# Reimagining Seed Grants for the 21st Century: Individual and Institutional Impacts of a Mini-Grants Program

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#### Abstract

The Connect Grants initiative is an innovative mini-grants program that promotes faculty leadership and career development while enhancing the university's scholarship environment and infrastructure. Launched in 2014 as part of a National Science Foundation (NSF) ADVANCE Institutional Transformation (IT) effort, the initiative is designed to broaden faculty opportunities and support creative department-level efforts to guide faculty through career stages. Due to its successes, the program has been institutionalized. Through Bolman and Deal's (2017) organizational lens, this paper describes the motivation for creating the program, its design, evolution, and evaluation. Findings indicate that the program supports individual awardees by expanding networks, building critical skills, and promoting scholarship, while also influencing institutional policies and practices. In contrast to some other inclusivity initiatives, the Connect Grants program targets institutional structures rather than focusing solely on individual skillsets and deficiencies. This provides an opportunity for reimagining seed funding and realizing both individual and institutional impacts.

*Keywords*: professional development, research infrastructure, academic environment, women faculty, mini-grants, STEM faculty, faculty development

# Reimagining Seed Grants for the 21st Century: Individual and Institutional Impacts of a Mini-Grants Program

Small, internal grants in academia, often called "seed funding," are recognized as a way to invigorate faculty research, providing funds to purchase equipment, hire research assistants, or travel to present research results. Seed funding can ultimately enhance a faculty member's success in securing external funding, an important element in a tenure or promotion dossier, as it provides evidence of research excellence (Davis et al., 2020). It is less recognized that seed funding can mitigate disparities in resources or access to resources, particularly in universities that are seeking R1 status. Benefits of seed funding within the context of faculty equity include the symbolic value of such grants, support for collaboration and mentoring, faculty and leadership appreciation for provided opportunities, and emotional benefits from feeling valued and recognized (Laursen & Austin, 2020). The Connect Grants program differs from traditional seed funding often centered on data collection efforts to position the researcher for a larger future project; awarded Connect grants aim to impact the culture and environment where faculty are advancing their scholarship.

This program is one of several initiatives that were developed as part of a large-scale, university-wide institutional transformation (IT) effort funded through the National Science Foundation (NSF) ADVANCE program (#1209115) at a large private university. The goal of the IT effort is to increase the representation and advancement of women faculty at Rochester Institute of Technology (RIT) by creating new interventions and resources and also by removing barriers to resources that support career success, including cultural barriers. The work of the grant, which began in 2012 and continues today as a unit within the Office of the Provost, influences long-term changes that transform the university's culture, promote inclusion, and

expand the representation of women faculty and leaders through a portfolio of interventions. The IT grant objectives are four-fold:

- Refine and strengthen targeted institutional structures.
- Improve the quality of women faculty's work life.
- Align institutional, administrative, and informal systems of power and resources to support and sustain progress towards the project goal.
- Enhance the working environment, and support career advancement for women faculty.

This paper describes a mini-grants program for pre-tenure and tenured faculty that was created to advance the grant's objectives. We integrate findings from multiple data sources, including program evaluation, proposer and awarded project characteristics, and objective faculty data, supplemented by reflections from the project researchers to assess the impact of the Connect Grants program on individuals and the institution.

The NSF ADVANCE-funded work at our large, private university began in 2008 with a three-year-long self-study grant awarded through the NSF ADVANCE IT-Catalyst program (#0811076) and continued in 2012 through an IT grant. Both funded efforts have supported the goal of increasing the representation and advancement of women faculty at our university. Our self-study findings began our journey to transform the university. The Connect Grants effort is a visible and important initiative that supports the IT effort. The program was developed and launched to offer modest levels of funding (average award \$5.7K) to impact individual faculty career success while creating an important new institutional practice that improves the quality of faculty's work life and aligns various systems of power and resources. By addressing these systems, institutional structures are targeted to support and sustain progress towards the IT

project goals. This shifts the focus away from solely addressing individual faculty deficiencies (as is sometimes the case with diversity programs) toward correcting structures that potentially perpetuate inequalities and create barriers for advancing minoritized faculty. In this manner, the emphasis moves from encouraging individual faculty conformity toward changing the environment by removing barriers in order to become more inclusive (Griffin, 2019).

## **Limitations of the Study**

Although our funded IT grant began to recognize women's experiences as they are impacted by intersections of gender, race/ethnicity, and hearing status, the intersectionality analyses could be more in-depth and explicit. While this type of intersectionality analysis is critical for understanding and generating knowledge, the broader scope of the program focuses on women as a whole as a minoritized group within the science, technology, engineering, and math (STEM) or social behavioral science (SBS) domains and across the University. In addition, much has changed since we began our self-study in 2008 in regards to understanding that gender and sex are distinct and that a multidimensional spectrum exists for gender, rather than a discrete binary classification. In this paper, when the terms "woman/women" or "man/men" are used, this indicates those who identify as these gender identities.

## **Background**

Despite decades of research and efforts to increase the number of women earning doctorates and securing faculty jobs in STEM fields, women remain underrepresented (Laursen & Austin, 2020). Increases in the number of women completing bachelor's degrees and continuing on to earn doctoral degrees in STEM fields over the past several decades have not led to a corresponding increase in their representation in faculty ranks (Hill et al., 2010). Over 50% of doctorates since 2006 have been earned by women overall. However, women earn only 23.5%

of doctorates in engineering, 20.1% in computer science, 19.3% in the physical sciences, and 28.5% in mathematics/statistics (Casad et al., 2021). They continue to be underrepresented in tenured faculty positions, especially in STEM, and overrepresented in non-tenured faculty positions (Taylor et al., 2017). Women faculty experience challenges associated with biased promotion and selection processes (Laursen & Austin, 2020), lack of adequate mentoring and sponsorship (De Welde & Laursen, 2011), and work-life challenges, among other issues (Allen & Eby, 2004; Bailey et al., 2011; National Academy of Sciences, 2007; Suitor et al., 2001).

Women of color represent only 5% of all science and engineering doctorates (National Science Foundation, 2019) and face many barriers that lead to their underrepresentation of women in STEM faculty positions. Barriers for women of color STEM faculty include fewer opportunities for collaborative research, feelings of isolation, and being laden with a disproportionate amount of university service (Corneille et al., 2019). In addition, women of color cope with micro and macro-aggressions and biases in evaluation processes, most notably tenure and promotion (Hall et al., 2012; Jones et al., 2015). Many studies have shown that d/Deaf and hard-of-hearing (DHH) <sup>1 2</sup> faculty professionals are excluded from spontaneous and informal conversations, leading to marginalization and isolation (Bristoll & Dickinson, 2015; Foster & MacLeod, 2003; Punch et al., 2007; Stapleton, 2015; Trowler & Turner, 2002). Schley et al. (2019) detail a story of pushback that DHH women faculty experienced when implementing a series of professional development opportunities focused on their own needs.

<sup>&</sup>lt;sup>1</sup> Lowercase deaf refers to the audiological condition of not hearing; uppercase Deaf to a particular group of deaf people who share a language (American Sign Language) and a culture (Padden & Humphries, 1988). The term 'hard-of-hearing' includes people with mild-to-moderate hearing loss and deaf persons who don't have/want cultural affiliation with the Deaf community (*Deaf Life*, 1997).

<sup>&</sup>lt;sup>2</sup> While 'people-first' language, e.g., 'individuals who are DHH,' is stressed by many advocates, terms like 'DHH academic' are considered acceptable because deafness is viewed as part of one's identity in the Deaf community (Burke & Nicodemus, 2013; Najarian, 2008; Smith, 2013).

To address these issues, NSF ADVANCE IT grantees "develop systemic approaches to increase the participation and advancement of women in academic STEM careers" (National Science Foundation). As of fall 2018, the NSF has invested \$315 million in ADVANCE projects and awarded over 70 IT grants (DeAro et al., 2019). Activities of ADVANCE-funded projects include mentoring programs, professional development workshops, work to promote equity in academic workplace policies and procedures, and workshops to support the creation of a more inclusive climate and culture for women faculty (DeAro et al., 2019; Yen et al., 2019).

The Connect Grants program is one component of our IT project and the rationale for offering the mini-grants was based on the results of a faculty climate survey and a literature review as part of our previously conducted NSF ADVANCE-funded self-study (Bailey et al., 2012). The self-study identified career advancement barriers for current women faculty, especially in the areas of workplace climate, career navigation, and flexibility in work-life management balance (Bailey, Baum et al., 2012; Bailey, Marchetti et al., 2011). The climate survey examined gender from a binary perspective (man/woman). However, as the project evolved, all gender identities were considered. With a response rate of 71%, the climate survey identified barriers consistent with those found in the literature. These included career navigation issues due to a tendency of women to have weaker self-agency and negotiation skills (Ibarra & Silva, 2010; List & Sorcinelli, 2018) and women's lack of sponsorship from senior faculty and administrators (De Welde & Laursen, 2011; Ibarra, 1993; Ibarra & Silva, 2010; Nolan et al., 2008; To Recruit and Advance: Women Students and Faculty in U.S. Science and Engineering, 2006). Together, these issues impact the ability of women faculty to secure favorable start-up packages, compensation, promotions, and workload assignments (Judge, 2004; Sege et al., 2015). Women value connectedness, support, and interpersonal relationships (Allen & Eby,

2004; Archie et al., 2015; Bilimoria et al., 2005; Rosser & Lane, 2002) which can increase feelings of isolation or marginalization where connectedness does not exist (National Academy of Sciences, 2007a; Preston, 2003; Rosser & Lane, 2002). Other barriers include experiences of subtle to open biases (Allen et al., 2006; Carnes et al., 2005; Dey et al., 1996; Marschke et al., 2007; National Academy of Sciences, 2007; Steinpreis et al., 1999) and a need for credibility and respect (Foschi 1996; Rosser & Lane, 2002; Shackelford et al., 1996).

In *Building Equity in the Academy*, Laursen & Austin (2020) outline the benefits of offering small grant programs in the context of ADVANCE IT projects. These benefits center on advancing individuals and include the potential for larger externally funded projects, their symbolic value, support for collaboration and mentoring, appreciation from faculty and leadership for the opportunities provided, and emotional benefits from feeling valued and recognized.

#### Bolman & Deal Four Frames Approach

Results from the campus self-study informed the creation of a detailed IT strategy that adopted a multi-frame organizational analysis approach in order to reframe and improve the understanding of the organization as well as the portfolio of interventions included in the strategy. In their book *Reframing Organizations: Artistry, Choice, and Leadership*, Bolman & Deal (2017) offer four frames or lenses through which individuals experience and view their organizations: Structural, Human Resources, Political, and Symbolic. This approach integrates several aspects of organizational theory and suggests the use of each as a frame for viewing the organization. These frames can also inform the strategic approaches created to change the organization (Austin et al., 2011). For example, the human resources frame can focus on improving the quality of work-life for women faculty while the structural frame refines target

institutional structures and practices. The political frame aligns institutional, administrative, and informal systems of power and resources to support and sustain progress, and the symbolic frame enhances the working environment and supports career advancement for women faculty using symbolic measures that emphasize issues of meaning (e.g., the importance of inclusion).

This IT project was designed to make progress in all four Bolman & Deal frames in order to influence long-term changes that will transform the culture, promote inclusion, and expand the representation of women on campus and among leadership (Mason et al., 2014a). Our project team used this multi-frame approach to improve understanding of the organization and to create a transformational strategy that employs all four of the cognitive frames. The team also used the frames extensively while executing the transformational change strategy, in improving the team's ability to identify and successfully navigate barriers and roadblocks during the transformation process, and throughout the project's evaluation and refinement processes. Table 1 describes how the frames were adapted and used during the development and evaluation of the Connect Grant program.

 Table 1

 Adapting Bolman & Deal Frames for Evaluation of Connect Grants Program

Frame	Frame description with Connect Grant program adaptation
Human	Fund mini grants within our university to improve the quality of faculty work
resource	life, professional development, and reward structures, especially for women.
Structural	Through grant funding, refine and strengthen targeted institutional structures
	and install practices promoting representation and advancement of women
	faculty.
Political	Through offering grant funds, align institutional, administrative, and informal
	systems of power and resources to support and sustain progress by shaping the

	political frameworks that impact the representation and advancement of women
	faculty.
Symbolic	Grant-funded activities enhance the working environment and support career
	development for faculty women using symbolic measures that emphasize issues
	of meaning within the organization.

*Note*. The table is adapted from Bolman and Deal's (2017) overview of the four-frame model, as presented in Reframing Organizations: Artistry, Choice, and Leadership (p. 20). Table entries describe aspects of the Connect Grant program within each frame which were used during the evaluation of the grant program.

#### Evolution of the Conceptual Design and Implementation of the Connect Grants Program

The Connect Grants program encourages mentoring, networking, leadership and career development, and research collaboration while enhancing the university's scholarship environment and infrastructure. The grant program design was modeled after the NSF grant proposal process using three key components: a data-driven rationale, a structured Request for Proposals (RFP), and a systematic review process. Throughout the years of the IT grant, the university progressed toward a more research-focused faculty and culture, and this is reflected in the evolution of the grant program specific to the conceptual design and implementation aspects.

**Data-Driven Rationale.** When the grant program was designed in the 2013 academic year, it was important to use key data sources as a rationale to underscore the need for grants to support women faculty across the university. A data-driven approach provided a compelling narrative and demonstrated to the campus community the need to support leadership and career development resources for women faculty at RIT. For this reason, a rationale document was initially presented within the RFP and supported by an annual faculty data report which was

updated and used through the 2019 offering. The data report includes insights gained during focus groups with RIT women African American, Latin American, and Native American (AALANA) and DHH faculty regarding their lived experiences while on the faculty. Patterns of AALANA faculty representation, advancement, and departures are also described. Updating the rationale and supporting annual data report to reflect current and longitudinal NSF Indicator Data ensured that the framework for the grants remained relevant (Frehill et al., 2005). A university-wide Faculty Mentoring Survey, the COACHE RIT Faculty Job Satisfaction Survey (The Collaborative on Academic Careers in Higher Education, 2022), and NSF Indicator Data served as primary data sources for the detailed rationale. Appendix A includes a past Connect Grant RFP with rationale.

The 2012 Faculty Mentoring Survey provided an initial data source for designing the grants program (Faculty Career Development Service, 2015). A limitation of this early survey is that race/ethnicity data was not captured in the survey. Results from the survey demonstrated that more women than men reported having a mentor at RIT (83% of women compared with 76% of men), yet fewer women reported being encouraged by their mentor to submit a grant proposal (32% of women compared to 41% of men). This finding was further supported by the 2013 COACHE survey where women reported placing more importance on mentoring than men with medium effect size, specifically around having mentors within the department, outside the department, and outside the institution. This was further confirmed with qualitative responses to the climate survey identifying the critical importance of high-quality mentoring with well-aligned research faculty mentors. For example, one respondent offered, "In case of new faculty that are research-oriented, we need strong research mentors, people that have successful research programs with a good research group. I think the biggest challenge is to identify the individuals

that fulfill these requirements and can serve as mentors." Together, this data indicated that faculty mentoring in regards to career networking and advancement as well as research collaboration was an area of importance to women faculty and also an area where the additional positive impact could be attained around career leadership, development, and advancement.

Regarding career navigation, the 2013 COACHE survey revealed that pre-tenure women gave lower mean ratings on several items related to the tenure process including clarity of the tenure process, tenure criteria, body of evidence for deciding tenure, and performance-based tenure decisions. Women also rated time spent on research and satisfaction with laboratory, research, and studio space as lower. The 2010 NSF Indicator Data further demonstrated challenges around the career advancement of women faculty in regards to rank progression, leadership roles obtained, and access to resources through start-up package and compensation analyses. The following are significant findings based on the objective data review and climate survey results leading up to 2011:

- On average, men were more satisfied than women with their distribution of time, overall research/scholarship, long-range career map/plan, and position overall.
   With respect to their time distribution at work, 50% of women respondents were dissatisfied compared to 32% of men. Professors were more satisfied than assistant professors and STEM faculty less satisfied than non-STEM faculty. Of all ethnic categories among faculty, the AALANA group was the least satisfied with the overall scholarship/research dimension of their careers.
- 2. Although promotion and tenure (P/T) rates did not differ statistically by gender, women considered delaying P/T at higher levels than men with the highest levels

- reported by AALANA women (56%). AALANA faculty were the least comfortable asking questions about P/T.
- 3. Regarding work/life balance, more women faculty agreed that their career had been slowed by personal responsibilities (50% of women compared to 23% of men) and that they often gave up personal activities for professional responsibilities (66% of women compared to 47% of men).
- 4. Overall tenure-track faculty data for 2002-2009 reveal higher levels of attrition for women faculty than men. As of October 2010, 28% of the 87 women faculty hired had left RIT compared with 14% of the 174 men faculty hired. Similarly, the attrition rate for hired AALANA faculty was 27%, considerably higher than the 17% for non-AALANA faculty.

In addition, the representation of tenured women faculty at this time was low. In 2010, women represented 42% of assistant professors but just 33% of associate professors and 20% of full professors across campus. This suggested that an opportunity area existed around women's career navigation and advancement and provided a rationale for presenting the Connect Grants program to the university community.

The rationale document's supporting annual faculty data report was eventually dropped from the RFP process in favor of streamlining the amount of information and number of documents presented to the faculty community and the applicants because a general awareness around gender inequity issues was embraced by the faculty. However, the data-driven rationale document provided the university community with a critical set of data that informed the sense of initial need and urgency for the grant program.

The Request for Proposals. Modeled after the NSF grant proposal process, the RFP initially offered two distinct funding tracks: a faculty/faculty group track and a department track. The faculty/faculty group track was designed to broaden faculty opportunities and enhance plans of work associated with tenure and promotion preparation and overall career advancement. The department track supported creative department-level efforts to guide and manage faculty through various career stages and project-oriented work facilitating institutional transformation (RIT Advance Connect Grant Request for Proposal, 2014). Appendix A includes a past Connect Grant RFP with rationale. All tenured and pre-tenure RIT faculty, department heads, chairs, and academic unit directors were eligible to apply. Applicants were required to support their proposals with the program rationale as well as describe how the project would advance their career, develop their leadership skills, and professional development goals. Faculty were also required to identify a mentor as part of their work (faculty/faculty group grants only). While applicants in more recent years are still required to identify a mentor and align with the overarching RIT Advance goals and objectives, the RFP has shifted from the two-track model to a process focusing on special interest areas such as projects involving international collaborations for research both internal (global campuses) and external to the university and redirecting or restarting research disrupted by the COVID-19 pandemic. This shift away from funding department-level efforts through the Connect Grant program reflects the evolution of the university toward a culture where faculty career development is more broadly integrated into the annual workload modeling for all faculty, resulting in less need for specifically addressing it outside of that process.

**The Review Process.** In continuing to model the NSF grant process, Connect grant proposals are reviewed annually by a cross-divisional committee of experts that includes faculty

from a wide spectrum of disciplines and administrators from units including Diversity, Equity and Inclusion, Office of Academic Affairs, and Office of Research. Each committee member is acquainted with the RFP and reads the individual proposals. To reduce implicit bias in the review process (Mason et al., 2014b), a template was designed to serve as a structure for defined criteria used by reviewers to examine the same criteria across proposals. After the committee members read and rate the proposals, the committee meets as a whole for a discussion guided by the program leadership. Funding recommendations are presented by the co-chairs of the review committee to the University ADVANCE Director and written feedback is offered to the grant authors. Upon request, discussions occur between the co-chairs of the review committee and proposal authors regarding proposal review feedback.

#### **Connect Grant Submissions and Awards**

Characteristics of the proposals and awards made during the Connect Grants program present a context for considering the outcomes of the program. In this section, we examine the applicants and awardees by faculty rank, gender, and domain (STEM, SBS, or other).

## **Proposals and Proposers**

Since the 2014-2015 academic year, eight rounds of the Connect Grants effort have been administered. A total of 141 proposals were received (see Table 2), with 91% led by women faculty. Among the lead proposers, 49% held assistant professor rank, 33% associate professor, and 16% professor.

**Table 2**Lead Proposer Characteristics 2014-2020

Gender	Count	Percent	Rank	Count	Percent
Woman	128	90.8%	Assistant Professor	69	48.9%
Man	12	8.5%	Associate Professor	47	33.3%
Unknown	1	0.7%	Professor	23	16.3%
			Lecturer	1	0.7%
			Unknown	1	0.7%
Total	141	100%	Total	141	100%

*Note*. Assistant Professor, Associate Professor and Professor are tenure-track ranks; Lecturer is a non-tenure-track position. The first three columns of Table 2 include a gender breakdown of the Connect Grant lead proposers from 2014-2020; the next three columns include a breakdown by rank/position for this same group over the same time period.

### **Awarded Projects**

From 2014 to 2020, 72 Connect grants were awarded to 54 different PIs, representing a funding rate of 51% (see Table 3). The lead proposers for the awarded projects were almost exclusively women and were most likely to be assistant professors (46%) although over half of the awards were presented to tenured faculty (see Table 4). AALANA faculty were well-represented among awardees with 13% of PIs and 17% of co-PIs identifying as AALANA. AALANA faculty representation in tenure-track faculty positions at RIT averaged 10.2% from 2013-to 2021. Grants varied in size from \$1,000 to \$13,500, with a total disbursement of \$396,311 since the inception of the Connect Grants program (see Table 5). All of RIT's ten colleges have had Connect grant awardees: 42 grants went to STEM fields, 14 went to SBS

fields, and 16 went to other fields including film and animation, philosophy, and communications. In total, 110 unique tenured and pre-tenured faculty members have been involved in these grants (as PIs or co-PIs) and had the opportunity to benefit from them, and some faculty have been involved in more than one Connect grant. With a total approximate university faculty (tenured and pre-tenure) of 750 over this time period, results indicate that about 15% of faculty members have been directly engaged in the Connect Grants program.

**Table 3**Percentage of Grants Awarded 2014-2020

Academic Year	Proposals Submitted	Proposals Awarded	% Awarded
2013-2014	23	8	35%
2014-2015	13	11	85%
2015-2016	18	11	61%
2016-2017	18	14	78%
2017-2018	15	6	40%
2018-2019	19	8	42%
2019-2020	19	5	26%
2020-2021	16	9	56%
Total	141	72	51%

*Note*. Table 3 lists the proposals submitted and awarded in the academic years shown; the final column is the percentage of submitted proposals which were awarded in that academic year. Proposals were submitted and grants awarded once each academic year.

Table 4

PI (Awardee) Characteristics 2014-2020

Gender	Count	Percent	Rank	Count	Percent
Woman	69	95.8%	Assistant Professor	33	45.8%
Man	3	4.2%	Associate Professor	27	37.5%
			Professor	12	16.7%
Total	72	100%	Total	72	100%

*Note*. Assistant Professor, Associate Professor and Professor are tenure-track ranks. The first three columns of Table 4 include a gender breakdown of the Connect Grant awardees from 2014-2020; the next three columns include a breakdown by rank for this same group over the same time period.

**Table 5**Summary of Awarded Dollars per Proposal 2014 - 2020

	N	Standard Mean Deviation Minimum			25th 75th imum Percentile Median Percentile			Maximum
Γ	72	\$5504	\$2833	\$1000	\$3109	\$4928	\$7657	\$13500

Note. Amounts are in U.S. dollars.

# Scope, Activities, and Outcomes of the Awarded Projects

Examination of the scope, activities, and targeted outcomes of the awarded Connect Grant projects across the duration of the program provides some insight into the faculty culture at the university. Project descriptions from the proposals of the awarded projects were coded using a thematic analysis approach (Table 6). The first emergent theme centered on the scope of the project. A 'personal' scope identified projects that centered on an individual faculty member.

A 'within institute' theme identified projects that benefited the department, college, or university. The 'beyond the institute' theme identified projects focusing on the discipline or national efforts. Sub-themes were also coded across scope themes as 'strategy' and identified specific activities that were part of the project. Finally, the primary targeted outcomes for each project were coded. Some projects targeted additional outcomes (beyond the primary ones identified). Examples of such projects are included in the case studies described later in this paper.

For 37 of the grants awarded (Table 6), the scope of the project was at an individual faculty level, 26 projects had a scope aimed at a group within the institution, and nine projects had a scope beyond the institution. The projects with individual faculty scope used the strategy of individual career support. Among the remaining projects, affinity groups were the strategy used most often, followed by mentoring, and creating opportunities for engagement through meetings. One project used interviews to document lived experiences, one aimed at creating allies, and one focused on measuring gender inequity. The most common primary targeted outcomes for the projects were building networks, skills, visibility, and discipline-based scholarship. Other primary targeted outcomes were organization building, external funding, organizational development, leadership development, and awareness of differences by gender.

**Table 6**Awarded Project Themes 2014-2020

Scope	Level	Count	Percent	Strategy	Count	Percent
Personal	Individual	37	51%	Career support	37	51%
	Department	6	8%	Affinity group	18	25%
Within Institute	College	12	17%	Mentoring	7	10%
	Institute	8	11%	Meet & engage	7	10%
Beyond Institute	Discipline	8	11%	Allies	1	1%
	National	1	1%	Interviews	1	1%

Total	72	100%	Measurement	1	1%
			Total	72	100%
Primary Targeted Out	Count	Percent			
Network/skill/visibility	building		•	28	39%
Discipline-based schola	rship			24	33%
Organization building				10	14%
External funding				4	6%
Organizational develop	ment			3	4%
Leadership developmen	t			2	3%
Awareness of gender di	1	1%			
Total				72	100

## **Program Evaluation Identifies Impact**

In 2016, a formal evaluation of the Connect Grants program was commenced by the Center for Evaluation & Research for STEM Equity (CERSE) at the University of Washington (UW). UW CERSE analyzed grantee report data from the 2014 and 2015 cohorts, focus group interviews with 2014 and 2015 awardees, internal RIT Advance documents, and quantitative program data across five cycles of Connect grants (2014, 2015, 2016, 2017, and 2018). This paper reports on the 12 confidential, hour-long focus group interviews with 19 people, representing 13 Connect Grant awards from these early cohorts (and 68% of the awards given during this period). The interview protocol asked former Connect grant awardees about their experiences with the grants, the process of applying, experiences during the award duration, and longer-term outcomes and impacts. Participant data were coded in a qualitative software coding program to quantify and make sense of prominent themes that emerged. We used these interviews to provide a few case studies of individual impacts and include representative quotes from the thematic analysis.

## **Findings**

Findings are based on the 2018 program evaluation report (Litzler et al., 2019), the data on proposals and awards across the duration of the program, and institutional practices that have emerged during this time frame. Based on this evaluation of the program, the RIT Advance Connect Grant program has shown strong impacts for the individual grantees of the program as well as the broader RIT community. The evaluation found that due to the program's unique design which funds efforts that vary significantly in aim, the mini-grants program primarily fell within the Human Resource frame with important aspects of the other three frames (see Table 1). The individual impacts were primarily focused on the Human Resources and Symbolic frames while the institutional impacts were primarily in the Structural frame.

### **Impact on Individuals**

Individual (Human Resources and Symbolic) impacts of the Connect Grants program relate to improving women's work life, professional development, career advancement, and improving the working environment. In particular, Connect grantees strengthened internal and external networks which led to career advancement, benefitted from mentoring relationships as mentors and mentees, built skills (including leadership skills) to support their professional development, and increased their research autonomy and project visibility. Related to the Symbolic objective, grantees increased their confidence in disseminating and being experts of their work, increase their value and influence, and supported the advancement of women and other underrepresented groups in their field. As expected, the benefits to individuals were multifaceted and not limited to one impact area. For this reason, the evaluator shared three case studies that reflect key, multi-faceted outcomes for grantees.

## Case Study 1

One grantee found that the Connect grant helped her advance scholarship and publications about developing tracking algorithms to guide diagnostic catheters. She also reported that the Connect grant built her leadership skills and increased her respectability in her field. She explained that the Connect grant was "very impactful in my research. That helped me to formulate the project [...] If it wasn't because of that, I may not be risking or investing in the work." She indicated that six publications, papers, and presentations resulted from the Connect grant. She was also able to hire and oversee one graduate student and offer them professional development, building on her leadership and mentoring skills. The student later presented her work at an academic symposium adding to the pool of RIT scholarship. This grantee found "talking to people about her work" helpful, as it strengthened her scholarly community. She felt that a notable positive impact of the Connect grant was that it caused her professional community to see her as both "competitive and successful."

## Case Study 2

Facilitating three electrical engineering professional development seminars for their colleagues and participating in five national conferences increased these two Connect grantees' visibility and expanded their professional networks. Organizing electrical engineering seminars with prominent scholars and attending national conferences "increased our representation of our own work by a lot." After the seminars, they were invited back to several universities to talk about their research which introduced their work to other faculty members. This resulted in collaboration with two seminar speakers; they have submitted joint proposals, joint journal papers, and developed joint research projects. One Connect grantee expressed that "all this collaboration wouldn't have happened if we hadn't reached out to these people. This all helped

my career a lot" as a junior faculty member. Conference travel has been meaningful to these grantees as well, as they "got to talk to a lot of people" regarding their research, resulting in increasingly robust professional networks.

# Case Study 3

This group of grantees, which included assistant and associate professors, came together to pursue professional development opportunities relevant to their needs and helped build their research and leadership skills. These grantees used a multi-tiered mentorship model in which the junior faculty gained experience with grant writing and advancing their scholarly portfolios. The senior faculty also strengthened their leadership and mentorship skills. The project also funded four graduate students, and one contributed to a book chapter as a result of their involvement. These Connect grantees created an infrastructure for graduate students to develop presentation skills through regularly scheduled community workshops. During focus group interviews, one grantee team discussed networking and grant proposals (Grantee 1) and then additional funding and career advancement (Grantee 2) as direct results of the Connect grant:

This network actually did two things. It established collaborations with other people...[to] discuss [different] research ideas, and it resulted in other proposals, one funded by NSF and one [recently] submitted. And without the network [created through the Connect grant], they would not have been submitted or funded. (Grantee 1)

I think it was extremely useful because it was a good opportunity. We've had discussions here about sometimes you just need that little bit of funding. It was extremely useful because it helped us to do things we wouldn't be able to do otherwise. You need just a little bit to get going and we were able to do something significant. This is a perfect program to accomplish those types of things. As a stepping stone, for career advancement

it was this little boost. You just need that little bit of boost to get over the hurdle. It was a perfect program for that! (Grantee 2)

# **Impact on the Institution**

Organizational (Structural) impacts of the Connect Grants program at RIT are related to refining institutional structures and installing practices to promote the representation and advancement of women faculty. Some grantees worked to transform their institutional environment by strengthening community and raising internal awareness of their work. They also created new learning and leadership opportunities which helped to modify institutional policies, practices, and procedures.

### Transformation of the Environment

In interviews, grantees discussed how they believed their work environments changed as a result of their Connect grants. The most notable themes were a sense of strengthened community and raised internal awareness about the grants which often led other colleagues to benefit professionally and resulted in recruitment efforts for students interested in grant projects.

Six of the 13 interviewees strengthened community with other colleagues in their workplaces as a result of their Connect grants. One interviewee explained that their colleagues now see them as more competitive and successful. This respect and visibility helped to build and strengthen relationships at RIT. Another grantee explained that they have started building relationships across campus with others: "You don't feel alone. Some of the seminars help educate people [...] Sometimes we are preaching to [the] choir, but we are also getting to people who wouldn't have heard this before." In their final report, another grantee explained that networking/community guides their process to support AALANA faculty: "the garden of ideas to promote the increased retention and advancement of AALANA faculty continues to grow and

evolve, as each women of color session becomes fertile ground for the harvesting of further insight into the population it serves." The Connect Grants program built community through providing visibility for the grantees' work which helped to foster new institutional connections around ideas and projects.

Six out of 13 interviewees described increased internal awareness about their work as a result of the awarded Connect grants. As awareness about faculty scholarship and projects increased, colleagues learned how they could plug into the work, and departments were able to reach out to students with a specific interest in the work. One interviewee described this climate change overall: "It helped demonstrate to my dean what I'm doing, raised internal awareness, and also connected us with other researchers." Another grantee indicated that the Connect grant indirectly helped to build their departmental credibility through the recruitment of high-quality graduate students. Multiple interviewees mentioned that the Connect grant helped make the transition to a research-focused university. Interviewees explained how their colleagues' awareness of their work was often to their colleagues' benefit. This increased awareness also inspired them to consider pursuing similar projects. One grantee said, "All of a sudden colleagues thought that we could do our own work like this...That inspired more people to think about what they could do immediately within our small community." One grantee reported that their Connect Grant project required interpretation for deaf and hard-of-hearing faculty. She had to advocate for an outside contractor instead of just having a student services interpreter, given the complexity of the talk. These conversations were one step forward to increased internal awareness at RIT of the needs of DHH faculty. Overall, increased awareness of the awarded Connect grants helped colleagues build scholarly connections and motivated them to consider embarking on similar projects in the future.

## Transformation of Policies/Practices and Infrastructure

Infrastructure, policy, and practice changes happened in departments and units as a result of the grantees' influence in their professional communities. Through the Connect Grants program, RIT transformed institutional policies, practices, and procedures that promote the representation and advancement of women faculty by creating new learning and leadership opportunities. New infrastructure, such as additional lab talks, updated facilities, and created spaces in which faculty and students could collaborate, resulted in greater visibility for interesting research. In addition, changes in policies and practices reflect institutional transformation or potential transformation, as shared below.

Not all the grants had a focus on organizational change. However, at least two Connect grants were focused on institutional change in policies and practices. One project developed a post-tenure mentoring program to emphasize work-life balance and career planning for their unit, which was then established across the institution for all associate professors. Another grantee explained in their report that creating a "sustainable core competency" in a STEM field not currently explored at RIT was one way they promoted the visibility and leadership of women in that field.

Sometimes policies weren't instituted in the time period of the grant but were under consideration. An interviewee explained that their unit is more aware of the importance of mentoring programs, encouraging people to get mentors from other universities, and thinking about what policies they could implement to reinforce the value of mentorship. Another grantee referred in their report to encouraging the provost to support faculty membership in the National Center for Faculty Development and Diversity (NCFDD) and participation in the Faculty Success Program which could lead to great changes in the policies and practices of RIT as a

whole. This encouragement worked because, in 2018, RIT became an institutional member in the NCFDD with 475 faculty, staff, and students at RIT participating as members. To date, RIT has provided funding for 38 faculty to participate in the NCFDD Faculty Success Program designed to teach pre-tenured and tenured faculty skills for increasing research-related productivity while maintaining work-life balance. Ten of the 38 participants completed an evaluation of the program conducted by RIT. A hundred percent reported better time management skills and 100% indicated they would recommend the program to others. RIT continues to support faculty through this program and a sustained commitment to faculty growth.

#### **Discussion**

The Connect Grants program had a significant impact on both the individual awardees and the institutional structures supporting faculty development and success. Due to its positive impacts, the program is institutionalized through the Advance Office within the Office of the Provost at RIT. As noted earlier, the program evaluation found that due to the program's unique design which funds efforts that vary significantly in aim, the mini-grants program primarily fell within the Human Resource frame with important aspects of the other three frames. Evaluation results indicate that positive impacts were also demonstrated across Structural and Symbolic frames. In this section, we add reflections from the project researchers on how the mini-grants program also impacted the Political frame of the Bolman and Deal model.

Within the Human Resources frame, the impact of the awarded Connect grants on individuals is immeasurably positive. Individuals reported significant advancements in their research resulting in journal publications, grant proposals, presentations, portfolio development, and book chapters. While the tangible outcomes of the grant projects are clear, the more intangible outcomes should not be overlooked. Women reported benefiting from mentoring and

network development with positive improvements in work-life integration, professional development, career advancement, and the overall quality of their work environment. Informal and increased visibility in a professional community and domain is invaluable in career progression, and women reported an increase in exposure to professional networks as a result of receiving a Connect grant. It may be difficult to measure the direct impact of the grants on the long-term career trajectory of the awardees; however, it seems clear that the grants program outcomes aligned with the goals of the IT grant: refine and strengthen targeted institutional structures; improve the quality of women faculty's work-life; align institutional, administrative, and informal systems of power and resources to support and sustain progress towards the project goal; enhance the working environment; and support career advancement for women faculty. For example, one grantee used the funding to support work that led to publications that she indicated helped support her promotion to full professor.

As viewed from the Symbolic frame, the Connect Grants program was impactful in many ways. The evolution of the RFP, which at first required justification for the program through a robust rationale support document to the current state where such a document is no longer included, symbolizes a broader and more innate understanding among the university community that gender inequities exist and must be addressed. Stories from awardees embody the goal of increasing the representation and advancement of women faculty at our university. Faculty reported taking risks with developing their work, indicating an increased sense of confidence and investment in their work within the context of their domain and academic unit. Faculty also developed their leadership and mentoring skills, symbolizing a sense of purpose within their unit in progressing their own and others' careers. An early grantee whose project focused on

leadership development now leads one of RIT's key research centers with over 80 affiliated faculty.

Within the Structural frame, Connect grants positively influenced the community, climate, policies and practices, and infrastructure. Together, this moved beyond the informal impact on the individual awardees to benefitting other faculty within the departments and colleges and across the university through more formalized policies and procedures. Informally, relationship building increased a sense of research awareness among colleagues. While this is positive, it also indicates a void that existed in the university community, and these grants enabled a pathway for faculty to fill that void. In addition, Connect grants supported the establishment and growth of organizations including the Women in Science (WISe) program within the College of Science and the Diversity, Equity, & Inclusion committee in the Kate Gleason College of Engineering. For example, a Connect grant funded an evaluation of WISe that provided valuable information for continuing college-level funding support and for seeking additional funding from external funding.

Outcomes in terms of the changes in the representation of RIT women faculty by rank during the years when the Connect Grants program was created, sustained, and institutionalized, can be viewed from the Human Resource, Structural and Political frames (see Tables 7-9). The Connect Grants program supported the awardees' professional development and research development which reflects the Human Resources work of the program. For example, the Connect Grants program likely contributed to the success that RIT has seen in improving promotion and tenure numbers for women faculty at the associate and full professor levels within the majority of our STEM and non-STEM colleges. The Structural frame helps us see how targeted institutional structures and new practices promote the representation and advancement

of women faculty. The Connect Grants program is one example of this, as are the 15 awarded projects that targeted organization building, organizational development, or leadership development (Table 6).

**Table 7**ALL RIT Faculty by Gender and Rank

	Assistant Professor Percent (number)			Professor (number)	Full Professor Percent (number)	
Year	2010 2018		2010	2018	2010	2018
Women	42% (89)	36% (63)	33% (99)	39% (110)	20% (54)	27% (75)
Men	58% (124)	64% (112)	67% (204)	61% (171)	80% (218)	73% (206)
Total	100% (213)	100% (175)	100% (303)	100% (281)	100% (272)	100% (281)

**Table 8**RIT STEM Faculty by Gender and Rank

		Professor (number)		Professor (number)	Full Professor Percent (number)	
Year	2010	2018	2010	2018	2010	2018
Women	32% (38)	23% (22)	27% (44)	29% (45)	16% (25)	19% (30)
Men	68% (82)	77% (73)	73% (122)	71% (110)	84% (135)	81% (124)
Total	100% 100% (95) (120)		100% (166)	100% (155)	100% (160)	100% (154)

**Table 9**RIT Non-STEM Faculty by Gender and Rank

		Professor (number)	Associate Percent (		Full Professor Percent (number)	
Year	2010	2018	2010	2018	2010	2018
Women	55% (51)	51% (41)	40% (55)	52% (65)	26% (29)	35% (45)
Men	45% (42)	49% (39)	60% (82)	48% (61)	74% (83)	65% (82)
Total	100% (93)	100% (80)	100% (137)	100% (126)	100% (112)	100% (127)

*Note for Tables 7, 8 and 9.* Assistant Professor, Associate Professor and Professor are tenure-track ranks.

The Political frame provides an opportunity to view how systems of power and resources either explicitly or implicitly support and sustain progress by shaping the political frameworks (such as resource allocation) that impact the representation and advancement of women faculty. Nearly \$400K has been dedicated towards the Connect Grants program to date and much of this funding originates from the university which heavily augmented NSF funding over the life of the IT grant. This visible level of financial support from the administration provided two important benefits. It helped establish a sense of ownership of the program by the university as they were invested in the program's success in a visible way. The detailed communication plan that supported the Connect Grants initiative included key email correspondences from the provost to the campus faculty, the deans, and the awardees and the non-awardees along with their department heads. A second important benefit of the administration's financial support of the program was that it provided an engaged and invested audience during annual presentations with the deans and provost during which we discussed the program's annual evaluation. Through

productive and informed dialogue, suggestions and reflections made during these meetings helped drive program effectiveness. The meetings also reinforced a sense of ownership of the Connect Grants program among the deans.

Although the NSF ADVANCE IT program targets the increase in representation of women STEM faculty, the Connect Grants program was created to support all pre-tenured and tenured faculty at RIT regardless of STEM designation. Therefore, Connect grants were awarded to faculty from all ten colleges with 58% awarded to STEM faculty and 42% awarded to non-STEM. As noted in Table 4, over half of the Connect grantees were tenured women faculty at the time of the award. Therefore, we might expect greater impacts in STEM fields and among tenured women faculty.

To validate that assumption, we examined the number of women and their representation among the faculty. From 2010 to 2018, pre-tenured and tenured faculty at RIT declined from 788 to 737. Referring to Table 7, the largest decreases occurred at the assistant professor rank, where the number of women decreased 29% (from 89 to 63) and their representation decreased from 42% to 36%. Conversely, the largest increases occurred for women full professors, whose numbers swelled 39% (from 54 to 75) and increased the representation of women from 20% to 27%. Changes to associate professors fell somewhere in between, where the number of women increased 11% (from 99 to 110), and the representation of women increased from 33% to 39%. During this time period, the number of men professors at all ranks decreased.

While one might have expected a larger impact on STEM faculty, the data demonstrate that greater gains (and fewer losses) were seen in the non-STEM departments. From 2010 to 2018, STEM departments saw the number of women assistant professors decrease 42% (from 38 to 22), reducing their representation from 32% to 23%, and the number of women full professors

increased 20% (from 25 to 30), improving representation from 16% to 19% (see Table 8). During this time the non-STEM departments experienced a decrease of 20% in the number of women assistant professors (from 51 to 41) and a decreasing representation from 55% to 51%, while the number of women full professors increased 55% (from 29 to 45), improving representation from 26% to 35% (see Table 9).

When looking at college-level data, there are bright spots. Within STEM colleges over the same period, the representation of women among the full professors within our largest STEM college (based on student enrollment), The Golisano College of Computing and Informational Sciences, more than doubled, increasing from 13.8% (4/29) to 27.8% (10/36). The second-largest STEM college, the Kate Gleason College of Engineering, also experienced increases in the representation of women among the college's full professors, improving from 12.9% (4/31) to 17.9% (7/39). In 2018, the percentage of women full professors in several RIT colleges including the Colleges of Liberal Arts, Art and Design, and Health Sciences and Technology, as well as the National Technical Institute for the Deaf (NTID), is close to or exceeds 40%.

As noted earlier and shown in Table 4, over half of the Connect grants were awarded to STEM faculty, and over half of the grantees were tenured women faculty at the time of the award. Referring to Tables 7-9, it is clear that tenured women faculty (at the ranks of associate and full professor) in STEM and non-STEM departments have grown in number and representation from 2010 to 2018. However, women assistant professors across the board have declined in both count and representation, most notably within STEM departments (Table 8). This decline can be attributed to a pattern associated with faculty hiring, especially in hiring women within STEM departments at the assistant professor rank.

The Connect Grants program, through influencing faculty individually and also influencing environmental and policy changes, was one of multiple strategies used by RIT during this time period that supported more women faculty to seek, and successfully obtain, promotion to associate and to full professor.

#### Conclusion

The mini-grants program featured in this paper is a form of seed funding aimed at supporting ongoing faculty success through wide- ranging projects that align with the overarching goal of a more inclusive university. The Connect Grant mini-grants program for pretenured and tenured faculty at RIT is supporting each of the goals of the RIT Advance program by removing barriers to resources that support career success and creating new interventions and resources for women faculty in STEM fields, thus targeting institutional structures rather than solely encouraging conformity of individual minoritized faculty (Griffin, 2019). The evaluation results and key reflections from the project researchers support the ways the program has impacted individual faculty and the institution overall.

The Connect Grants program is an intervention that was designed to address several opportunity areas within RIT for women faculty. It serves as an intervention that improves the quality of faculty work life, professional development, and reward structures, especially for women faculty. Through grant funding, targeted institutional structures are refined and strengthened, and practices are installed that promote the representation and advancement of women faculty. Grant-funded activities also enhance the working environment and support career development for women faculty using symbolic measures that emphasize issues of meaning within the organization. Due to its wide level of success, the Connect Grants program has been institutionalized at RIT through internal funding. Connect grant rounds continue to be

offered in support of the goals of the IT effort and a shift in the RIT organization towards a more inclusive campus environment.

The impacts of such a program can extend beyond individual support toward creating more inclusive cultures through policy and practice changes. University-supported funding, coupled with grant-team administration and influence over the funding process can positively affect both individual career success and cultural shifts at the institution level. In this way, the Connect Grants program provides a way of re-imagining seed funding as a means to benefit both individuals and the university as a whole.

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for women faculty. Aside from institutional transformation, her research interests include the impact that design projects engaged with the community can have on a student's educational experience and gender equality in STEM education

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## References

- Allen, M. W., Armstrong, D. J., Riemenschneider, C. K., & Reid, M. F. (2006). Making sense of the barriers women face in the information technology work force: Standpoint theory, self-disclosure, and causal maps. *Sex Roles*, *54*, 831-844.
- Allen, T. D., & Eby, L. T. (2004). Factors related to mentor reports of mentoring functions provided: Gender and relational characteristics. *Sex Roles*, *50*, 129-139.
- Archie, T., Kogan, M., & Laursen, S. L. (2015). Do labmates matter? The relative importance of workplace climate and work-life satisfaction in women scientists' job satisfaction.

  International Journal of Gender, Science and Technology, 7(3), 343-368.
- Austin, A., Laursen, S., Hunter, A., & Soto, M. (2011, April). Organizational change strategies to support the success of women scholars in Science, Technology, Engineering, and Mathematics (STEM) fields: Categories, variations, and issues. Proc. Annual Conference of the American Educational Research Association, New Orleans, LA.
- Bailey, M., Baum, S., DeBartolo, E., Marchetti, C., Mason, S., Mozrall, J., & Valentine, M. (2012). EFFORT Establishing the foundation for future organizational reform and transformation at Rochester Institute of Technology. Internal report. Retrieved from Rochester, NY: http://nsfadvance.rit.edu/effort/
- Bailey, M. B., Marchetti, C., Debartolo, E., Mozrall, J., Williams, G., Mason, S., & Lalonde, S. (2011). Establishing the foundation for future organizational reform and transformation at a large private university to expand the representation of women faculty. Paper presented at the American Society for Engineering Education, Vancouver, B.C., Canada.

- Bilimoria, D., Perry, S., Liang, X., Higgins, P., Stoller, E., & Taylor, C. (2005). *How do male and female faculty members construct job satisfaction?* Retrieved from <a href="http://www.case.edu/admin/aces/resources.htm?nw\_view=1320436552&">http://www.case.edu/admin/aces/resources.htm?nw\_view=1320436552&</a>.
- Bolman, L., & Deal, T. (2017). *Reframing organizations: Artistry, choice, and leadership* (6th ed.). John Wiley & Sons.
- Bristoll, S., & Dickinson, J. (2015). Small talk, big results. Newsli, 92, 6-13.
- Burke, T. B., & Nicodemus, B. (2013). Coming out of the hard of hearing closet: Reflections on a shared journey in academia. *Disability Studies Quarterly*, 33(2). <a href="http://dsq-sds.org/article/view/3706/3239">http://dsq-sds.org/article/view/3706/3239</a>
- Carnes, M., Geller, S., Fine, E., Sheridan, J., & Handelsman, J. (2005). NIH Director's Pioneer Awards: could the selection process be biased against women? *Journal of women's health*, *14*(8), 684-691.
- Casad, B. J., Franks, J. E., Garasky, C. E., Kittleman, M. M., Roesler, A. C., Hall, D. Y., & Petzel, Z. W. (2021). Gender inequality in academia: Problems and solutions for women faculty in STEM. *Journal of Neuroscience Research*, *99*(1), 13-23. https://doi.org/10.1002/jnr.24631
- The Collaborative on Academic Careers in Higher Education. (2022). A research-practice partnership and network of peer institutions dedicated to improving outcomes in faculty recruitment, development, and retention. Harvard Graduate School of Education.

  Retrieved at https://coache.gse.harvard.edu/
- Corneille, M., Lee, A., Allen, S., Cannady, J., & Guess, A. (2019). Barriers to the advancement of women of color faculty in STEM: The need for promoting equity using an

- intersectional framework. *Equality, Diversity and Inclusion: An International Journal,* 38(3), 328-348. http://dx.doi.org/10.1108/EDI-09-2017-0199
- Davis, J. M., Soltis, P. S., Adams, D. C., Larkin, S. L., & Gilbert, R. A. (2020). Seed funds leverage external awards for research in natural resources and agricultural systems. *Forests*, 11(1), 76.
- De Welde, K., & Laursen, S. (2011). The glass obstacle course: Informal and formal barriers for women PhD students in STEM fields. *International Journal of Gender, Science and Technology*, *3*(3), 571-595.
- DeAro, J., Bird, S., & Ryan, S. M. (2019). NSF ADVANCE and gender equity: Past, present and future of systemic institutional transformation strategies. *Equality, Diversity and Inclusion: An International Journal*, 38(2), 131-139.
- Deaf Life (1997, October) as cited by the National Association of the Deaf (2019). Community and Culture Frequently Asked Questions. <a href="https://www.nad.org/resources/american-sign-language/community-and-culture-frequently-asked-questions/">https://www.nad.org/resources/american-sign-language/community-and-culture-frequently-asked-questions/</a>
- Dey, E. L., Korn, J. S., & Sax, L. J. (1996). Betrayed by the academy: The sexual harassment of women college faculty. *The Journal of Higher Education*, 67(2), 149-173.
- Faculty Career Development Services. (2015). Faculty mentoring @ RIT: Program assessment:

  Year 4, academic year 2014-2015. Retrieved from

  <a href="https://www.rit.edu/provost/sites/rit.edu.provost/files/images/2014-2015\_FINAL\_MentoringAssessmentYear4.pdf">https://www.rit.edu/provost/sites/rit.edu.provost/files/images/2014-2015\_FINAL\_MentoringAssessmentYear4.pdf</a>
- Foschi, M. (1996). Double standards in the evaluation of men and women. *Social Psychology Quarterly*, 59(3), 237-254.

- Foster, S., MacLeod, J. (2003). Deaf people at work: Assessment of communication among deaf and hearing persons in work settings. *International Journal of Audiology*, 42, S128-S139.
- Frehill, L., Jeser-Cannavale, C., Kehoe, P., Meader, E., Sheridan, J., Stewart, A., & Svigli, H. (2005). Toolkit for reporting progress toward NSF ADVANCE: Institutional transformation goals prepared by ADVANCE institutional transformation indicators working group. Retrieved from <a href="https://wiseliarchive.engr.wisc.edu/docs/Report\_Toolkit1\_2005.pdf">https://wiseliarchive.engr.wisc.edu/docs/Report\_Toolkit1\_2005.pdf</a>
- Hall, J. C., Everett, J. E., & Hamilton-Mason, J. (2012). Black women talk about workplace stress and how they cope. *Journal of Black Studies*, 43(2), 207-226.
- Hill, C., Corbett, C., & Rose, A. (2010). Why so few (AAUW Ed.). American Association of University Women.
- Griffin, K. A. (2019) Institutional barriers, strategies, and benefits to increasing the representation of women and men of color in the professoriate: Looking beyond the pipeline. *Higher Education: Handbook of Theory and Research: Volume 35*, 1-73.
- Ibarra, H. (1993). Personal networks of women and minorities in management: a conceptual framework. *The Academy of Management Review*, 18(1), 56-87.
- Ibarra, H., & Silva, C. (2010). Why men still get more promotions than women. *Harvard Business Review*, 88(9), 80-85.
- Jones, B., Hwang, E., & Bustamante, R. M. (2015). African American female professors' strategies for successful attainment of tenure and promotion at predominately white institutions: It can happen. *Education, Citizenship and Social Justice*, 10(2), 133-151.

- Judge, T. A., Kammeyer-Mueller, J., & Bretz, R. D. (2004). A longitudinal model of sponsorship and career success: A study of industrial-organizational psychologists. *Personnel Psychology*, *57*(2), 271-303.
- Laursen, S., & Austin, A. E. (2020). Building gender equity in the academy: Institutional strategies for change. Johns Hopkins University Press.
- List, K., & Sorcinelli, M. D. (2018). Increasing leadership capacity for senior women faculty through mutual mentoring. *The Journal of Faculty Development*, 32(1), 7-16.
- Litzler, E., Affolter, E., & Maister, L. (2019). Rochester Institute of Technology ADVANCE IT

  grant Connect grants evaluation. Retrieved from

  <a href="https://www.rit.edu/advance/sites/rit.edu.advance/files/documents/RIT%20Connect%20G">https://www.rit.edu/advance/sites/rit.edu.advance/files/documents/RIT%20Connect%20G</a>

  rant%20Eval%20Report B%26D%20Lenses UPDATE%20NOV2019.pdf
- Mason, S., Bailey, Marchetti, C., Crawford, K., M., Foster, S., Dell, E., Bailey, M., Baum, S., Clayton, L., & Valentine, M. (2014a). Institutional transformation at a large private technical university: Reporting on the accomplishments of a combined data driven top down and bottom up approach. *Proc. of 2014 IEEE Frontiers in Education Conference* (*FIE*), Madrid, Spain.
- Mason, S., Marchetti, C., Bailey, M., Baum, S., & Valentine, M. (2014b). Faculty awards at a large private institution: An indicator of evolving university values? Paper presented at the 2014 American Society for Engineering Education Annual Conference and Exposition, Indianapolis, Indiana. 15-18 June 2014.
- Marschke, R., Laursen, S., Nielsen, J. M., & Rankin, P. (2007). Demographic inertia revisited:

  An immodest proposal to achieve equitable gender representation among faculty in higher education. *The Journal of Higher Education*, 78(1), 1-26.

- Najarian, C. G. (2008). Deaf women: Educational experiences and self-identity. *Disability & Society*, 23(2): 117–128.
- National Academy of Sciences. (2007). Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering. The National Academies Press.
- National Science Foundation. (2019). *Women, minorities, and persons with disabilities in science and engineering*. Retrieved from https://ncses.nsf.gov/pubs/nsf19304/
- Nolan, S. A., Buckner, J. P., Marzabadi, C. H., & Kuck, V. (2008). Training and mentoring of chemists: A study of gender disparity. *Sex Roles*, 58, 235-250.
- Padden, C. & Humphries, T. (1988). *Deaf in America: Voices from a culture*. Harvard University Press.
- Preston, A. E. (2004). *Leaving science: Occupational exit from scientific careers*. Russell Sage Foundation.
- Punch, R., Hyde, M., & Power, D. (2007). Career and workplace experiences of Australian university graduates who are deaf or hard of hearing. *Journal of Deaf Studies and Deaf Education*, 12(4): 504-517.
- RIT Advance Program. (2014). 2014 Connect Grants Request for Proposal. Unpublished manuscript.
- Rosser, S. V., & Lane, E. O. (2002). Key barriers for academic institutions seeking to retain female scientists and engineers: Family-unfriendly policies, low numbers, stereotypes, and harassment. *Journal of Women and Minorities in Science and Engineering*, 8, 161-189.

- Schley, S., Blizzard, D., Ross, A., Marchetti, C., Dannels, W., Beiter, K., Kavin, D., & Foster, S. (2019). What about me? Theorizing power and pushback in advancing marginalized identities. *Journal of Cultural Analysis and Social Change*, 4(1).
- Sege, R., Nykiel-Bub, L., & Selk, S. (2015). Sex differences in institutional support for junior biomedical researchers. *Jama*, *314*(11), 1175-1177.
- Shackelford, S., Wood, W., & Worchel, S. (1996). Behavioral styles and the influence of women in mixed-sex groups. *Social Psychology Quarterly*, 59(3), 284-293.
- Smith, D. H. (2013). Deaf adults: Retrospective narratives of school experiences and teacher expectations. *Disability & Society*, 28(5), 674–686.
- Stapleton, L. (2015). The disabled academy: The experiences of deaf faculty at predominantly hearing institutions. *Thought and Action*, (Winter), 55-69.
- Steinpreis, R. E., Anders, K. A., & Ritzke, D. (1999). The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: A national empirical study. *Sex Roles*, *41*, 509-528.
- Suitor, J. J., Mecom, D., & Feld, I. S. (2001). Gender, household labor, and scholarly productivity among university professors. *Gender Issues*, 19(4), 50-67.
- Taylor, L. L., Beck, M. I., Lahey, J. N., & Froyd, J. E. (2017). Reducing inequality in higher education: The link between faculty empowerment and climate and retention. *Innovative Higher Education*, 42(5), 391-405. doi:10.1007/s10755-017-9391-1
- To recruit and advance: Women students and faculty in U.S. science and engineering. (2006).

  The National Academies Press.

- Trowler, P. R., Turner, G. H. (2002) Exploring the hermeneutic foundations of university life:

  Deaf academics in a hybrid 'community of practice.' *Higher Education*, 43(2), 227-256.

  doi:10.1023/A:1013738504981
- Yen, J., Riskin, E. A., Margherio, C., Spyridakis, J. H., Carrigan, C. M., & Ana Mari, C. (2019).

  Promoting gender diversity in STEM faculty through leadership development. *Equality*, *Diversity and Inclusion: An International Journal*, 38(3), 382-398.

  <a href="http://dx.doi.org/10.1108/EDI-09-2017-0181">http://dx.doi.org/10.1108/EDI-09-2017-0181</a>

## Appendix A

## Connect Grant AY 2019 RFP (Funding Round 7)

The Connect Grants program supports faculty career development and advancement as well as academic unit-level culture change initiatives and faculty recruitment approaches through awarding mini-grants. Funded projects align with the goals and objectives of the Advance RIT program. Connect Grants are offered through the Advance RIT program within the Office of the Provost with advisory support from Faculty Career Development, the Division of Diversity and Inclusion, and Sponsored Research Services. The program's target audience is all tenured and pre-tenured faculty at RIT and proposals are accepted from individual faculty and from academic units.

As of the fall of 2019, six past rounds of Connect Grants have been awarded (\$330K overall with average award of \$5.7K) with 58 awards supporting 111 unique faculty members. Scholarly products commonly result from this funded effort including funding proposals, peer-reviewed publications, short animations and films, etc. There have been a total of 143 tenured and pre-tenured faculty awardees serving as grant PIs and Co-PIs over the past six funding rounds, 80% self-identify as female. Of the 58 awarded grants to date, 95% of PIs self-identify as female. The grant "award rate" overall is 55% and the award rate for the last round (Round 6) was 42% (8/19).

The Connect Grants are designed to broaden faculty opportunities and enhance career advancement. Creative unit-level efforts to engage in cultural change, guide and manage faculty through various career stages are encouraged. During this current round, \$XX K is available for the Connect Grants program with the number of awards depending upon the review and evaluation of the proposals in relation to the posted selection criteria.

Examples of Past Proposed Efforts (visit the website for more details):

Networking: Strengthen faculty's professional visibility in national/international networks.

Utilize social resources to support the creation and expansion of networks among RIT faculty and within professional disciplines.

Research: Support research proposal development or re-submission efforts for external funding. Expand research and/or writing capabilities to enhance competitive proposal development and submissions. Promote interdisciplinary collaborations among faculty internal and external to RIT which could include formal peer-to-peer reciprocal visits to mutual institutions.

Professional Development: Sponsor and coordinate a visiting scholar's colloquium series. Present research at national/regional conferences. Specialized training to support scholarly collaborations. Engage the assistance of an external career/leadership coach.

Community Building and Engagement & Unit-Level: Unit-level efforts focused on recruiting and retaining exceptional faculty from broadly diverse backgrounds. Efforts designed to support organic efforts, organizational development, and research to inform change or other self-identified areas of need.

## Advance RIT Background

Originally funded through a National Science Foundation ADVANCE Institutional Transformation grant (1209115), Advance RIT is a long-term, multi-faceted program designed to increase and advance women faculty at RIT. Additionally, the program examines the unique challenges experienced by women faculty of color and Deaf and Hard-of-Hearing faculty and adapts interventions to address the needs of these key subpopulations. The Advance RIT program goal is to increase the representation, retention, and career advancement of women

faculty with a focus on women faculty of color and deaf and hard of hearing faculty. Program objectives in support of this goal include:

- Refine and strengthen targeted institutional structures, and install practices promoting representation and advancement of women faculty.
- 2. Improve the quality of women faculty work life, professional development, and incentive/reward structures.
- 3. Align institutional, administrative, and informal systems of power and resources to support and sustain progress by shaping the political frameworks that impact representation and advancement of women.
- 4. Enhance the working environment and support career development for women faculty using symbolic measures which emphasize issues of meaning within the organization.

In AY 2018, the Advance RIT program was incorporated within the Office of the Provost. The program continues to combine research with programming and policy/practice enhancements to drive long-term changes to transform RIT's culture, promote inclusion, and expand the representation of women on the faculty and among campus leadership. Proposal Submission Details:

All proposals shall identify at least one mentor, either internal or external to RIT, and include a description of their role on the proposed project. Use the Executive Summary from the Advance RIT Annual Faculty Data Report to inform and support your proposal. Using evidence to inform decision-making is critical during institutional transformation initiatives. The Advance RIT program has gathered and analyzed information from a variety of sources and is using the resulting "data knowledge" to support the creation and administration of various programs and initiatives. Quantitative and qualitative data sources include the 2016 Collaborative on Academic

Careers in Higher Education (COACHE) RIT Faculty Job Satisfaction Survey, results of focus groups conducted by social science researchers at RIT, and NSF ADVANCE Indicator Data. Findings within the Advance RIT Annual Faculty Data Report provide a compelling narrative and demonstrate the need to support leadership and career development activities for RIT faculty as well as organizational development initiatives to support an inclusive campus culture.

Proposal Template: Complete the *proposal template* and submit as a pdf file.

CV/Biosketch: Email a two page (maximum) CV or NSF style biosketch for the PI which lists current rank, department, and contact information.

Recommendation Letter(s): For proposals submitted by faculty, provide letter from the Department Head of the PI. For unit-level proposals, upload a recommendation letter from the college dean and from constituents/department members indicating department support for the proposed effort. Letters should concisely describe the potential impact of the proposed effort on the proposer and on their respective department, college, and the university.

Grant Schedule: Request for Proposals <date>, Proposals Due <date>, Decisions Announced <date>, Funding Available <date>, Funding End Date <date>, Final Report Due <date>
Award Obligations:

- Awardees shall be willing to disseminate project outcomes and experiences through participation in university-wide workshops, panel discussions, and presentations.
- Awardees will attend a project initiation meeting with grant sponsors and other awardees.
- Awardees must submit event or activity evaluation materials related to the grant to the Advance RIT program if applicable.
- Awardees must complete a final report summarizing activities and impacts. A final report (with unique identifiers removed) may be disseminated more broadly.