR	8	22.8%	6	27.3%	6	37.5%	20	27.4%	N/A ¹
A&S, NS	7	10.0%	4	14.3%	12	54.5%	23	23.7%	26.7% ²
A&S, SS	26	35.1%	20	37.0	19	59.4%	65	40.6%	41.0% ²
CEOE	3	10.0%	5	29.4%	3	37.5%	11	20.0%	N/A ¹
COE	5	7.3%	8	27.6%	6	25.0%	19	15.7%	13.8% ³

*In this and subsequent visuals: Ag&NR = Agriculture & Natural Resources; A&S, NS = Arts & Sciences, Natural Science; Ag&S, SS = Arts & Sciences, Social Sciences; CEOE = Earth, Ocean & Environment; COE = Engineering) Sources for national data: ¹ Not available; ²[60]; ³[113].

In clear need of improvement, however, is the advancement of women post-tenure and into leadership positions. The inclusion of women in upper faculty ranks and administration is important if UD is to change its academic culture [12]. In 2012, women represented 24.3% of all *full* professors, a figure that has not changed over the last five years. Notably, women represent 24.5% of all *department chairs*, but those women are disproportionately at the associate professor level, potentially delaying their promotion to full professor (women made up 62.5% of associate-professor chairs but only 19.5% of full-professor chairs). Currently there are no female department chairs in STEM departments, and women make up only 5% of named professorships in STEM fields. The lack of women department chairs is particularly problematic as it is an influential position in terms of resource distribution, policy interpretation, and department climate [12].

An area needing significant improvement is the representation and advancement of women faculty of color (defined here as Hispanic, African American, Native American) and Asian women in STEM. Table 2 shows the low representation of faculty of color (both sexes) across campus (UD has no Native American faculty); these numbers become vanishingly small when one focuses on STEM disciplines. For example, there was only one Black female t/tt faculty member in STEM departments in 2012 (4 Black males). There were 14 Asian women faculty (58 Asian men), and there were no Hispanic women faculty (4 Hispanic men).

Table 2. Representation of Male and Female Faculty of Color at UD in 2012.

College	White		Asian		Black		Hispanic	
	Male	Female	Male	Female	Male	Female	Male	Female
Ag&NR	42	17	8	3	1	0	1	0
A&S, NS	95	17	17	4	1	1	3	0
CEOE	35	8	3	1	0	0	0	0
COE	63	13	30	6	2	0	4	0
A&S, SS	78	50	5	4	8	7	5	4
Non-STEM/SS	132	169	18	17	9	11	4	4
Total (900)	445	274	81	35	21	19	17	8
%F, by Race	30.4% WF		3.9% AF		2.1% BF		0.9% HF	

Table 3 shows t/tt faculty hires and departures between 2005-2012, just longer than a typical tenure cycle. UD is hiring Black and Hispanic faculty at low rates, 8.1% and 3.3% of the total hires, respectively (of these, four faculty of color were in STEM and ten were in social sciences).

Table 3. T/TT Faculty Hires and Departures at UD, by Race and Gender, '05-'12.

	Hires				Departures			
	Male	Female	Total	% of Total	M	F	Total	% Loss
White	103	85	188	69.6%	50	35	85	45.2%
Asian	31	20	51	18.9%	5	1	6	11.8%
Black	10	12	22	8.1%	5	8	13	59.1%
Hispanic	7	2	9	3.3%	0	0	0	0%
All	151	119	270	100%	60	44	104	38.5%

Regarding retention, data from table 3 show low rate of departure among Hispanic and Asian faculty over the last seven years (0% and 11.8%, respectively). The story is quite different for Black faculty. UD hired 22 Black faculty from 2005 – 2012, but in that same time frame 13 left, representing a net gain of only 9 (a 59.1% net loss). What is especially alarming is that 73.3% of these departures occurred pre-tenure. Not shown on the table is that two additional Black women assistant professors have left as of August 2013, and another is in her terminal year.

B. Institutional Readiness: Existing or Previous Structures

UD has structures in place for change at all levels, many highly active. These structures, targeted at enhancing diversity on campus, exist from the Administrative level, to the AAUP-UD (UD chapter of the American Association of University Professors, our faculty union), to the faculty level.

B.1: Commissions: From 1974 to 2007, UD benefitted from an internal Commission on the Status of Women (CSW). The CSW reported directly to the University president regarding concerns of women faculty and staff; it issued an annual report on the status of women at UD; and it provided grants and awards to recognize women's accomplishments. With the AAUP-UD, the CSW negotiated additions to the faculty contract, including "stop the tenure clock" for birth or adoption; administered loads for family reasons; family leave; flexible spending accounts for dependent care; pre-tenure research sabbaticals; mortgage support for home purchase; and a consultant to assist with dual-career situations. The UD President disbanded CSW (as well as the Commission to Promote Racial and Cultural Diversity, whose mission was to create a diverse UD community) and replaced those two commissions with one presidential commission, the Diversity and Equity Commission (DEC). The DEC consists of one representative from each of the grassroots-formed (joint faculty and staff) Caucuses on campus (see section B.3) The DEC thus represents a broad range of ethnic, gender and professional interests. Its mission is to guide institutional change toward diversity. However, the breadth of agendas within the DEC is overwhelming (they represent numerous diversity groups and both staff and faculty).

B.2: Administration: The University President has drawn attention to diversity by making it one of the five guiding principles of UD's strategic plan, *The Path to Prominence* [95] (other principles are Delaware First, Partnership, Engagement, and Impact). He demonstrated his personal commitment to diversity by hiring several women of color as direct reports (Vice President (VP) for Development, VP for Communications and Marketing, Chief of Staff); he later established the President's Diversity Initiative (PDI), whose charge is to promote diversity (students and faculty). The PDI has supported faculty mentoring through membership in the National Center for Faculty Development and Diversity, Kerry Ann Rockquemore [71], President and CEO.

B.3: Faculty and Staff: At the faculty level, advocates for women and underrepresented groups include AAUP-UD, the Women's Caucus, the Center for the Study of Diversity (administratively created but faculty led), the African Heritage Caucus, the Latino/Hispanic Heritage Caucus, the Disability Caucus, and the UD-ADVANCE PAID Core Faculty, among others.

B.4: Data and Climate Studies: The UD Office of Institutional Research and Effectiveness (OIRE) collects and publishes annual data on UD faculty, staff, and students sorted by gender and race within each department and college [94]. In addition to these public data, OIRE provides more detailed data on rates of hiring, retention, and promotion to select campus groups, such as AAUP-UD, the caucuses, and UD-ADVANCE. These data help UD and union administrators, faculty, and staff track where significant gender and race inequities exist. Also key to understanding the status of women and faculty of color at UD are the following institutional climate studies, which have been initiated by and carried out by disparate groups with differing agendas. (Key results are discussed below, in Section C.)

- 2008: Qualitative climate study targeting students, faculty and staff, conducted by a President-appointed Diversity Task Force.
- 2009: President-appointed climate survey of faculty, staff, and students.
- UD ADVANCE PAID-initiated qualitative climate study on current and departed women faculty in engineering and the natural sciences.
- 2013: AAUP-UD initiated University-wide faculty survey.

Collectively these studies reveal broad support for a more diverse UD campus and faculty. While formalized and informal structures are in place to promote diversity, it is critical that there be persistent change agents to accomplish the change.

B.5 Persistent Change Agents: Kezar [44] cites the importance of *persistence* -- along with the willingness to "attend regular committee meetings ... take on seemingly mundane tasks ... and meet with administrative leaders" -- in effecting change in "ambiguous and complex" higher education environments. UD's environment is indeed ambiguous and complex and difficult to navigate. The persistence and willingness of our UD faculty to promote faculty diversity is evidenced in part by the proactive involvement and leadership of the UD ADVANCE Core-Faculty through the PAID grant. Faculty did attend regular meetings, take on seemingly "mundane" tasks, present workshops, and accomplish positive change. Our proposal is designed to build upon these recent achievements -- as well as the activism of groups such as the Women's Caucus and the Center for the Study of Diversity -- to create an infrastructure to ensure that the strides made in diversity will not only be maintained, but will be strengthened and become standard within UD.

C. Need for interventions: "*There is a growing gap between upper administration management and the colleges, the departments, and the faculty.*" -- anonymous faculty member, UD AAUP survey, 2013 [85]

As indicated, formalized steps have been taken at the presidential level, and directed efforts are underway at the faculty (grassroots) level, toward improving the status of UD's women faculty and faculty of color. Nonetheless, the data and surveys indicate a chilly campus climate and systemic inequities for women and faculty of color [66,85,90,94]. Women and faculty of color are concerned about fairness and transparency in promotion and tenure as well as in salary determinations and other resources. Both groups feel isolated, marginalized, experience tokenism, and are disproportionately overburdened with service without adequate compensation. All faculty groups (regardless of race, gender, or ethnicity) are concerned about lack of transparency in policies and procedures, a lack of effective communication

and flow of information between the administration and the faculty, and about having nowhere to go with problems or concerns.

So, while there appears to be broad support for improved representation and a better climate for women faculty and for faculty of color – the question is, why are things moving forward so slowly? The answer involves resources, resolve, and coordination. Diversity groups are stretched thin because most try to serve the needs of students, faculty and staff. Further, diversity efforts are silo-ed; lack of communication and flow of information is especially problematic between the upper administrative and the faculty levels. Institutional research [85,90,91] suggests that the silo effect has been enhanced recently due to significant flux in administrative leadership and structuring causing confusion about reporting structures and dilution of the strength of leadership needed to transform the institution. Significant changes were recently made to UD’s budget model (it is now a Revenue-Based Budget model). According to a recent Faculty Senate survey and report [91], this new budget model has led to confusion among the faculty about how resources are allocated and distributed among colleges and departments. It has harmed faculty morale and increased distrust of the administration. Finally, over the last several years administrative layers have been added to the reporting structure. The result is a greater gap between university leadership and faculty, as reflected in the quote above. Faculty no longer know where to go with problems or for help and don’t know if their concerns are heard. These feelings, along with concerns about transparency, were clearly expressed in the UD-AAUP 2013 faculty survey [85].

As detailed below, our solution is to create an Institute (W2L) that specializes in diversity at the faculty level, that can act as a stabilizing force, and that can work with diversity groups at the administrative and faculty levels to produce more transparency, better flow of information, and improved climate. Existing groups will be valuable to our efforts -- but UD needs an organization to focus on change at the faculty level with the resources, the recognition, and authority to accomplish that change.

D. Conceptual Framework for Proposed Work

The idea of second-order versus first-order change provides a broad conceptual framework for our project. Kezar [44] describes first-order change as “minor adjustments and improvements in one or a few dimensions of the organization; it does not change the organization’s core.” Progress already made at UD constitutes first-order change. Second-order change is transformational, multidimensional (involving many aspects of institutional change) and multilevel [44]. We now seek second-order change, which is often affiliated with the theoretical framework of organizational transformation. Austin et al. [6] point out that “...successful change efforts are nonlinear, require multiple levers of change, and benefit from efforts to connect an array of strategies.” UD is already implementing an “array of strategies,” at various levels throughout the university. **W2L aims to connect the array.**

We will use the metaphor of an “unbalanced hourglass” (Figure 2) to explain how W2L will connect the array. The top layer of the hourglass represents the upper administration and the bottom layer represents the faculty. The narrow middle region of the hourglass represents the gap (discussed above) between the faculty and the upper administration. The hourglass is unbalanced because the administration is smaller than the faculty in size (smaller width), but top-heavy in terms of influence and power (thicker).

Figure 2. The “unbalanced hourglass” of diversity efforts

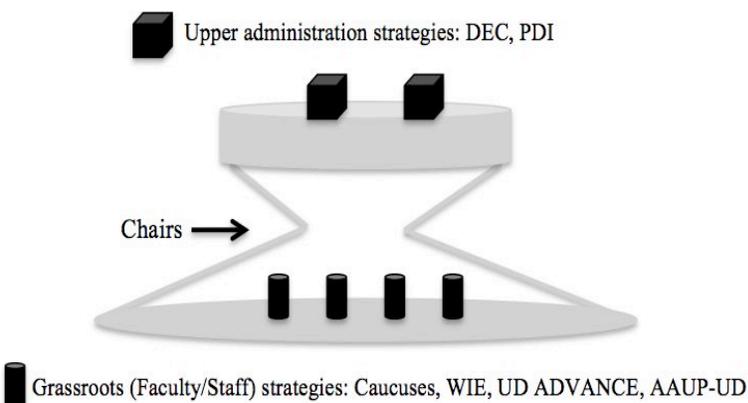


Figure 2 uses cubes to represent efforts of the UD administration to increase faculty diversity and the cylinders represent efforts of faculty (or faculty/staff) groups. Cubes and cylinders are singular entities, with no connection between levels. Initiatives are limited in their effectiveness in part due to this lack of opportunity for cross-fertilization. **Our interventions will build connections through this middle region.** The result will be

more cohesion, better strategic implementation of diversity efforts, and improved climate.

The connections we seek to build can be thought of as ropes spanning the gap between the levels. It is not enough to weave a strong rope -- to make a solid connection we must secure the rope at the top and bottom levels. In a similar fashion, we will use a multi-tiered strategy to build connections. We will “secure the rope” by directing interventions to the upper-administrative (top) and faculty (bottom) levels of the hourglass. We will “weave a strong rope” by working closely to support and mentor department chairs. We choose the department chairs because they sit structurally between the faculty and the upper administration and thus provide a natural conduit for information between the levels. Further, chairs are responsible for interpreting and enacting university and college policies at the department level. Finally, chairs have a large degree of influence over determining the microclimate of a department [1,11]. Therefore, a focus of our interventions will be to facilitate chairs’ understanding of and support for policies and practices that lead to equitable treatment of women faculty. (See our social science research supplement for more details on the role of department chairs and microclimate in determining faculty members’ job satisfaction.)

We enact our multi-tiered strategy through a multi-frame change model set forth by Bolman and Deal [14], which has served as a common framework for ADVANCE IT projects [1,68]. Bolman and Deal’s model employs four perspectives to frame interventions: structural, human resources, political, and symbolic. We choose this particular model for two reasons: 1. It facilitates interventions customized to different levels of the hourglass; and 2. Many faculty and administrators are familiar with the model’s frames because they are already in use at UD (e.g., PDI, Section B2). **Objective 1 aligns with political strategies**, which support leaders (provost, deans, chairs) as change agents (section II-1 below). **Objective 2 aligns human resources strategies**, which support faculty members directly (section II-2 below). **Objective 3 aligns with structural strategies**, which aim to improve policies and organizational structure (section II-3 below). **Objective 4 aligns with symbolic strategies**, which directs proposed methods towards creating a university milieu that fosters (and is capable of sustaining) a climate in which diversity is valued and respected by faculty, administrators, and staff (section II-4 below).

Our proposed methods have also been selected in order to engage UD administrators -- department chairs, deans, and the provost -- because they have implicit and explicit authority to lead efforts toward diversity. So, while we incorporate interventions from each of the four categories, the area where we must work the hardest is the political. For this reason, W2L will reside in the provost’s office. W2L will differ from all other diversity organizations and centers on campus because: 1. It will be targeted at the success of women *faculty* (not students and staff); and 2. It will be directly in the line of leadership between the provost and the deans and chairs.

To construct our interventions we drew from the successes of other ADVANCE IT institutions (e.g., WISELI, Michigan, Maine, RIT, U. Washington). Several of our proposed interventions have been implemented at other institutions (e.g., chair mentoring [19,69,63,102,109], climate surveys [111], faculty exit studies [110], mini-grants [101,105]). However, because “change is unique to each organization” [52], we tailor the interventions to complement our strengths and to meet the needs of our institution.

Existing efforts at UD to support women faculty have focused largely on issues facing women at the early stages of their careers, with little effort devoted to issues specific to women post-tenure or to women faculty of color. To place our new interventions in context, here we provide brief backgrounds on research done on the experiences of post-tenure women faculty and on faculty of color.

Post-Tenure Women: Observed faculty career patterns as described in section II-A are not unique to UD. Other institutions report that women faculty lag behind men in promotion to full professor and, relatedly, to senior leadership positions [8,15,16,22,30,55,62,]. This is true across disciplines, but is magnified in STEM, where women’s representation is below critical mass [62]. Barriers to advancement include: lack of transparency or clarity regarding promotion criteria; isolation and feelings of career dissatisfaction; little to no post-tenure mentoring, career development opportunities, and even funding resources. Furthermore, associate professors are often expected to take on heavier service loads, which research shows disproportionately impacts women relative to men [8,15,16,30,40,55]. Remedies suggested by research include [8,16,30,54,55]: mentoring for associate professors; establishing clear

guidelines for promotion to full professor; providing funding for mid-career research and travel; training and development for mid-career faculty; training chairs and deans to understand the needs of mid-career faculty; raising awareness of the issues that post-tenure faculty face as well as data on years in rank; nominating mid-career faculty for awards; and working to ensure that women are represented on high-prestige committees. UD does not have any programs in place specifically to support mid-career faculty.

Faculty of Color: Underrepresentation of faculty of color, especially women and especially in STEM disciplines, is a national problem [26,61,62,113]. For example, nationally in 2011 2.7% of engineering faculty were Black and 3.7% were Hispanic. The same year women made up 13.8% of *all* engineering faculty, suggesting that the percent women Black or Hispanic engineering faculty was close to zero [113]. These women experience the consequences of being in the minority in two domains: race and gender. According to Hurtado and Figueroa [39,38,31] in 2008 “women of color represent only 2.3% of t/tt faculty despite the fact that they make up 12.5 percent of the U.S. population. ... This structural underrepresentation ... directly affects ... perceptions that others hold of women of color, as well as their own perceptions of the learning and work environment.”

In 1976, Shirley Malcom, Paula Hall, and Janet Brown published their seminal report *The Double Bind: The Price of Being a Minority Woman in Science* on the challenges faced by women of color in STEM fields. While there has been some growth in the number of women of color becoming faculty members, women of color in academia continue to experience many of the same problems that they experienced more than thirty-five years ago – including very low representation, tokenism, implicit (and sometimes explicit) bias, stereotyping, feelings of isolation and a chilly climate [9,32,33,49,50,54,77,83]. As discussed in section II-A, women faculty of color at UD today are no exception.

Research indicates that certain intentional strategies can be successful for recruiting and hiring faculty of color. Such strategies include using inclusive language in job advertisement, debunking myths (e.g., that there aren't any PhDs of color in a field, or if there are they all have multiple job offers), bridge programs, and financial incentives [33,54,56,77]. However, as UD's experience illustrates, *retaining* faculty of color appears to be even more of a challenge. People refer to the “revolving door,” meaning a high turnover rate, of faculty of color [1,57]. Faculty of color, especially women faculty of color, need strong support systems in order to succeed. Recommendations for retention include formal mentoring with training for mentors [3]; departmental accountability for mentors; cultural competency training for existing faculty and staff; regular climate studies; and data collection and interpretation [33,32,54,56,57,77]. In addition to these academic supports, faculty of color, especially at predominantly white institutions, need socio-cultural support and community [56,71].

In the last year we, in partnership with PDI, have brought in several prominent women of color to speak to the UD community, including Dr. Gilda Barabino (Dean of Engineering, City College of NY), Dr. Shirley Malcom (Head, Education and Human Resources, AAAS), Sonia Sotomayor (U.S. Supreme Court Justice), and Dr. Lani Guinier (Bennett Boskey Professor of Law, Harvard University). To follow up on these inspiring visits, we propose three interventions specifically designed to improve recruitment and retention of women faculty of color at UD, especially in STEM fields (1.D, 2.D, and 4.B, below).

III. Activities (Interventions)

Objective 1: Improve departmental microclimates for all women faculty. Hurtado and Figueroa [39] note that “the departmental social climate is a critical factor affecting the experiences of women of color in STEM” and “a supportive work environment can go a long way toward improving the career satisfaction of women of color in academia.” Guided by this and other research that establishes leadership – especially chair – development as an effective means of improving departmental climates [11,12,69,72,102], we will approach objective 1 through the use of Political Strategy Interventions [14] (section D above). We propose the following four methods (A-D) to support leaders as change agents.

1.A “Talking Points” W2L revolves around the ongoing development of customized facts, figures, and best practices – known as “talking points” – that we will research and communicate regularly to the provost, deans, and department chairs. Talking points will be delivered through a variety of means, such as regular briefings with the provost (deans, chairs), workshops, and monthly bookmarks. Some talking

points will be context-specific and detailed. For these we will additionally provide tools such as slides or handouts. For example, to help a dean prepare to charge a search committee, we will collect hiring statistics for the department over the last several years and create a short presentation module suggesting best practices either to sustain a good track record or to recruit more women or faculty of color. Other examples of talking points include best practices for: mentoring faculty of color, leadership development for mid-career faculty, and fair evaluation of faculty job applications or tenure and promotion dossiers. Talking points will encourage communication between faculty and administration, reinforce programmatic messages, and enhance diversity conversations on campus. As such, they comprise a key binding element of our proposal that will connect lower- and upper-level diversity efforts (see Fig. 2).

This intervention will be effective due to two key partnerships. One, the provost (see appended letter) will facilitate our access to relevant information and timetables (e.g., hiring plans for STEM and social sciences departments) and leverage the authority of his office to ensure chair and dean participation. Two, UD's Office of Institutional Research and Effectiveness (OIRE) will provide us timely data sets (see section 3B). Talking points will be developed in consultation with faculty experts from across campus, including those from the Center for the Study of Diversity, the Women's Caucus, the African Heritage Caucus, Latino/Hispanic Heritage Caucus and the Disability Caucus. Content will be integrated into other elements of the program (for example, chair mentoring, see 1.B below). We will publish the talking points on our website as well as in print (see Dissemination, V-E, below).

1.B Chair Mentoring We will provide department chairs in STEM and the social sciences three elements, which together constitute our chair-mentoring program: 1. **annual workshops**, 2. **enhanced talking points**, and 3. **networking structures**. Department chairs receive little formal management training or guidance to advocate for inclusive practices. Moreover, chairs may be teaching on top of maintaining a research program and running a department. Research shows that people are especially prone to taking cognitive shortcuts while multitasking or in a hurry [18,51,103], which disproportionately affects underrepresented groups such as women in STEM and faculty of color. Our chair-mentoring program will minimize this effect, will improve departmental experiences of women faculty of color [39], and will provide an accountability structure for checking in with chairs. We will launch the mentoring program in year 1 with a half-day workshop for chairs, introduced by the provost. The agenda for this workshop will include: (a) the structure of W2L, from the departmental level to the level of the provost, (b) implicit bias: ways that departments unintentionally create an unwelcoming environment for underrepresented groups, and (c) ways that department chairs can design and lead activities that will reduce implicit bias. Trained former and current chairs will conduct the workshop. Workshops will follow in years 2-5, each with a different focus, for example, "effective leadership of diverse faculty" or "developing underrepresented faculty into leaders." Workshops will provide opportunity for chairs to share experiences and learn from each other [12,102]. In the months between workshops we will provide chairs general talking points as described above (1.A) in addition to chair- or department-specific talking points. Finally, we will provide the chairs electronic forums for continued conversation among them, a form of peer mentoring. The ongoing nature of our chair-mentoring program makes it distinct from one-time chair/leadership training workshops offered by other ADVANCE institutions [19,63,102].

1.C Provost Activities: UD's new provost, Domenico Grasso, strongly supports W2L, as indicated in his attached letter of commitment. He will participate in **Provost briefings** and **campus walkabouts**.

In Provost briefings, the W2L co-PIs will meet every other week with Provost Grasso to provide him talking points, updates on the status of women STEM/SS faculty, W2L progress, upcoming W2L activities, and best practices. The co-PIs will craft meeting agendas, each with a different theme to cover many topics over the course of the grant. Themes will coincide with talking points and may include "best practices in recruiting faculty of color," "mentoring faculty of color," "mentoring women to full professor," and "mentoring full professors to senior leadership positions." Expected outcomes include dissemination of key ADVANCE messages to upper-level administration, and connection of our human resources strategy interventions (2.A-D, below) with the interests of the upper administration.

In campus walkabouts (also known as *management by wandering around*, MBWA), Provost Grasso will visit faculty labs and offices and interact with faculty groups to talk informally with them, clarify

their working conditions, and hear their concerns. This activity is designed to bridge the gap between the faculty and the administration [85], to make the UD administration more accessible to faculty, and to provide opportunities for faculty to ask questions or to make confidential suggestions about how to improve the climate for faculty. Although this practice is not often found in universities, its success in business suggests that it would be useful to academic administrators in clarifying faculty concerns [52]. W2L co-PIs will arrange itineraries for the walkabouts, assuring that the provost visits with a variety of faculty, particularly women faculty in STEM/SS departments. Walkabouts will provide Provost Grasso with opportunities to receive, first hand, faculty members' perception of diversity issues so that he can bring their perspectives back to the UD president and relevant policy makers.

1.D Faculty of Color Roundtable In year 1 of the grant we will bring a national panel of distinguished experts to the UD campus for a high-level roundtable discussion with the UD president, provost, and deans on the experiences and needs of women faculty of color. Panelists will share their expertise and experiences and launch an interactive discussion on effective practices to recruit and support faculty of color within the specific culture and climate of UD. The result of the small, focused roundtable will be a series of targeted recommendations to improve the recruitment and retention of women faculty of color at UD. The panel will reconvene in year 3 for the president and provost to report on the current status of faculty of color and progress made. External advisory board members will help organize the panel.

Objective 2: Educate, mentor, and support women STEM/SS faculty, especially women post-tenure and women of color. To propel women faculty into higher ranks and leadership positions requires more than informed and involved administrators. We designed the following Human Resources Strategy [14] interventions in consultation with diverse UD women faculty across disciplines.

2.A Panels We will offer panels twice a year for faculty across ranks. A promotion and tenure (P&T) panel for assistant professors will have newly tenured and selected senior faculty as panelists (with a focus on those who have served on P&T committees). A panel for associate professors (post-tenure) with full professors as panelists will address the uncertainty that associate professors often experience regarding career progression [16]. A panel on leadership opportunities for full professors will have panelists who hold positions such as department chair, dean, or named professor. We will develop materials to accompany each panel to be posted on our website. The panels will be open to men and women, but each panel will include at least 50% STEM women faculty. We plan follow-up luncheons for women who attend the panels to increase mentoring and cohesion among them (decrease isolation). We expect panels to increase retention, P&T rates, women in leadership positions, visibility for women faculty who sit on panels, and sense of community among the faculty.

2.B Mini-Grants Because research shows that women, especially women of color, experience isolation and fewer networking opportunities [56] we will provide mini-grants, on a proposal basis, to encourage mentoring, networking, and research collaborations. Mini-grants will support primarily (a) women post-tenure and (b) women faculty of color at all ranks. Mini-grants may fund, for example: travel to conferences or for collaborative research; participation in external mentoring or faculty-development programs; or new research directions post-tenure. Mini-grants may also be given to STEM/SS departments or groups of faculty wishing to initiate innovative mentoring or networking activities for women [102,106]. Recipients will be required to assess the results of their grant (W2L will help develop assessments) to gauge the effectiveness of the program.

2.C Associate Professor Mentoring A 2012 qualitative study on STEM women faculty at UD [66] revealed a desire among associate professors for formal mentoring, consistent with results of other studies [16]. We will extend our formal mentoring program for assistant professors (see section I) to include associate professors. Chairs will assign associate professors a full-professor mentor, who will be trained, through workshops, to mentor post-tenure faculty. Mentor-training workshops will focus on the unique needs of associate professors, in addition to general best practices for mentoring faculty.

2.D Faculty of Color Mentoring: Because UD has so few senior women faculty of color – and they are likely already to be overburdened with service [38] -- we will establish an allies program to provide mentors who are not faculty of color to STEM/SS women of color junior faculty. We will base our

program on the ADVANCE Implementation Mentors (AIM) Women of Color Allies and Partners Toolkit [3]. We will bring in an expert recommended by AIM to launch the program.

Objective 3: Increase transparency of policies, procedure, and practices that affect faculty careers and enhance institutional data gathering, analysis, and presentation. We approach this objective through the following three (A-C) Structural Strategy [14] interventions.

3.A Enhanced Data Collection Associate Provost John Sawyer, head of OIRE and W2L co-PI, is experienced with “systematic monitoring of indicators” as a practice for enhancing diversity [80]. As Associate Provost, he annually provides faculty-demographic data to the Women’s Caucus, UD-AAUP, and PDI. To synergize his support of these groups with W2L, as well as to provide data including (and beyond) what is required for the annual data reporting to the NSF, he will systemize data collection and reporting. With support from the university, he is currently piloting software that will provide users (e.g., deans, chairs, faculty) advanced analytics and active reports to enable easier comparisons between units. “Dashboards” of key diversity indicators will be accessible via the OIRE website and by smart phone apps. Having current, readily accessible data on diversity and diversity trends on campus presented in easily understandable and consumable formats will support the talking points and campus conversations on the importance, as well as our progress toward accomplishing a diverse campus.

We will also replace the multiple, disparate surveys of the past with a single faculty climate survey, which will centralize results and allow for direct comparison of results over time. We have already adapted a faculty climate survey (with permission) from WISELI [109,112] for use at UD. All faculty will be surveyed every two years, starting in spring 2014, with strong support from the provost to increase participation rate. Results of the climate survey will inform ADVANCE activities, be used in our social science research project, and will help assess our programs.

3.B Policy, Procedure, and Data Review: Selected senior faculty will review university documents and policies (e.g., departmental P&T and workload documents, faculty handbook, the AAUP collective bargaining agreement, family-friendly policies) to screen for unclear or unintentionally discriminatory language or policy. These faculty members will also receive access to data such as faculty salaries, space allocation, or tenure and promotion decisions and review these for fairness, with a particular eye toward equity for tenured women and women of color. The expected outcome is improved transparency and climate. Policy and procedure review is a standard element for ADVANCE-IT programs (41,71,85,98, 100,101]. However, because each institution has its own culture and its own policies and procedures, each must conduct its own review. UD’s unionized status adds a layer of complexity to our policy review, necessitating that we conduct our review in consultation with UD AAUP representatives.

3.C Faculty Exit Study: Exit studies are another way some ADVANCE institutions collect information on climate and faculty needs [12]. After UD’s 2008 and 2009 climate studies, recommendations for increasing faculty diversity were passed down, one of which was to conduct faculty exit interviews (note, this was the only recommendation not already being done in STEM departments). Through this proposal we will survey t/tt faculty who leave the university with the aim to understand factors that influenced their decision. The results will be used to inform future ADVANCE activities as well as institutional policies and practices. Given UD’s huge departure rate among faculty of color, is especially important to learn from their experiences.

Objective 4: Coordinate and draw attention to actions and discussions of diversity around campus. We will approach this objective through two (A-B) Symbolic Strategy interventions [14], which highlight the accomplishments of women faculty in addition to drawing attention to diversity.

4.A Canvassing Committee Research shows that women in STEM win teaching and service awards more than they win research awards, partially because they are not nominated for research awards [47]. To reduce this effect at UD we will assemble a committee of senior faculty to suggest women faculty, especially women faculty of color, be recommended for honors and awards such as named chairs, university or college research awards, or professional society awards.

4.B Faculty Diversity Conference In year 2, we will hold a research conference on “Women Faculty of Color in the Academy.” The purposes of this conference are to raise awareness campus wide, to

participate in a national discussion on the topic, to bring visibility to UD as an institution that values diversity, to highlight women faculty of color, and to provide mentoring and networking opportunities (seeding mentoring relationships among faculty of color at institutions in our region). This conference will be organized in partnership with UD's Center for the Study of Diversity (CSD). The CSD is creating a history of supporting annual national diversity conferences on different topics. This year's conference, "Disability Disclosure in/and Higher Education Conference," was run by UD Assistant Professor of English Stephanie Kerschbaum.

IV. Project Evaluation W2L evaluation has been designed to meet all of NSF's requirements. It aligns with the Joint Committee on Standards for Educational Evaluation (2013) and includes formative and summative components. The evaluation will be conducted by internal and external evaluators who have worked together on this proposed design and have previous experience working together on other evaluation projects. Formative evaluation will be conducted by the Delaware Education R&D Center (DERDC), an independent research center in UD's College of Education and Human Development. Summative evaluation will be conducted by RBS, a regionally based research and evaluation entity.

The primary purpose of the formative evaluation is to assess whether project activities are occurring as planned and whether progress is being made in meeting program objectives. Formative evaluation will provide information to the W2L team to determine if midcourse corrections are needed. Overarching questions to be answered, aligned with the Objectives, include:

- Are the proposed activities to educate and support leaders as change agents occurring as planned (e.g., Provost meetings: Walkabouts; chair/administrator briefings, chair workshops/networking)?
- Are UD women faculty being actively mentored and networked through a variety of forums (e.g., leadership panels, mini-grant (external mentors) program)?
- Are UD hiring, promotion, climate survey, and faculty exit study data being collected, analyzed, and disseminated in ways to shape ADVANCE-relevant policies and inform practices?
- Are relevant and appropriate materials (e.g., talking points, website, visible news items) being developed and shared to draw attention to and support ADVANCE interventions?

To answer the first four questions, the formative evaluators (DERDC) will observe program meetings and events; review relevant program documents; conduct interviews and/or surveys of key W2L program staff, faculty, and administrators. These data when aggregated will provide a comprehensive view of the program's status and progress in moving forward. Periodically, the internal evaluation team will meet with W2L program staff to review evaluation findings so that they can inform ongoing project management and refinement.

The summative evaluation will determine if project goals were achieved. Three primary questions have been identified:

- Did the participation and advancement of women in academic science and engineering careers change over the course of the program?
- Did the patterns of faculty interactions and networks, particularly those of women faculty in STEM, change over the course of the program?
- Did distribution of resources to women and minority women faculty reach equity with male faculty?

The first question will be addressed through longitudinal analyses of UD institutional data on hiring, promotion, retention, and other relevant data. The data will be disaggregated by race and/or ethnicity. Longitudinal analyses of climate surveys and other relevant data also will be conducted to assess changes in attitudes, communication channels, and other supports. The second question will be answered through social network analysis. Administrators and faculty in academic STEM and social science departments will be surveyed at the start of the project to identify existing patterns of interaction and network. A second survey will be conducted midway through the program and then again at the end. Statistical comparisons of the networks over time will be conducted. If W2L is successful, we expect to see

expanded networks among women faculty, regardless of ethnicity, and greater linkages between faculty and staff and upper administration. Changes in the social networks would be indicative of more cohesive and strategic implementation of diversity efforts. The third question will be answered through analysis of resource (including physical space) allocations for research in STEM disciplines.

V. Project Management Grant activities will be based in the UD ADVANCE Provost’s Institute, which will be housed centrally and visibly. The formal leadership structure will include the co-PIs and an executive director, a full-time professional staff member whose job will be to pull together and coordinate activities. Table 4 summarizes co-PI responsibilities with respect to the interventions (by strategy type).

A. Personnel PI Cook is a champion of institutional transformation, which is critical to the success of an ADVANCE IT project [12]. Dr. Cook was a co-PI of and directed UD’s PAID initiative. She has twice received UD’s Trabant award for Women’s Equity (once individually, once as part of the ADVANCE PAID team) as well as the national 2012 WEPAN (Women in Engineering ProActive Network) university change agent award. She has had extensive faculty and administrative involvement having chaired her department (mathematics) and served as associate dean of CA&S and of COE. Dr. Cook will be

Table 4: Co-PI Responsibilities

Strategy Type	Co-PI
Political	Doty, Cook
Human Resources	Doty
Structural	Sawyer
Symbolic	Cook, Andreasen

responsible for the political strategies and co-responsible for the symbolic strategies. She will coordinate all aspects of grant responsibilities with and through the Executive Director, including assuring regular Internal and External Advisory Committee meetings. She will follow up on explicit recommendations made by the two Advisory Committees and by the Evaluators.

Co-PI Andreasen has directed the research for the UD ADVANCE PAID faculty reading group since its inception in 2009 and has been actively involved in implementation of the workshops. Her research has been highly interdisciplinary (with faculty appointments variously in Philosophy, in Women’s Studies, and in Linguistics and Cognitive Science). Her research interests relevant to this grant focus on topics in race and gender in science, e.g., the social construction, or lack thereof, of race; the use of race as a variable in biomedical research; conceptions of sexism; and women and faculty of color in the academic workforce. Dr. Andreasen will lead the research component, will inform the major proposal, and will co-lead Symbolic Strategies with Dr. Cook.

Co-PI Doty has managed UD ADVANCE activities since 2009. Dr. Doty is a continuing non-tenure track faculty member with teaching and service duties in Mechanical Engineering as well as a 50% appointment in the provost’s office. Her role in the provost’s office is to assure faculty input and continuity of programming for women in STEM. Dr. Doty will be responsible for the Human Resource strategies as well as co-responsible with Dr. Cook for the Political Strategies. In this role she will interact directly with the Executive Director.

Co-PI Sawyer is Associate Provost for Institutional Research. Dr. Sawyer is a professor of management whose research is on organizational, work group culture, and team performance in science and technology organizations. Dr. Sawyer’s responsibility to this project will be the Structural Strategies. In particular, through his position he has access to and means to transform data collection at UD. With the input of the co-PIs, he will work to institutionalize and systematize regular reporting of data in appealing formats to all stakeholders; to administer and summarize key findings of the climate survey; and to work with Dr. Cook on equity in salaries, space, start-ups and other resources among the faculty. Dr. Sawyer will also work with the internal and external evaluators to provide them data as needed.

Dr. Asia Friedman, assistant professor of sociology, in conjunction with Dr. Andreasen, will conduct the social science research study (see supplement for details). Dr. Friedman is a mixed-methods sociologist whose research specializations relate to gender and disability.

Research personnel will gain IRB approval for each data collection stage prior to data collection.

B. Advisory Committees: W2L will be guided by an Internal, and an External, Advisory Committee. **The Internal Advisory Committee (IAC)**, chaired by Provost Grasso, will include the following strong advocates for change to increase the diversity in the UD faculty: Nancy Targett, PhD (Dean, CEOE); Tunde Ogunnaike, PhD (Dean COE); James Jones, PhD (Director, Center for the Study of Diversity; CA&S, SS faculty); Carla Guerron-Montero, PhD (CA&S, SS faculty); Nii Attah-Okine, PhD (COE faculty; co-chair of the African Heritage Caucus); Janine Sherrier, PhD (Deputy Dean and CA&NR faculty), and Charles Riordan, PhD (Vice Provost for Research, CA&S, NS faculty). IAC members of color are Drs. Jones, Guerron-Montero, Attah-Okine, and Ogunnaike. IAC members who are UD administrators are: Drs. Targett, Ogunnaike, and Sherrier. A former chair of UD Chemistry and UD ADVANCE core faculty, Dr. Riordan understands the complexities, and need for mentoring, of chairs. **The External Advisory Committee (EAC).** Members of our EAC are dedicated to increase diversity at all faculty and administration levels. Eric Kaler, PhD (President, U. Minnesota) has agreed to serve as Chair. The following committee members have agreed to serve: Molly Carnes, MD (U. Wisconsin-Madison); Havidan Rodriguez, PhD (Provost, U. Texas Pan American); Margaret Bailey, PhD (Rochester Institute of Technology); Gilda Barabino, PhD (Dean of Engineering, City College of New York); Melissa Thomas-Hunt, PhD (U. Virginia); Jan Rinehart (Northeastern U.); Milika Jeffries-EL, PhD (Iowa State U.). EAC members of color are Drs. Rodriguez, Barabino, Thomas-Hunt, and Jeffries-EL.

C. Institutional Commitment and Sustainability: We position W2L in the provost’s office strategically. Our proposed interventions will affect faculty in all colleges. Therefore, it is crucial to locate our efforts centrally and under the authority of the provost. This top-down approach to change “...has the benefit of legitimating the change and creating enforceable rules for persons who resist change” [27]. Provost Grasso has committed to continue to “support the activities related to this grant, if awarded, after termination of the grant” (see appended letter of commitment). Further, educating the chairs on diversity, unconscious bias, and equity -- and then creating chair networking structures and opportunities -- will result in programs and an institutional climate that are not dependent on a single leader. As such, leadership turnover will not disintegrate programs or disrupt climate. We are also institutionalizing effective, enhanced data gathering and presentation. The administering of a single faculty climate survey, to be completed every two years, will institutionalize and enable data comparisons. Finally, the provost’s office has committed to continuation of a Faculty Associate to the Provost position with the intent of assuring ADVANCE continues. As indicated in section I we have been effective in COE, through the authority of our PAID grant, in bringing in \$2.5 million in funding for women faculty programming (two junior named professorships, WIE endowment). UD Development is committed to continuing to work with us to ensure funding for continued and enhanced university-wide ADVANCE programming.

D. Timeline

Table 5: Timeline of W2L activities

Year	2014				2015				2016				2017				2018				2019			
Quarter	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
Project Activity																								
NSF Site Visit																								
Quarterly Project Reports		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Internal Evaluator Report			x				x					x					x					x		
External Evaluator Visit and Report				x				x				x					x					x		
Annual Report to NSF					x				x				x				x				x			
External Advisory Board Meetings				x				x				x				x				x				
Internal Advisory Board Meetings	x				x			x			x			x			x			x				
Faculty Climate Surveys	(x)							x									x							
Survey analysis (social science study)								x	x															
Interviews (social science study)													x	x										
Interview analysis (social science study)																	x	x	x					

Interventions																				
Panels			x	x			x	x			x	x					x	x		
Policy & Procedure Review				x																
Faculty of Color Roundtable					x							x								
Women Faculty of Color Conference												x								

Most W2L interventions and data collection/analysis will be performed on an ongoing basis, including: talking points, provost activities, chair mentoring, mini-grants, associate professor mentoring, faculty of color mentoring, institutional diversity data collection, faculty exit studies, resource equity data collection and analysis, and intervention formative responses. Other activities are in Table 5, above.

E. Dissemination A pillar of our project is the dissemination of information both internal to UD (to inform the faculty and to facilitate the mentoring of the leadership as change agents) and external to UD. We will partner with the UD Office of Communications and Marketing (OCM), who will support all aspects of this dissemination. Outlets and deliverables will range from traditional print materials (“talking points,” brochures) to an active and strong website presence, to social media outlets, and to professional meetings and publications.

We will assure a strong web presence through a professionally designed website, which will include creative platforms such as animated video shorts. We will create an e-newsletter, for public distribution, that will feature W2L stories (e.g., information on awarding of the mini-grants, on survey results) and information and updates on W2L activities. When appropriate, we will share information on UDaily, the University’s electronic news service with over 30,000 internal and external subscribers. We will utilize social media platforms such as Twitter, Facebook, LinkedIn and YouTube to promote information sharing among participants and externally. These electronic outlets will build awareness for the next generation and will enable our alumni network to contribute (as speakers, mentors, and in gifts, to the W2L activities). OCM will regularly monitor website metrics, as well as social media using tools such as Google Analytics and Hootsuite.

W2L members will give posters and presentations, and organize panels and/or trainings, at both local and national professional meetings such as: the NSF ADVANCE annual meeting, the Society of Women Engineers (SWE), Women in Engineering Programs and Advocates Network (WEPAN), Society for Industrial and Applied Mathematics meetings, American Physical Society (APS), American Association for the Advancement of Science (AAAS) and American Women in Science (AWIS), meetings. Co-PIs have connections to and have presented at these venues. Best practices in data gathering, reporting, and comparison statistics, will be disseminated through the Association for Institutional Research (AIR). The reported research from our proposed workshop on “Women Faculty of Color in the Academy” is a key example of a dissemination opportunity for UD and for other institutions. Key findings of that conference, of our social science research project, and of the W2L program will be submitted to academic journals.

VI. Broader Impacts and Intellectual Merit

A. Broader Impacts This NSF ADVANCE IT proposal (like the NSF ADVANCE program) is part of a national initiative to enhance the STEM workforce and STEM training through broadening participation. In particular, the project is aimed at diversifying the STEM faculty. We identify best practices for recruiting, retaining, and mentoring to leadership women STEM faculty, including those of color. A diverse faculty that represents the population will provide role models and mentors as encouragement to a diverse student body. Our partnership with OCM to promote and disseminate our work will extend the reach of our work – as well as increase the visibility of STEM/SS women and women of color -- to the more general population, e.g., UD alumni, their children; graduate and undergraduate students; and to external news outlets to the broader (high school) audience.

B. Intellectual Merit The intellectual merit of this proposal is particularly in its potential to advance knowledge regarding identifying and institutionalizing best practices in faculty development and progress along the path to academic leadership. More precisely, the outcome will lend understanding to the need

for, and the success of, specific interventions and mechanisms to enhance the progress of STEM/SS women faculty to leadership. The result will contribute to the knowledge of new paradigms for other institutions. The social science research will particularly support the intellectual merit in informing the research community on the varied paths and perceptions of women versus men faculty, and those paths of import to women faculty of color, as contributors to their job satisfaction and success.

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