

Montana State University ADVANCE Program Evaluation

Big Sky Leadership Initiative to ADVANCE
Women into Research Leadership
Amy Gullickson and Jerry Horn, Evaluators



09

Acknowledgements

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1. Executive Summary

Montana State University (MSU) is a land grant institution located in Bozeman, Montana in the heart of the Gallatin Valley. In August 2006, MSU's Big Sky Leadership Initiative to ADVANCE Women into Research Leadership (BSLI: ADVANCE) received a \$299,222.00 grant from the National Science Foundation (NSF). NSF awarded the three-year grant out of its ADVANCE Program to develop "national and/or discipline-specific leadership in enabling the full participation and advancement of women in academic science and engineering careers." The project has been managed by a cross-disciplinary team of Principal Investigators (PIs) including representatives from science, technology, engineering and math (STEM) and the social sciences. In 2009 the PIs requested a one-year, no-cost extension, which was granted; funding for the project will now end July 31, 2010.

According to the project website, BSLI: ADVANCE intended to pursue the goals set by NSF through "on-going professional development, network building and a cascading system of mentoring. Funding will be used to support the development and delivery of intensive training workshops, the initiation and development of mentoring relationships on MSU campus for mid-career women faculty, and travel to facilitate mentoring relationships between senior women faculty and outside mentors."¹ To that end, BSLI: ADVANCE has given 13 mini-grants to women faculty, planned and conducted three mini-workshops, and three off-campus workshops.

The PIs created and used an evaluation sheet for all three off-campus workshops. In addition, MSU contracted with AMGullickson Consulting to conduct an external evaluation of the project. Evaluators Amy Gullickson and Jerry Horn came to Bozeman in May 2009 to conduct interviews with the PIs, workshop participants, mini-grant recipients and their departmental supervisors, as well as administrators and staff who have worked with the project. In addition, Gullickson observed the off-campus workshop, "Science and the Public Interest." This report is the product of that visit, and fulfills the contract obligations.

BSLI: ADVANCE has had a clear, positive impact on the women faculty who have participated in its two primary activities: workshops and mini-grants. The off-campus workshops provided women a chance to network both within their own departments and across disciplines – more than 40 disciplines were represented across the three years of the event. Women from the sciences particularly expressed how much they valued the chance to gather with other women faculty, since some of them are the only females in their respective departments. The networking opportunity has fostered cross-disciplinary collaborations on research and grant-writing in addition to creating a support network. Participants also reported benefiting from the skill building components of the off-campus and mini-workshops, particularly the sessions on negotiating and communicating with the public.

The mini-grant recipients reported a variety of benefits as well. Some will or have published books and articles as a result of the research conducted with the mini-grant funds. One planned and conducted an international symposium at MSU. Others created new courses for their department's curriculum, presented at conferences and co-edited a monograph. Several wrote new grant proposals seeking outside funding for larger awards. The evaluators' initial cost analysis estimates the return on investment for this portion of the BSLI: ADVANCE program was over 400% as of July 2009.

Opportunities that remain for BSLI:ADVANCE include finding ways to sustain the successful network that has been created, and disseminating findings and best practices for advancing women into research leadership.

¹ <http://www.montana.edu/wrt/advance.html>

2. Background & Context

2.1. NSF ADVANCE

The goal of the National Science Foundation's ADVANCE program is to increase the representation and advancement of women in academic science and engineering careers, thereby contributing to the development of a more diverse science and engineering workforce.

The basis for the ADVANCE Program and the identification of this specific goal is in recognition that

The pursuit of new scientific and engineering knowledge and its use in service to society requires the talent, perspectives and insight that can only be assured by increasing diversity in the sciences, engineering and technological workforce. Despite advances made in the proportion of women choosing to pursue science and engineering careers, women continue to be significantly underrepresented in almost all science and engineering fields, constituting only approximately 25% of the science and engineering workforce at large, and less than 21% of science and engineering faculty in 4-year colleges and universities. Women from minority groups underrepresented in science and engineering constitute only about 2% of science and engineering faculty in 4-year colleges and universities.²

In 2005 when Montana State University proposed to participate in the NSF ADVANCE Program, there were three categories of possible awards—(1) Institutional Transformation, (2) Leadership, and (3) Partnerships for Adaptation, Implementation, and Dissemination. MSU decided to pursue funding for a Leadership project.

The Leadership Award, which was granted to MSU and its Big Sky Leadership Initiative, is intended to “. . . support the efforts of individuals, small groups, or organizations in developing national and/or discipline-specific leadership in enabling the full participation and advancement of women in academic science and engineering careers” (National Science Foundation, 2005).

2.2. Montana State University - Bozeman

Founded in 1893, Montana State is a land grant university, and part of the Montana University System. It is located in Bozeman, MT in the heart of the Gallatin Valley. In fall 2008, 12,369 total students and 1,850 graduate students³ were enrolled. Montana State University had \$96,150,553 in competitively awarded grants and contracts⁴ during 2007-8, more than 85% were from federal agencies. According to the evaluation interview with the Office of Sponsored Projects staff, the university has experienced rapid growth in this area, up from \$51 million in 1998, as a result of intentionally hiring grant-active people.

Interviewees reported that MSU and Bozeman are appealing to faculty candidates for several reasons. First, its location in the Gallatin Valley, close to Yellowstone Park makes it an ideal location for people who enjoy the outdoors. Second, it has moved from an isolated, agricultural community to an internationally connected, open-minded and diverse community. Third, MSU is a

² <http://www.nsf.gov/pubs/2005/nsf05584/nsf05584.pdf>

³ <http://www.montana.edu/misc/aboutmsu.php>

⁴ <http://www.montana.edu/opa/facts/quick.html>

research leader; the Carnegie Foundation for the Advancement of Teaching⁵ classifies MSU as one of 96 research universities with "very high research activity." Finally, the small size of the university makes it possible for faculty to work with colleagues from other disciplines.

2.2.1. Diversity

Dr. Geoffrey Gamble began his tenure as the President of MSU in December 2000.⁶ According to Tom McCoy, Vice President for Research, Creativity, and Technology Transfer, "Dr. Gamble has put a lot of emphasis on diversity – women and under-represented groups, particularly Native Americans...[he has been] very intentional about hiring and advancing women, not just external hires but internal promotion." This commitment has been demonstrated in several ways, ranging from creation of the Women's Faculty Caucus, to financial support for women staff and faculty to attend the annual HERS conference at Bryn Mawr, to working side-by-side with Henrietta Mann, endowed chair for the MSU Native American Studies Department. Under his leadership, the university hired five women to serve as deans: Elizabeth Nichols for Nursing and Sheldon McKamey for Museum of the Rockies (2004), Susan Agre-Kippenhan⁷ for Arts & Architecture (2006), and Tamara Miller for the Libraries (2007) and Paula Lutz⁸ for Letters and Science (2007). In addition, the broader MSU administration has also been actively recruiting talented mid-career women, with some success. In the three months prior to the evaluation visit, two new women faculty were hired as department heads for Psychology and Land Resources & Environmental Sciences.

MSU was awarded the NSF ADVANCE grant in Fall 2006. At that time, women comprised 40% of the faculty at the university (Table 1). However, in the colleges that house the majority of STEM departments (Agriculture, Engineering, Letters & Sciences), women made up only 20% percent of the faculty. According to the ADVANCE grant proposal, women comprised 15% of the tenure-track faculty in MSU science, social science and engineering departments. At the time of application, half of the women full professors at MSU (n=5) were in those departments, as well as a notable contingent of women in associate (n=15) and assistant professor (n=23) roles (Capalbo, 2006).

Table 1. MSU Faculty by Gender⁹

College	Fall 2005				Fall 2006			
	Female	Male	Total	% Female	Female	Male	Total	% Female
Agriculture	15	78	93	16.13%	12	73	85	14.12%
Arts & Architecture	34	61	95	35.79%	30	59	89	33.71%
Business	21	37	58	36.21%	18	30	48	37.50%
Education, HHD	53	29	82	64.63%	46	24	70	65.71%
Engineering	8	75	83	9.64%	7	83	90	7.78%
Letters & Science	91	144	235	38.72%	108	162	270	40.00%
Nursing	58	4	62	93.55%	78	6	84	92.86%
Other*	52	68	120	43.33%	26	43	69	37.68%
TOTALS:	332	496	828	40.10%	325	480	805	40.37%

2.2.2. Contextual Limitations

The location of Montana State University in Bozeman, MT poses some contextual limitations. First, Montana is a state with lots of space and not many people. Bozeman's population of 37,981

⁵ <http://www.montana.edu/cpa/news/nwview.php?article=3487>

⁶ <http://www.montana.edu/president/prescomm/gamblebio.html>

⁷ <http://www.montana.edu/wrt/AgreKippenhan.html>

⁸ <http://www.montana.edu/cpa/news/nwview.php?article=4434>

⁹ <http://www.montana.edu/opa/facts/instfaccollegegender.pdf>

(87,359 in Gallatin County¹⁰) makes it the largest city within a 140 mile radius.¹¹ MSU is the largest employer in the county. Due to its location and access to outdoor activities, Bozeman is an attractive place to live. So, while housing prices have fallen elsewhere, homes in Bozeman remain relatively expensive – a three bedroom, two bath averages \$278,982.¹² Finally, the low population and lack of a large industrial base in the state means fewer tax dollars available for higher education; so MSU has a relatively small budget compared institutions of similar size in other states. While this enables them to access government funding through programs like NSF's EPSCoR/IDEA, often those sources are not enough to bridge the gap between MSU's funding and the funding of institutions outside Montana.

In the course of our evaluation, these contextual limitations were mentioned in two regards: finding work for faculty spouses, and active recruitment of quality mid-level MSU women faculty by other institutions. When considering a move to Bozeman, potential faculty members may discover one or both of the following: (1) they cannot afford housing on one salary, and (2) their spouses' employment options are limited. In one case, a qualified woman interviewed for a position in the ecology department. She and her husband were interested in the lifestyle Bozeman offered compared to Los Angeles, where they were living. The department thought she would be a perfect fit for their needs. However, the closest job her husband, a surgeon, could find was in Salt Lake City, more than 600 miles away. If the spouse of a potential faculty member is also an academic, MSU tries to accommodate by arranging a spousal hire in a suitable department. Opportunities for tenure-track faculty positions are limited, and departments value the ability to conduct a search rather than hiring a faculty spouse. The result is that the 'trailing' spouse often ends up in a research position, awaiting the chance to apply for a tenure-track position.

Active recruitment of quality mid-level faculty by other institutions was the second theme we heard regarding the contextual limitations. Montana's state budgetary constraints affect MSU's ability to compete with other universities in terms of start-up packages and facilities for research, particularly in the sciences. As a result, women faculty with an active research agenda are recruited and leave for other institutions. Lisa Graumlich and Susan Capalbo, two of the original PIs on the ADVANCE grant, and Linda Hyman, one of the current PIs, were all recruited by larger, out-of-state universities. Graumlich left before the ADVANCE grant was awarded, Capalbo left in 2008, and Hyman will depart this year. Christina Campbell, a mini-grant recipient in Health and Human Development was also recruited and left MSU. The Vice President for Research, Creativity, and Technology Transfer (VPR) summed it up this way, "Lots of our faculty stay because of the local amenities, but when the differential is so huge, at some point the appeal of the amenities of the local environment disappears. The gap has widened significantly since I've been here."

2.3. Big Sky Leadership Initiative

In August 2006, Montana State University received the NSF ADVANCE Leadership Award: Big Sky Leadership Initiative to ADVANCE Women into Research Leadership (BSLI: ADVANCE). As the project website states,

The overall objective of the project is to advance women into leadership positions in research administration in higher education through on-going professional development, network building and a cascading system of mentoring. Funding will be used to support the development and delivery of intensive training workshops, the initiation and development of mentoring relationships on MSU campus for mid-career women faculty, and travel to facilitate mentoring relationships between senior women faculty and outside mentors.¹³

¹⁰ <http://www.bozemanchamber.com/relocation/>

¹¹ http://factfinder.census.gov/servlet/GCTTable?_bm=y&-geo_id=04000US30&-box_head_nbr=GCT-PH1&-ds_name=DEC_2000_SF1_U&-format=ST-7

¹² <http://www.bozemanchamber.com/relocation/>

¹³ <http://www.montana.edu/wrt/advance.html>

The project was originally led by Susan Capalbo, former Director of Special Projects for the Office of Sponsored Programs¹⁴ (OSP), who was tasked with finding ways to enhance diversity through grant money. Capalbo, along with Graumlich, Anne Camper, Linda Hyman, Gwen Jacobs and Sue Monahan served as the original co-PIs for the grant. Capalbo left Montana State for Oregon State University; Graumlich left for the University of Arizona. Since that time, the remaining PIs have stayed involved and two others have been added: Cathy Whitlock, who first joined the PI group and then replaced Capalbo in the OSP, and Paula Lutz, who was hired in 2007 as the Dean of the College of Letters and Science. The current set of six PIs represent a range of disciplines (Table 2).

Table 2. ADVANCE PIs

Name	Department/College	Role
Sue Monahan	Sociology	Department Chair
Anne Camper	Civil Engineering	Associate Dean of Engineering
Gwen Jacobs	Cell Biology and Neuroscience	Assistant Chief Information Officer for Academic Computing
Linda Hyman	Health Sciences / WWAMI ¹⁵	Vice-Provost for Health Services
Cathy Whitlock	Earth Sciences	Professor, part-time Office of the Vice President for Research
Paula Lutz	Letters and Science	Dean of Letters and Science

Since receiving the ADVANCE grant in 2006, this team has sponsored a variety of events designed to advance women into research leadership. These events fall into two main categories: 1) events on professional development and science, which are open to all women faculty, and 2) mini-grants designed to enable mid-level faculty establish mentoring relationships. Activities completed at the time of the evaluation included three multi-day workshops, three mini-workshops, one panel discussion co-sponsored with the Women’s Faculty Caucus and awards of three rounds of mini-grants.

2.4. BSLI: ADVANCE Evaluation

The BSLI: ADVANCE program evaluation was conducted under a contract between Montana State University and AMGullickson Consulting. Amy Gullickson and Jerry Horn served as the external evaluators. Amy is a doctoral candidate in Interdisciplinary Evaluation at Western Michigan University in Kalamazoo, MI. Jerry is a former Senior Researcher at The Evaluation Center at Western Michigan University and an independent evaluator. Brief biographies of each are presented in Section 13.1. The primary evaluation activities were conducted from April through August of 2009, although initial contact between PI Sue Monahan and Amy Gullickson began in August 2007 (Table 3). The PIs created the evaluation form that was used for all three workshops before the contract with AMGullickson consulting began.

Table 3. Evaluation Timeline

Date	Activity
2007	
Aug 19-21	Workshop evaluation data collected
Nov 29	Initial contact between Sue Monahan and Amy Gullickson
2008	
May 4-5	Workshop evaluation data collected

¹⁴ Housed in the office of the Vice President for Research, Creativity, and Technology Transfer

¹⁵ WWAMI is University of Washington School of Medicine, Wyoming, Alaska, Montana, and Idaho. “The WWAMI program’s purpose is to provide access to publicly supported medical education across the five-state region.” <http://uwmedicine.washington.edu/Education/WWAMI/>

June	Initial evaluation proposal submitted to BSLI:ADVANCE
Aug	Revised evaluation proposal submitted to BSLI:ADVANCE
2009	
Feb-April	Contract negotiations and evaluation visit planning
May 1	Amy arrives in Bozeman
May 3-4	Amy observes "Science and the Public Interest" Workshop; Jerry arrives in Bozeman
May 5-8	On-campus interviews
May 9	Amy conducts final interview; Amy and Jerry depart
May-Jun	Interview notes emailed to participants for comments and feedback
Jun-Jul	Evaluation report writing
Jul 15	Draft report delivered to Sue Monahan
Aug 17	Evaluation feedback session in Bozeman
Sept 20	Final report due

2.4.1. Data sources

Several data sources were used in the preparation of the BSLI: ADVANCE evaluation report. Table 4 summarizes the contacts made in the on-site interviews, which were conducted in May 2009. Amy also observed the May 2009 Workshop, "Science and the Public Interest," held at the Gallatin Gateway Inn. Additional information was obtained from Montana State University's website and the National Science Foundation website. Sue Monahan provided the evaluation team with the original grant proposal and background information. Audrey Thurlow in the Office of Sponsored projects provided the evaluation data collected after each of the three workshops, the BSLI: ADVANCE annual reports to NSF filed in 2007 and 2008, as well as other logistical and budget information about the grant. Traci Miyakawa in the Office of Sponsored Projects provided current funding data for mini-grant recipients. The discussion during the evaluation feedback session on August 17, 2009 in Bozeman, and the two email responses received after the meeting were treated as data sources as well.

Table 4. Evaluation Interviews conducted May 4-9, 2009

Contacts	Individuals	Women	Interviews
Mini-grant recipients	8	8	7
Workshop participants	8	8	2
Co-Principal Investigators	6	6	3
Office of Sponsored Projects Staff	3	3	1
Departmental supervisors of mini-grant recipients	4	0	4
VP for Research	1	0	1
Totals	30	25	18

3. Descriptions and Definitions

The following list of descriptions and definitions are intended to clarify the terminology used in this report.

3.1. BSLI: ADVANCE Terminology

Women's Faculty Caucus (WFC)¹⁶ - an advisory group started in 2006 through the action of the President and Provost, with the intention of addressing the concerns of women faculty.

¹⁶ <http://www.montana.edu/wrt/women-caucus.html>

According to interview data, the WFC's orientation is that women faculty are women first, and faculty second. WFC issues mentioned in the ADVANCE evaluation include space for breast-feeding on campus and work-life balance. The women we interviewed see BSLI: ADVANCE as a separate entity, more focused on helping women advance themselves professionally.

Workshop – the BSLI: ADVANCE planned and held three off-campus events, intended to promote professional development and networking.

Mini-workshop – BSLI: ADVANCE sponsored three afternoon sessions on campus designed to help women faculty develop specific skills necessary for professional advancement. Interviewees referred to them as the 'small' or 'little' workshops. For this sake of this report, they are called 'mini-workshops.'

Mini-grant – BSLI: ADVANCE awarded 13 small grants to mid-career women faculty to help them further their research through mentoring or interdisciplinary collaborations.

ADVANCEnetwork – the moniker given to the visible presence of BSLI: ADVANCE on MSU's campus. This phrase is part of the logo used to advertise events; the PIs and some participants use it when they speak about the activities that have occurred under the auspices of the NSF ADVANCE grant.

3.2. Evaluation Terminology

Evaluand – the program or object being evaluated. In the case of this report, the BSLI: ADVANCE program is the evaluand.

Criterion – represents a decision about what characteristics of an evaluand are of value in a given situation. A criterion is, by definition, connected to the value of the evaluand. A set of criteria must be established in order to judge the merit, worth, and/or significance of an evaluand.

Indicator – a factor or variable that gives information about how the evaluand is performing on a criterion. Good indicators have been connected by observation or experiment to a specific criterion, and describe part of its performance. Accurate estimates of performance require information on several indicators for each criterion.

Primary Consumers – the intended target of the program, intervention, or treatment. Women faculty are the primary consumers of the BSLI: ADVANCE program.

Downstream Impactees – people who experience secondary impact from the program, intervention or treatment. In BSLI: ADVANCE for example, colleagues and departments of participants could be downstream impactees.

Performance Need – “A state of existence or level of performance required for satisfactory functioning in a particular context. Roughly it is a ‘need to do’ something, a ‘need to be’ something, or a ‘need to be able to do’ something” (Davidson, 2005). Performance needs are the criteria by which the evaluand is judged. The performance needs determined for the BSLI: ADVANCE are described in Section 6. Values.

Treatment Need – an intervention, product or substance required to attain a satisfactory level of performance. Treatment needs are the indicators by which performance on a criterion is judged. The treatment needs determined for the BSLI: ADVANCE are described in Section 6. Values.

4. Consumers

The primary consumers of the BSLI: ADVANCE program have been the mid-career women faculty at MSU. While NSF programs in the past have targeted women in STEM disciplines, the BSLI intentionally included a broader range of faculty from its inception. The workshops and mini-workshops were open to all faculty¹⁷ at MSU, although the target audience was women faculty.

¹⁷ Only men invited as presenters attended the off-campus workshops; however, the PIs reported that some men attended the on-campus afternoon workshops.

The off-site workshops extended the benefits of the program to visitors from University of Montana, and guest speakers from a wide range of institutions and agencies including Brown University, University of California-Davis, University of California-Santa Cruz, University of Washington Medical School, Arizona State University, The Implementation Group, Yellowstone National Park, Grand Teton National Park, Crow Indian Health Service, and the Wildlife Conservation Society. The consumers of the mini-grants were women faculty doing work in NSF-fundable areas.

Downstream impactees of the program were more varied, including:

- Graduate and undergraduate research assistants on mini-grant funded projects
- Undergraduate students in the pilot classes of the math education research course
- Department chairs/heads and staff, colleagues and families of the mini-grant recipients and workshop participants
- Students from MSU's Natural Science and History Film Making program

The long-term outcomes of the program have yet to be realized; however, the list of downstream impactees will likely expand over time as mini-grant research is parlayed into either new and larger grants or full-fledged courses adopted by departments.

5. Resources

A variety of monetary and social capital resources have been dedicated to the ADVANCE project at MSU. The primary financial support has been the NSF ADVANCE grant of \$299,222.00, awarded in 2006 for a three year term. The PIs applied for and received a one-year no-cost extension, so the program will continue through July 2010.

Social capital has been invested from several sources. First, the original PIs gave time and effort in preparing the initial proposal, in preparing the solicitations for the first mini-grants and planning the first workshop. The 2007 NSF Progress Report said that PIs contributed more than 160 hours each that year (20 working days per person). From 2007 until the time of the evaluation, that high level of investment has continued from the current PIs as they have solicited and reviewed two more rounds of grant applications. In addition, they recruited women from a wide range of departments across campus to serve as an internal steering committee. This larger group, in conjunction with Audrey Thurlow from the Office of Sponsored Projects, worked together to plan and execute the workshops and mini-workshops (Table 5).

Table 5. Internal Steering Committee

Name	Department/College
Suzanne Christopher	Health & Human Development
Sarah Codd	Electrical & Computer Engineering
Susan Kollin	English
Michele Hardy	Veterinary Molecular Biology
Valerie Copie	Chemistry and Biochemistry
Patty Simpson	Modern Languages
Anneke Metz	Cell Biology
Jodee Kawasaki	Libraries
Elisabeth Swanson	Science, Math Resource Center
Elizabeth Nichols	Nursing
Mary Miles	Health & Human Development
Christina Campbell	Health & Human Development
Beth Quinn	Sociology
Cathy Cripps	Land Resources & Environmental Sciences
Susan Dana	College of Business

Source: 2007 Annual Report: 0545393

The ADVANCE team also enjoyed excellent support from the Vice President for Research, Creativity, and Technology Transfer (VPR) through the Office of Sponsored Programs (OSP), which housed the project. Program Specialist Audrey Thurlow managed the ADVANCE budget, assisted with workshop logistics and documented project accomplishments. The ADVANCE team, OSP staff, as well as mini-grant recipients and workshop participants unanimously praised her efforts as essential to the projects' success. Fiscal Manager Traci Miyakawi assisted the mini-grant recipients with their project management and preparing proposals for larger grants based on the work conducted under the auspices of the mini-grants.

ADVANCE also received support from the VPR and Provost through a pre-existing mini-grant program at MSU. All faculty are eligible to apply for the Buy-Out for Enhancing Scholarship and Teaching (BEST) Award, which provides funds to buy-out one course. The VPR and Provost committed four BEST awards over two years to be given through the ADVANCE mini-grant initiative. The BEST Award also provided one of the templates the ADVANCE team used when they developed their mini-grant call for proposals.

The ADVANCE project was also careful to conserve other human resources. The department heads and chairs interviewed reported that they did not have to be involved in the administration of mini-grant funds. Mini-grant recipients and their chairs also praised simplicity of the mini-grant application as appropriate for the size of the awards. The PIs forethought and dedication made it possible for many people to enjoy the benefits of the ADVANCE award without inordinate investments of time and effort.

6. Values

The criteria for a well done consumer-based program evaluation must come from the needs of the consumers (Scriven, 2006). In the case of BSLI: ADVANCE the primary consumers, as described in Section 4, were the women faculty at MSU. The evaluators analyzed the NSF ADVANCE Leadership Program Solicitation and the BSLI: ADVANCE Project Proposal to determine the performance and treatment needs (see Section 3. Descriptions and Definitions). The evaluators synthesized the descriptions¹⁸ of intellectual merit, broader impacts, vision and goals as stated in those documents, and as described by interviewees, into a list of two performance needs: ADVANCE Women and ADVANCE Knowledge-Discovery-Understanding. In Table 6 these performance needs are presented as the values of the BSLI: ADVANCE program, and are the list of criteria on which the program was judged in this evaluation. The treatment needs are presented below the performance need with which they are associated. The treatment needs serve as indicators of performance on each value/criterion.

Table 6. ADVANCE Evaluation Values

BSLI: ADVANCE Values		I*	S*	D*
1: ADVANCE Women				
	Mentoring			
	Networking			
	Professional Development			
	Curricular development in women's research leadership			
2: ADVANCE Knowledge-Discovery-Understanding				
	Enhancement of the research programs of women scientists and engineers			
	Advancement of interdisciplinary science			
	Cross-cutting networks of researchers			

* Impact (I), Sustainability (S), Dissemination (D)

¹⁸ Appendix 13.2. Values Synthesis Map presents a summary of the synthesis process.

In order to move from a simple description of the BSLI: ADVANCE program to a value judgement, each indicator will be color-rated on three dimensions: impact (I), sustainability (S) and dissemination (D). These dimensions were chosen based on NSF expectations and the stated goals and intentions of the program. The ratings will be reflected using red, yellow, or green to indicate the status of the program on each indicator. The rubric for the color ratings on each dimension is presented in Table 7.

Table 7. Rating rubric

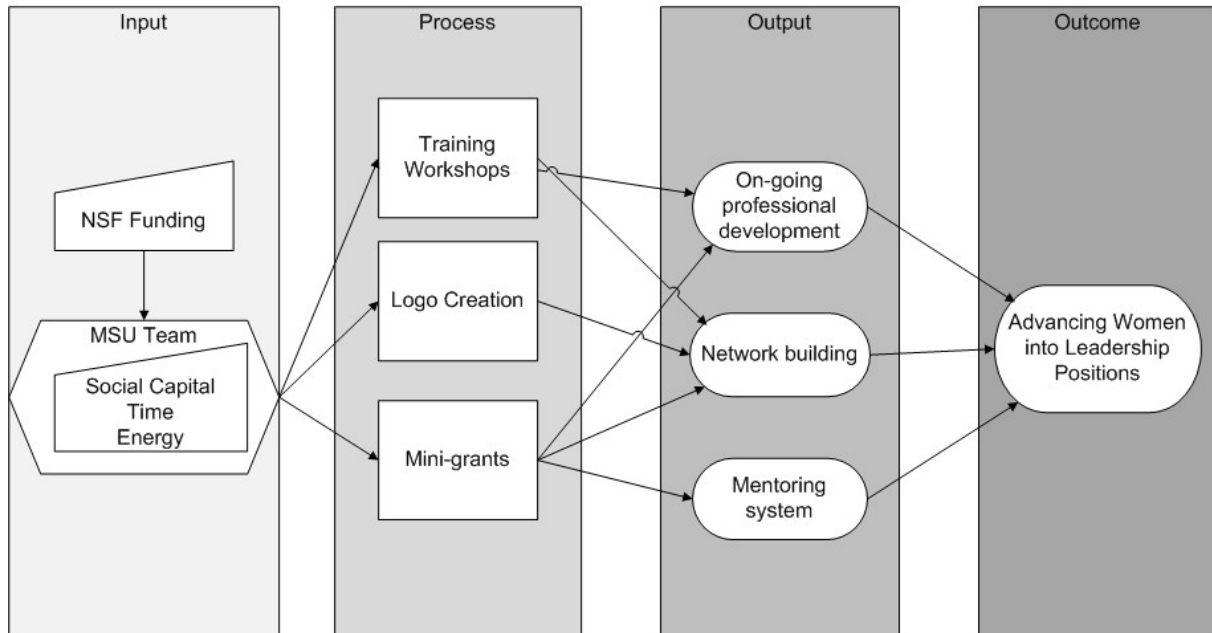
	Impact	Sustainability	Dissemination
	No activities, Activities of low quality, or Negative impact on participants	No possibility the activities or results can be sustained beyond the grant funding	No dissemination of information or findings, and no plan to do so.
	Only a few activities, Activities of mixed quality, or Mixed positive and negative impacts on participants	Some groundwork (personnel, funding or other) for sustainability laid, but more effort required to ensure it.	Dissemination of findings to one group or in one format (i.e. publication/ presentation in a participant's discipline)
	Adequate activities, All activities of high quality Positive impacts on majority of participants	Funding, personnel and other resources in place to ensure the program and its positive impacts will be sustained	Findings disseminated through multiple venues to a variety of disciplines (as appropriate).

The information presented in the following sections, 7. Process and 8. Outputs, is synthesized in Section 9. using this method. This approach enables a quick visual summary of BSLI: ADVANCE's performance on the values established for the program.

7. Process

The PIs executed the BSLI: ADVANCE program through several processes, which are presented in visual form in Figure 1. The project timeline places the processes and events historically; the following sections describe the key processes executed as part of the program, including creation of a logo, soliciting and awarding mini-grants, planning and conducting the workshops. The sections on mini-grants and workshops also contain the strengths and future opportunities within those processes as reported in the evaluation interviews.

Big Sky Leadership Initiative



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Figure 1. BSLI: ADVANCE Process Map

7.1. Project Timeline

When MSU received the ADVANCE grant, the leadership team began by recruiting an internal steering committee and working with an undergraduate student to design an appropriate logo for the project. They then began a cycle of soliciting and funding mini-grant applications as well as organizing and conducting a variety of workshops. The activities carried out under the auspices of the ADVANCE grant are summarized in the timeline below (Table 8).

Table 8. Project Timeline

Date	Activity
2006	
Aug 15	NSF ADVANCE Award granted to MSU
Oct	Begin development of logo with undergraduate student Kadri Rebane
2007	
Jan 5	Planning Retreat: PIs and Internal Steering Committee
Mar 19	2007 Mini-grant Applications Due
Apr 1	2007 Mini-grant Awards Announced
Apr 10	2007 Mini-grant Award Funding Begins
May 1	Internal Steering Committee Meeting
Aug 19-21	Workshop: "The Future of Science"
Nov 7	Mini-workshop: "More Negotiating"
2008	
Jan 11	Internal Steering Committee Planning Retreat
Feb 27	Panel Session: "Finding Work-Family Life Balance: Faculty Perspectives"
Mar 17	2008 Mini-grant Applications Due

Mar 19	Mini-Workshop: "Desperately Seeking Mentoring: Figuring out what you need and how to find it"
Apr 1	2008 Mini-grant Awards Announced
Mar-Jul	2008 Mini-grant Award Funding Begins (start dates based on proposals)
May 4-5	Workshop: "Science and Place"
Nov 25	Grant-getting Seminar
2009	
Mar 30	2009 Mini-grant Applications Due
Apr 2	Mini-Workshop: "Conflict Management"
Apr 17	2009 Mini-grant Awards Announced
May 3-4	Workshop: "Science and the Public Interest"
Jul 1	2009 Mini-grant Award Funding Begins
2010	
TBA	Workshop

7.2. Logo development

Susan Capalbo encouraged the original team of PIs to invest some time and energy in creating a logo for the ADVANCE program (Figure 2). It was their intention that the grant money be used to create a sustainable network of mentoring and relationships among women faculty across campus and beyond. During the evaluation, two of the PIs who participated in the logo-creation mentioned it as an important experience.

PI.1: At first I thought it was just fluff, we met for coffee for hours and hours and hours. I thought 'Let's get going! Let's do something!'

PI.2: I thought the same thing!

PI.1: [But] It brought us together as a team and gave us cohesion. At the end of the day it was an interesting outcome...we have an identity that was born out of a real process – Discover, Mentor, Lead is what we chose to describe it.

Thus, developing the logo provided a key to creating cohesion among the PI team, which was a broadly inter-disciplinary group that had only limited contact previously. In addition, it created the possibility of brand recognition for the ADVANCE Network across the MSU campus. The logo has been used in all advertising of workshops, mini-workshops, and the panel discussion, including posters and email messages.



Figure 2. ADVANCE Network logo

7.3. Mini-grants

The distribution of mini-grants was the second of three principal processes for carrying out the BSLI: ADVANCE program. Applications for mini-grants were solicited in the early part of 2007, 2008, and 2009 through announcements in several venues:

- Women’s Faculty Caucus listserv (tenure track faculty women at MSU)
- MSU Today – campus wide news - <http://www.montana.edu/cpa/news/>
- VP Research web page - <http://www.montana.edu/wwwvr/awards.html>
- Women in Research and Teaching web pages – <http://www.montana.edu/wrt/advance.html>; AND under “Take Note” – bottom of main WRT page - <http://www.montana.edu/wrt/>
- Emails to Provost, VPR, Deans & Associate Deans, and Department heads at MSU

The PI team reviewed applications based on six criteria (Table 9) and made thirteen awards ranging from \$3,396.00 to \$14,150.00 (Table 10). Six recipients were from NSF-funded disciplines in non-STEM areas.¹⁹ Of the 11 recipients who remain at MSU (two have left for other institutions), five are tenured and were when they received the mini-grant.

Table 9. Eligibility Criteria

Research Program
Enhance research productivity
Facilitate interdisciplinary collaboration or entry into new research areas
Support the development of effective mentoring relationships
Faculty Status
Tenure or tenure track position
Successfully completed retention review
Involved in a collaborative and/or interdisciplinary research related to fields currently funded by NSF.

Table 10. Mini-grant Recipients

Recipient	Department	Tenure	Award	Spent
2007				
Christina Campbell	Health and Human Development	left	\$10,612.50	\$8,677.77
Mary Miles	Health and Human Development	Y	\$10,613.00	\$10,497.00
Beth Quinn	Sociology and Anthropology	left	\$3,396.00	\$843.19
Cathy Cripps	Plant Sciences and Plant Pathology	N	\$8,773.00	\$5,171.11
2008				
Elizabeth Burroughs	Mathematical Sciences	N	\$5,463.32	\$3,931.76
Jennifer Luebeck	Mathematical Sciences	Y	\$5,456.24	\$3,996.99
Kristin Ruppel	Native American Studies	N	\$13,961.81	\$12,540.54
Tamela Eitle	Sociology and Anthropology	Y	\$12,439.67	\$8,507.65
Christa Merzdorf	Cell Biology and Neuroscience	N	\$14,150.00	\$13,450.35
2009				
Laura Black	College of Business	N	\$7,461.00	TBD
Lisa Davis	Mathematical Sciences	Y	\$7,980.00	TBD
Jessi Smith-Klaphake	Psychology	N	\$5,542.20	TBD
Linda Young	Political Science	Y	\$4,100.00	TBD

Recipients used their mini-grant funds to support activities ranging from course buy-outs to international travel. Accepting the funds implied their consent to “(1) develop and submit a grant proposal to a discipline appropriate funding agency by the end of the funded year, (2) participate in the ADVANCE Research Leadership Development Workshop, and (3) submit a short progress report at the end of the funded year” (2007 Request for Proposals). After the awards were made,

¹⁹ NSF offers grants in Social, Behavioral and Economic Sciences as well as STEM disciplines.

management decisions regarding minor changes in allocation of funds within mini-grants were made by PIs Susan Capalbo and Sue Monahan. Funds were tracked in the Office of Sponsored Projects and distributed through the Business Office.

7.3.1. Strengths

Stakeholders in the BSLI:ADVANCE program described a variety of strengths with regard to the mini-grant process. The PIs were pleased that the applicant pool expanded over time to include both “hard and soft sciences.” Two department leaders expressed gratitude that they did not have to manage the grants through their offices.

Mini-grant recipients expressed appreciation about several aspects of the process. First, all of them praised the straightforwardness of the application. One recipient summed it up: “[It was a] relatively easy application. Two to three pages and some background information. Didn’t take up a lot of time – that was HUGE. It was really accessible.” Second, the mentoring requirement was unusual, but the PIs stuck to it. One recipient was asked to re-apply when she did not include a plan for connecting with a mentor as part of her original proposal. The six mini-grant recipients who made connections with mentors were grateful for the requirement. The outcomes as a result of that component of the mini-grant are further described in Section 8.1.1.

Management of the grant monies was also a strength according to recipients. Once the awards were made there was “no micromanaging, which was really nice,” one recipient told us. Another described the process as “all opportunity and none of the paperwork. Not having to do the evaluation and administration of the grant. To be trusted with the funding...We got a lot more done because we weren’t focused on tiny components of time and accomplishing small things.” Only one recipient reported any difficulty with accessing the funds through the business office; the rest reported a smooth process. In addition, recipients expressed appreciation for Susan Capalbo and Sue Monahan, for being available to discuss applications, research plans and logistics. Three recipients also praised Monahan for being flexible about the allotment of funds within their mini-grants when their research plans required adaptation or they had funds remaining after their proposed activities were complete.

7.3.2. Opportunities

The primary opportunity with regard to the mini-grant portion of the BSLI:ADVANCE program remains dissemination. Mini-grant recipients did publish and present on their findings (see Section 8.3.2). The first round recipients (Quinn, Campbell, Cripps and Miles) reported to the internal steering committee in January 2008. However, no public presentation to the participants in the ADVANCEnetwork or the broader university community was required as part of the grant agreement. Several grant recipients expressed an interest in presenting their studies and findings to the ADVANCEnetwork at a mini-workshop or as part of the annual workshop. “I would like to be able to tell people what I did, to meet the other women that also got the grants and hear what they did,” one said. The OSP staff thought the presentations had potential as a town and gown event, if the recipients could bring the presentations down to a layperson’s level of understanding.

7.4. Workshops

BSLI: ADVANCE program’s third principal process included planning and conducting professional development workshops for women faculty. BSLI: ADVANCE sponsored three multi-day workshops, three afternoon ‘mini-workshops’ and one panel discussion. The dates and titles of the above are presented above in Section 7.1, Table 8. The ADVANCE workshops were announced using:

- Posters (sent to all colleges and departments)
- Hand addressed invitations to tenure track faculty women, post doctoral students & women at Montana Tribal Colleges

- MSU Today – campus wide news - <http://www.montana.edu/cpa/news/>
- ADVANCE PIs were encouraged to invite researchers and students

All announcement methods were determined by the PI and Audrey (personal communication from Audrey Thurlow, 5.13.09).

The multi-day workshops were held off-campus at the Gallatin Gateway Inn. The PIs and internal steering committee planned the programs, which included keynote addresses from nationally recognized speakers, and interactive panel discussions featuring experts from MSU and external agencies. Roundtable discussions were part of the first workshop, but removed from the program due to participant feedback. The first conference in 2007 ran Sunday evening to Tuesday afternoon, August 19-21. Again in response to participant feedback, the length and time of year was changed for the next two workshops, which ran Sunday at 4pm until Monday at 5pm in early May 2008 and 2009.

For the three workshops, attendance was tracked and evaluation forms distributed and collected. Registrants (not counting PIs and external speakers) ranged from 41 (2007) to 46 (2009). At the first conference in 2007, registrants represented one-third STEM and two-thirds non-STEM disciplines. In 2009 the distribution was approximately half STEM and half non-STEM registrants. The response rate for the event evaluations was about 50% (based on number of responses vs. number of registrants). Participants were asked to rate various aspects of the workshop on a scale of 1 (poor) to 5 (excellent); across all three workshops; the total ratings averaged more than 70% positive (i.e ratings of 4 or 5). Ratings and comments from 2007-8 were each used to make plans for the following year's workshops.

7.4.1. Strengths

The workshop component of the BSLI: ADVANCE program demonstrated a variety of strengths. Interviewees attributed most of the strengths to the multi-day workshops. Therefore, unless otherwise noted, the information presented in this section of the report pertains to the off-site workshops.

Venue

In the majority of one-on-one interviews and in the workshop participants' focus group, women were in favor of the workshop being held off campus. They agreed that they were more likely to commit to the conference and stay for the whole day at an off-campus venue. In addition, they enjoyed the beauty of the Gallatin Gateway Inn, the relaxed atmosphere, and the good food. The focus group expressed appreciation for the venue in these words:

- R1: I love having it at the Gateway.*
- All: It's great.*
- R2: Not too far away and not on campus.*
- R3: Food was good.*
- R4: Lots of places to sit and talk.*
- R5: And you have to think hard about sneaking away.*

The quality of the event and the venue was an intentional choice of the PIs and Internal Steering Committee. As one of the PIs expressed it, the quality of the event is a reflection of the attitude the ADVANCE network has toward MSU's women faculty:

Treat people really well – I feel strongly that it costs money but I don't think you get the same result from having it on campus and getting catered sandwiches. Off site, good food, it's an opportunity to treasure people that work hard.

Leaders attend and participate

MSU's women faculty leaders that are involved in BSLI: ADVANCE make a point of attending the workshops. One PI noted that the participation of female deans was critical, "[Women in]

leadership attend, participate, tell personal stories. It shows their commitment. And people come because their dean will be there. We might not have had quite the success if the deans had not been involved.”

Opportunity for networking

Women in STEM disciplines are quite often the only female in their departments, and don't have the chance to connect with other women on campus. The workshops provide the opportunity for women to network and share experiences. One of the focus group participants expressed it in these words, “[F]or someone in a field with few women colleagues, I didn't realize how much I'd been missing. I have plenty of times to network with men on campus. To me the female leadership in engineering is Anne Camper, but if it extends to social sciences, then I get to see women in a similar career but further along than me.”

The opportunity to connect with other women faculty also benefits the presenters. Referring to the May 2009 conference, one PI recalled, “The guest speaker yesterday said she'd never been in a meeting with only women faculty. [Young women faculty] like to get together with other women and see that it's shared experience they're having rather than being alone.”

Orientation

Participants praised the orientation of the ADVANCEnetwork, saying it offered an alternative to the pre-existing Women's Faculty Caucus. The comments of the focus group participants echoed those from the other evaluation interviews:

- R1: *I liked that ADVANCE looked at us as professors rather than as working mothers.*
- R2: *I had the same feeling – I wanted it to be about working and getting to know people....*
- R3: *I like the tone of the ADVANCE network.*
- R4: *I've attended events that were for networking with scholarly women. Either [we talked] about how we have such a harder time than our male colleagues. Or it was a well formed group that already knew each other. That's what I liked about ADVANCE – I could talk to anyone.*

All the women we interviewed testified to the fact that the ADVANCEnetwork had developed a specific identity and focus. One mini-grant recipient expressed it this way, “ADVANCE was women who wanted to talk about science and doing science. That was much more what I wanted to participate in...With ADVANCE it was ‘We are scientists who happen to be women and there are different ways we do that.’ It's a different focus.”

Program

In the workshop evaluations and the evaluation interviews, participants gave mixed reviews to keynote speakers and panels. However, reactions were never unanimous, which indicates a program with enough variety to capture the interest and attention of women from such a wide spectrum of disciplines. Participants thought the content and variety were good overall, and that the mix of topics, presenters, kinds of sessions (lecture, panel, discussion) as well as pacing were appropriate. Again, in the words of the focus group:

- R1: *The idea is the multiple parts – good speaker, panel, food, draw in the critical mass of people.*
- R2: *Is it the longer span of time that makes it possible to network – more so than at a lunch?*
- R3: *The length of time is important.*
- R1: *Nice to have some standing around with snacks so you can move around and talk to a variety of different people. And then the sit down dinner you get to really talk to 8-9 people.*
- R4: *Does the speaker have to be external?*
- R1: *That's a draw.*
- R4: *We have interesting people here- it wouldn't have to be an external person.*

R1: *The quality of the program has been important – the titles of the workshops and the external speakers were a big attraction. I probably wouldn't have come otherwise.*

Those we interviewed also expressed appreciation for the mini-workshop sessions focused on building particular skills. A mini-grant recipient said,

The little workshops, it's good to hear women talk about their experiences and how persistent you have to be. Like getting grants – I'm not as persistent with that as I am with publishing...So they told us, 'think about where you are successful and how to apply that in a different situation.' Now I can identify who the successful senior people who've gotten grants and be able to talk to them, that's been the biggest.

Diversity

Over the course of three years of workshops, women from 42 distinct departments on campus have come together. At the 2009 conference, 19 departments were represented, as well as the MSU News Service, Montana Water Center and the Big Sky Institute. Participants ranged from graduate students to junior and mid-career faculty members, to full professors and college deans. Participants felt that this diversity provided a unique opportunity to connect and learn from people they wouldn't normally encounter on campus. A participant remarked,

I don't know if this was an unusual ADVANCE because it included social science but I really appreciated that...I hear sociologists and political scientists that are really interesting to me, listening to people talk about ethics and public policy, how to present the positive face of science to the world, all that was good.

Evaluation

The evaluation forms distributed at the workshops were more than just 'smile sheets' – i.e. "how much did you like our conference?" The PIs asked for detailed feedback and the participants gave it. The PIs and Internal Steering Committee then used the feedback to plan future mini-workshops and workshops. For example, the evaluations from the 2007 workshop indicated that the session on negotiating was the most popular program element. The team created a mini-workshop on it for later in the year. This attention to feedback is a critical element of program sustainability and excellence.

7.4.2. Opportunities

The opportunities for improving workshops generated lively discussion among participants in our interviews. Topics included timing, program, and the invitation list. The time of day for the workshops and mini-workshops was reported to conflict with child care for some women faculty. The days of the week on which the off-site workshop was held created a conflict with those who keep their Sundays for family time.

The timing in the school year of the off-site workshop was the biggest discussion in the focus group. The last two workshops had been held during finals week, which made it difficult for some faculty to get there, schedule-wise, or caused them to get behind on their commitments. The group discussed a variety of options (which were also mentioned on the workshop evaluation forms) including January before the start of spring term, and August, before the start of fall term. One person suggested holding three workshops a year, in August, January and May to reach the most people because "finding the right time is difficult. People who can't make it are disappointed."

The need for external speakers as a draw for the program was also discussed. The focus group members agreed that external speakers made the program more attractive, but what they enjoyed the most was connecting with colleagues. However, they discovered in the course of their conversation that they were of two minds about it:

R1: *If the poster had said networking with women from various science departments I wouldn't have talked to Sue about it. It was the title and the speakers that drew me in.*

- R2: *I'm with you – I wouldn't do that. But what we're talking about implies that the networking is important.*
- R3: *I still wouldn't prioritize it even though I know it's important.*
- R4: *I still think it would have to be a skill or high profile speaker. It has to have one draw – but I don't know if the Gallatin Gateway for just one speaker and dinner. A good draw will also bring more people who haven't attended before.*

Clearly networking is important, but even women who have participated in the workshop and see the benefits are not committed to it as a stand-alone activity. A couple of options were suggested by interviewees to balance the draw of content with the opportunity for networking:

- R1: *Maybe rather than large group listening to a speaker – every time I have a conversation with those women I learn something. So more structured opportunities to do that would be good.*
- R2: *What about creating a lot of panels so people are on a panel and feel obligated to come?*

The ADVANCEnetwork has been deliberately focused on involving women faculty. However, permanent research staff members who have participated felt the workshops were also beneficial for them, and would have valued a personal invitation. In the words of the focus group:

- R1: *From my personal perspective my career here is long-term so I would have valued being invited.*
- R2: *Me too.*
- R3: *Inviting permanent research staff would be good...*
- R4: *In the future the email list should be expanded beyond the Women's Faculty Caucus – all you'd have to do is go to the department or dean's office and find out who the other women are who should be invited.*
- R2: *If NSF's goals are to increase women getting NSF grants – then it would seem reasonable to include research faculty.*

Inviting permanent research staff also would have the benefit of creating a more welcoming climate for women who may be spousal hires.

The final opportunity for the workshops comes from the evaluation feedback. Every year, participants requested the workshop provide childcare for the duration. Women mentioned having to come late or leave early because of childcare arrangements – most of which were in Bozeman, 20 minutes away from the Gallatin Gateway Inn. The ADVANCEnetwork might benefit from addressing this existing need of their target audience.

8. Outputs

Short term impacts (outputs) of the BSLI: ADVANCE program have appeared in several areas. The impacts on individual faculty women with regard to mentoring, networking and professional development were part of the original program goals. The outcomes are summarized in the following sections.

8.1. Mentoring

One of the intended outcomes from the BSLI: ADVANCE program was “a cascading system of mentoring organized around existing interdisciplinary research centers and programs at Montana State University (MSU). The NSF ADVANCE Leadership Award will be used as start-up funds for the BSLI, supporting... the initiation and development of mentoring relationships on MSU's campus for mid-career women faculty, and travel to facilitate mentoring relationships between senior women faculty and outside mentors” (Capalbo, 2006). While the system did not come into place exactly as outlined in the original proposal, advances have been made in creating mentoring

relationships for faculty women. In addition to the outcomes presented below, progress has been made on a cultural level, according to one PI:

The definition of mentoring for me is a kind of transparency – it's a kind of awareness that makes mystery go away. You are unafraid to ask questions because you'll get good answers and people won't think less of you for asking.

Mentoring is a culture where transparency is available and people take advantage of it.

In addition, mentoring is described as being of value now, even though departments do not uniformly implement it. Another PI reported viewing the current project as a vehicle that has given structure to heretofore individual efforts across campus to assist and mentor junior faculty.

8.1.1. Primary Source: Mini-grants

The primary source of mentoring outcomes was the mini-grant process. Applicants were required to include either mentors or interdisciplinary coordination in their proposals. Six of the nine mini-grant recipients from 2007 and 2008 opted to engage a mentor or mentors, and all six reported that it was a rewarding experience.

Funds from two mini-grants were used to support a pre-existing mentoring relationship. In one department, a senior faculty member had already been assigned by her chair as a mentor for a junior faculty member. They applied jointly for a mini-grant each, and have spent the last year working closely together on developing new courses for their department. In the following quote, their department chair described the growth of their relationship as the result of participating in ADVANCE:

They applied in a joint application...and were funded together. I had assigned [senior faculty] to [junior faculty] to be her mentor. But it has coalesced into them working together extremely well. They made some changes to the middle school methods course and now they've worked together to import those changes into the high school methods classes. [The mini-grant has] been great for the two of them to give them time to do things, and gave them a way to make significant strides and progress – they work very well together. We're very excited for how that's playing out.

Five mini-grant recipients used mini-grant funds to support travel to meet with their mentors. Kristin Ruppel travelled to Native American reservations in the southwest United States, and met with two women judges and a member of a tribal board. Beth Quinn used her mini-grant to buy out her courses and spend a semester at University of Wisconsin, the birthplace of her discipline (Criminology). Cathy Cripps used her grant money to travel to Austria, meet with her mentor and plan an international symposium. Elizabeth Burroughs and Jennifer Luebeck travelled to a conference where they made connections with two mentors for their project.

Tamela Eitle's mini-grant enabled her to both mentor and be mentored while investigating racial inequality between whites and Native Americans. She mentored undergraduate students by involving them in the research. She was mentored by the contacts she made conducting the study, and in an unexpected but useful direction. "I learned tangentially this might not be the thing to do – pursuing this discrimination area of research – because I'm not being mentored by one of the big names in that area. I probably won't be able to get funded there." As a result, Eitle wrote a grant proposal for a health disparity study, rather than continuing to pursue Native American discrimination issues.

8.1.2. Other Sources

The ADVANCE PIs reported that their contact with each other, as well as with the keynote speakers for the workshops created a mentoring network for them. Those connections were

fortunate, since they all admitted to being too busy to pursue more formal mentoring opportunities. Two of them spoke about it directly in the evaluation interview:

PI.1: The keynote speakers who have come in have been nationally recognized and really outstanding, and fun for us to get to know. First year, having the connection to M.R.C.Greenberg was great. So there have been connections made here through that – I got to know her because I asked her to come and she did. We were all too busy to take advantage of the mentoring beyond that.

PI.4: Even though we didn't go around the country and seek mentors, the network and friendships we developed on campus are powerful and wouldn't have happened otherwise. I came two years ago to MSU and I was the only woman in my department. Now I have friends and support all over campus.

8.1.3. Opportunities

The subject of mentoring sparked a lively conversation during and after the August 17, 2009 evaluation feedback session. The mini-grant recipients who were present talked favorably about the mentoring opportunities that funding allowed them to pursue. While the evaluation findings reported mentoring as a strength of ADVANCE, the women present agreed that plenty of opportunity remains in this area.

The group agreed that there is a great need for mentoring among women faculty, but that it is difficult to create an effective relationship through requirement, i.e. department heads assigning senior faculty to mentor junior faculty members. One woman at the meeting reported that she had developed into a mentor because others sought her out for help and advice. These organic mentoring relationships, which are often inter-departmental, seem to work well for both parties. However, the women present at the feedback session agreed that organic mentors are not recognized or rewarded in any way for their extra work, though it has been critical in helping advance women in a variety of ways.

Another opportunity for mentoring would be to broaden the scope and types of mentors. The women faculty at the feedback session voiced a variety of mentoring needs. Some were looking for help with grant writing and navigating NIH or NSF. Others mentioned a need for ideas about how to teach their courses more effectively, since they did not have pedagogical training in their graduate work. Those who were interested in pursuing administrative positions in the future expressed a desire to learn about what skills would be needed and how to cultivate them. Women faculty with children expressed interest in, as one participant expressed it, "establishing mentoring relationships with a common understanding of the needs of the professor who is simultaneously a mother." The group agreed that needs this diverse would be met best by a variety of mentors, not a one-woman-one-mentor system. If this kind of system could be developed, it would not only meet a significant need among faculty women at MSU, but could serve as a model that MSU and other universities could use to advance women in academic and research leadership.

8.2. Network Building

Another intended outcome from the BSLI: ADVANCE program was "the development of sustainable cross-cutting networks of researchers ...an active network of participants, mentors, sponsors and others interested in advancing women into research leadership" (Capalbo, 2006). Cross-disciplinary networking happened primarily as a result of the annual workshop, where women from a score of disciplines spent time together listening to speakers, engaging in panel discussions and chatting with their neighbors.

Staff from the Office of Sponsored projects attended all three conferences, and observed that the cross-disciplinary networking took some time to catch on:

This third one you could see the networking going on so much more – and we provided more time for that. You could look at the tables and see six different departments sitting together and making conversation. At the first, the tables were

mostly by department, so that's been a good change. The more comfortable they feel the more they network.

One of the workshop participants echoed this observation when she described her own experience of networking at the workshop:

...now I know sociology faculty by name and can say hi to them at other events. People that I said hi to last year I said hi and then some this year. And if I had one more year we might actually start a whole conversation.

The ADVANCE network seems to have reached a tipping point after three years. One of the PIs expressed it, "My sense now is that there is energy to continue activities. And if we can keep it going it a little longer it will develop a life of its own." Another PI told the evaluation team she perceived the planned activities or venues for women to interact with others at MSU as one of the major accomplishments of this project.

8.2.1. Primary Source: Workshop

The primary process that created networking among women faculty was the annual workshop. Those interviewed reporting making a remarkable breadth and variety of connections at these events. In one instance, the only two women in the earth science department had never talked with each other until one of them invited the other to a workshop. Another woman reported seeing one of the panel presenters often in her building, but had never spoken to her before the workshop. Connections were also made between colleges and institutes on campus, and between faculty and campus resources. Participants reported that they made connections that created collaborative projects, that they felt more connected and enjoyed the opportunity to share ideas and experiences with their female colleagues. The following quotes are representative of interviewee comments when asked about their networking experience at the workshop:

R1: The first ADVANCE workshop was my second year as a faculty member. I felt isolated the first year. The workshop was amazing in terms of connecting with women faculty... social capital – it's the only time women can get together, time to actually be with other women faculty.

R2: I've been to all three although this one was just the first evening. Some things were really good and some went right over my head. I'd say if I had to pick the most important thing – it's getting to know the community of women at the university. My department is predominantly female but [my academic program] is not. So it was good to get together with female colleagues. I have had some difficulty with my male colleagues. It was nice to be in that group, I've gotten to know Linda Hyman, Anne Camper, that's probably the biggest part.

R3: I didn't know many people last year. This year it felt like more people I recognized. I found people to help me negotiate academia, that was extremely helpful. [At MSU] there are only three [other faculty in my program area] and one is a woman and she doesn't come to these things. So these other connections have been really helpful.

Connections made at the workshop have had a way of expanding out into the broader university community as well. One workshop participant already had plans to extend the network from the workshop into her home department:

I have made arrangements for my mentor [from another department] to meet with the tenured faculty member who invited me to the ADVANCE workshop. Both women are among the most successful grant writers on campus, but come from very different disciplines and have never met. I believe that the ADVANCE workshop helped me recognize the importance of this type of network and provided

the incentive to organize a workshop on grant writing in my department. I think such a workshop would be invaluable to students applying for funding for research projects, as well as faculty – regardless of gender. Cross discipline collaborations could benefit all concerned...I'm [also] creating a mini-workshop with someone from the news service to come and talk to the students about how to deal with the press.

At the workshops, junior faculty also had the opportunity to engage senior faculty and deans in conversation. A department chair told us about two of his junior faculty members' experience at the 2009 conference:

Two [women faculty] came back from the workshop and were in my office yesterday and we were talking about schedules and commitments and long term goals. I said three weeks ago you were talking about establishing a consulting center... and developing a white paper. They said you know at the workshop, two things happened. I happened to be sitting by the dean and I got some ideas from her and she said, "You really need to do this." And somebody at the workshop mentioned having experience in developing white papers, this person talked to them about it, and offered to give them feedback on it when they wrote one.

Those are the kinds of things that come out of [the workshop] that I think are wonderful – young faculty members don't get to sit down and talk one-on-one with a dean very often – so that's really great.

8.2.2. From Working on ADVANCE

The PI team also reported that working together on the BSLI: ADVANCE program created a network that didn't exist before the grant. Their network-within-the-network has given them a stronger voice with the university administration, and laid the foundation for true interdisciplinary collaboration among women faculty.

PI.2: This group has gotten a lot more cohesive. We knew each other before but now with the grant we had a focal point. It's been a real pleasure getting to know and working with these ladies, and now we have a nucleus to work from. The grant brought us together on a common level – and now a group voice on the administration level. Not that they didn't listen to us as individuals, but now we have a group so our voice is stronger.

PI.1: Starting with the leadership, with the head PIs being from the social science side and the rest of us being from science and engineering there's been a foundation laid, an important networking for soft and hard sciences. And this has been the first interdisciplinary effort that was funded – it's really gotten some legs. [We've had a] sensitivity to funding, workshop topics, with the focus on interface between natural and physical sciences. It got legs because of the funding, because [previous PI] was a great advocate for it. [There was a] clear commitment from the institution, not necessarily a gender issue, but certainly there are a lot of women faculty in those departments (social sciences). And so we've been able to reach out to women who would not necessarily be touched by NSF projects. It was a lot of other disciplines besides engineering.

8.3. Professional Development

On-going professional development was the final intended outcome of the BSLI: ADVANCE program. Interviewees reported that it did occur, through the workshop, the mini-grants and working directly on the ADVANCE grant.

8.3.1. From Workshop

The workshop created interdisciplinary opportunities for professional advancement. Two examples revolve around connections made between Mathematical Sciences Department and the

Psychology Department and between Political Science Department and Earth Science Department. One of the Math faculty women is going to serve on the committee to plan next year's ADVANCEnetwork workshop. She described how she was invited to participate during her interview:

I am a self-proclaimed introvert, so I wouldn't seek out interaction to make contacts with most people there, but when I'm at the workshop I do it. One of the contacts I met [at the workshop] is a woman in psychology. Sue asked her to be in charge of the last ADVANCE workshop next year and [the committee chair] invited me to be on that committee. That's a leadership opportunity I wouldn't have had otherwise.

An attendee from Political Science said that attending the workshop, "...led to avenues of opportunity and research connections. I'm working on proposals with [a woman faculty member from Earth Science], and that wouldn't have happened without this interaction."

Participants also mentioned that at both the workshops and mini-workshops they learned skills that were essential for professional advancement. As one participant expressed it, "There wasn't any event I attended that I wasn't impressed and didn't learn something." The list of lessons included negotiation, conflict management, grant-getting, and finding mentors.

The 2009 workshop had one professional development session with immediate payoffs: "Communicating with the Media." At that session, a faculty member from Mechanical Engineering was one of several women who volunteered to share her 25 word description of her research with the group. She received feedback about how to make it more understandable to a non-engineering audience. When this faculty member participated in the evaluation focus group session on Wednesday that same week, she shared this news: "I got called into the dean's office today and asked for a two sentence description of my job. And I could give it. I took out 'polymer.'"

The "Communication" session also included a piece on how to deal with press calls. A faculty member who participated in the evaluation focus group reported on the impact the session had for her:

My take home [from the workshop] – the press call exercise from the weekend. I got one of those calls this morning – so I was really prepared. Usually it would catch me flat-footed, but now I could ask for the questions and call back... I just found the message from the press call before I came over here – but I will approach it more informed than I would have if I didn't attend the workshop. I've always felt we had to placate the press – now I know they can write the questions out and give me a chance to reflect on them a little bit. I thought that was very helpful.

8.3.2. From Mini-grant

Women who received the mini-grants also reported impacts on their professional development. Tamela Eitle, Jennifer Luebeck and Mary Miles were tenured before receiving the grant award. Eitle used the money to explore a new research track, and came out with a publication and as Co-Investigator on a \$142,500 NIH proposal. Luebeck's grant enabled her to re-invigorate her research and teaching after several years of high profile service in her department. She and her colleague Elizabeth Burroughs created one new course for future middle school math teachers, and worked on a process for math teacher certification through distance learning. As a result of collaboration with one of their mentors, she is also co-editing a monograph for the Association of Math Teacher Educators. Miles used the grant money to conduct a research study that laid the foundation for applying for \$197,000 in grant funds from the American Heart Association.

Beth Burroughs, Christa Merzdorf, Kristin Ruppel and Cathy Cripps were not tenured when they received their mini-grants. Burroughs worked with Luebeck on curriculum development, and has applied for an almost \$200,000 NSF grant as a result of her mini-grant sponsored work. She and Luebeck have also proposed sessions at four different conferences. Merzdorf conducted a preliminary research study. The data from that study, in combination with a letter of

recommendation written by one of the mentoring contacts she made on her mini-grant funded trip, played a part in her being awarded an NSF Career grant for \$765,000.

Kristin Ruppel conducted new research in an area with international importance. Her department chair is confident that this research will serve her (and the university) well in the future. As he summarized it:

She's working in a pretty select area, and important since there are several court cases that will be heard by the Supreme Court this week or next. Her research has been in areas that are really timely: treaty rights, land tenure, financial. For her this work is really important... She's right in the thick of it... We're starting to work more with international [groups] – I think her work will be helpful there. With the Maori and the Australian Aborigines, they have land claims too. We're beginning to make those connections with emerging indigenous communities... we wanted to be able to work with indigenous communities that face similar challenges to the native people in North America – treaty rights, land rights, leadership issues. Those are areas in which Kristin really shines.

Cathy Cripps travelled to Austria to meet with her mentor, an expert in Arctic-Alpine mycology. Together they planned the international symposium, which was held at MSU in 2008. Mycologists from 12 countries attended and “put MSU on the mycological map.” Her prior experience, added to the research and coordination of the symposium, has made her an authority in the area of Arctic-Alpine mycology. The timing of the mini-grant was good for her as well; the positive attention from the symposium and resulting press helped her achieve tenure status. In addition, Cripps has applied for seven grants since the mini-grant and been awarded six of them, for a total of more than \$157,000. She estimated that about one-third of the award money could be attributed to the work she did through the mini-grant.

Recipients and their department chairs expressed gratitude for the mini-grant funding and the opportunities it created. Ruppel and Merzdorf both told the evaluation team that the research they conducted would not have been possible without the mini-grant. Miles and Quinn both leveraged their grant money into larger awards that enabled them to conduct larger studies than the ADVANCE grant would have allowed. One recipient said, “It snowballs a little – ADVANCE is helping me, then I could get the department pots. Once you get one then you can kinda get others.” One of this year’s recipients concurred, “A small grant is a first step and really helpful in seeking further funding.”

8.3.3. From Working on ADVANCE

Managing the BSLI: ADVANCE program has also been professionally beneficial for the PIs. Susan Capalbo and Linda Hyman both accepted prestigious positions at other universities. One of the current PIs said, “Managing the grant has been a great experience – working with these senior women, dealing with the funding agency, the budget, there’s all this stuff I know now that I didn’t know before that will make me better at my job in the future.”

8.4. Opportunity

In email feedback regarding the evaluation presentation on August 17, 2009 two participants expressed a concern that the identity of ADVANCE had been portrayed as for “women doing science” to the exclusion of “women as working mothers.” In the ensuing conversations via email and phone, both women expressed the need for both perspectives in ADVANCE. As they perceived it, keeping them separate reinforces the idea that women have to choose between science and motherhood, which leads to less diversity in the workforce over the long term. One summed it up this way, “What I need as a scientist is a better appreciation for working mothers.” The other said,

If ADVANCE really wants to ADVANCE women, then advancing working mothers who are faculty is part of that. To my view, ADVANCE has not consciously

addressed the professional needs and support that can help us navigate being scientists and mothers. ADVANCE could further its mission by celebrating and directly addressing the fact that some women scientists have needs particular to motherhood.

The resulting opportunity for ADVANCE is to consider professional development activities that treat women faculty as “whole persons” some who have children and some who don’t, but all of whom desire to advance as professionals while living as responsible citizens.

8.5. Concerns

As mentioned above in Section 2.2.2 Contextual Limitations, ‘poaching’ of strong women faculty is a very real problem for MSU. In this case, NSF ADVANCE’s goal of seeking to “facilitate women’s advancement to the highest ranks of academic leadership” (National Science Foundation, 2005) is often at cross-purposes with MSU’s faculty needs. A side effect of BSLI: ADVANCE has been to create attractive candidates who are actively recruited by other institutions.

In one case, the mini-grant program negatively affected a recipient’s bid for tenure. While this was not the only criterion used to make the decision, the association of the grant with this negative outcome is unfortunate. Future mini-grant applications (if the mini-grant program is continued) could require a brief letter of support from the applicant’s department head to open a conversation about whether or not the grant would be a help or hindrance in terms of faculty advancement.

9. Synthesis and Outcomes

The BSLI: ADVANCE program has had significant positive impact since the grant was awarded in 2006 (Table 11). As reported in the above sections, women who participated in BSLI: ADVANCE reported the processes were excellent and the activities were of high quality. Under the first value, ADVANCE Women, participants reported numerous positive outcomes in creating mentoring relationships, becoming connected to other women on campus (both within their own and across disciplines), and developing skills that would enable professional advancement. In the second value, ADVANCE Knowledge-Discovery-Understanding, mini-grant recipients were the main beneficiaries. They reported positive impacts in terms of their research, and a broadening of their research networks. Those networks were also developed through the workshops.

Curricular development in women’s research leadership was the only area with mixed results. While the workshops have clearly been successful, there was no report of efforts to codify it into a system of training for junior and mid-level faculty. This kind of curriculum and process, if developed, could broaden the impact of BSLI: ADVANCE on MSU’s faculty women.

Table 11. BSLI: ADVANCE Performance Ratings

BSLI: ADVANCE Values	I	S	D
1: ADVANCE Women			
Mentoring	Green	Yellow	Red
Networking	Green	Yellow	Red
Professional Development	Green	Yellow	Red
Curricular development in women’s research leadership	Yellow	Yellow	Red
2: ADVANCE Knowledge-Discovery-Understanding			
Enhancement of the research programs of women scientists and engineers	Green	Yellow	Yellow
Advancement of interdisciplinary science	Green	Yellow	Red
Cross-cutting networks of researchers	Green	Yellow	Red

I = Impact, S = Sustainability, D= Dissemination

The sustainability of the ADVANCE network remains a question. Clearly, an excellent base of support among women faculty and some administrators has been built for the program. After three years, the project has made excellent progress in creating a cross-disciplinary network of women

faculty. However, funding for the workshop is now in its last year, as a no-cost extension of the grant. No funds have been designated by the university to ensure this vital activity is sustained. The last BSLI: ADVANCE mini-grants have been awarded. While the BEST award is a possible alternative, the difference in proposal conditions (available to all faculty, lack of a mentoring requirement) will likely diminish the impact of those funds on women faculty in comparison to BSLI: ADVANCE. Institutionally, upcoming changes like the retirement of President Geoffrey Gamble and the unionization of the faculty also have potential to affect the sustainability of this effort to advance women.

One of the expected broader impacts of NSF ADVANCE grants is that “results be disseminated broadly to enhance scientific and technological understanding” (National Science Foundation, 2005). Mini-grant recipients engaged in some dissemination of findings in their disciplines, either through publications or presentations; however, their studies and findings have not been presented in any kind of campus or community forum. In addition, interviewees reported no efforts being made to disseminate the processes, activities or outcomes of the BSLI:ADVANCE program.

As stated above, the BSLI: ADVANCE project has the potential to serve as the base for the transformation of the culture of MSU with regard to women in the STEM areas as well as a more general impact across the university. Overall, this project has produced a core group of people who have gained leadership skills and knowledge. This group has identified and tested various approaches contributing to the success of women. In large measure, the communications/networking aspects seem to have been very much needed and were successful. The mini-grant program has been popular and has produced results (understanding/knowledge, grants, publications, etc.) far beyond what one would normally expect from such small investments. The processes and activities of BSLI: ADVANCE created a “dense web of connections that are good for people in academia,” as one PI expressed it. Receiving the ADVANCE grant and the presence of the ADVANCEnetwork has the added benefit of making MSU more appealing to women faculty candidates. Further efforts to sustain the ADVANCEnetwork on campus and extend its benefits through dissemination will benefit not only a broader array of women faculty at MSU but also women at other higher education institutions.

10. Cost Analysis

The BSLI: ADVANCE was awarded \$299,222.00 in August 2006. In addition to the resources invested (described in Section 5), the following costs were incurred as of May 2009 (not an exhaustive list):

Table 12. BSLI: ADVANCE Costs

Mini-grant costs:	
Previous awards (9)	\$84,865.54
2009 awards (4)	\$25,083.20
Total grant monies awarded (13 mini-grants awarded)	\$109,948.74
Workshop costs:	
Approximately \$12,500 (3 workshops)	\$ 37,500
Total Costs	\$147,448.74

As mentioned above, two women have received grants from outside institutions as a partial outcome of their mini-grant work. One, Recipient A, received six grants for a total of \$157,775.00. When asked, she estimated that 31.4% of that total could be attributed to the work she did with the mini-grant funding (Attribution = \$49,550.00). The same percentage (31.4%) was then used to

estimate the attributed amount for the other new grant recipient (Recipient B²⁰), who received two grants for a total of \$778,177.00 (Attribution = \$244,390.24). The calculations for each recipient are presented in Table 13.

Table 13. New Award Monies Attributed to Mini-grant Research

Recipient	New Grants Awarded	Attribution Percentage	Attributed Amount
A	\$157,775.00 *	0.314	= \$ 49,550.00
B	\$778,177.00 *	0.314	= \$244,390.24
Estimated Amount Attributed to Mini-grant Research			= \$293,940.24

The sum of those estimated attributions divided by the sum of all awards made through the mini-grant program (from Table 12) gave a benefit-cost ratio of 2.67. The benefit-cost ratio was then used to calculate Return on Investment, (ROI = Benefit/Cost *100). The resulting estimated Return on Investment for the BSLI:ADVANCE mini-grant program is 267%. Appendix 13.1 presents further description of this cost analysis, including a range of estimates.

$$\frac{\text{Benefit}}{\text{Cost}} = \frac{\text{New award monies attributed to mini-grant}}{\text{Total monies awarded in mini-grant program}} = \frac{\$293,940.24}{\$109,948.74} = 2.67$$

In a Benefit-Cost analysis, any ratio greater than one is considered a worthy investment. BSLI:ADVANCE has the added advantage that NSF grant money provided the initial funds; therefore, any return is a straight benefit to the university. In addition, as of July 2009, mini-grant recipients had new grant applications on file for \$884,938.00. At this point, even if only a portion of those are awarded and a portion of those awards are attributed to the BSLI: ADVANCE mini-grant program, the estimated Benefit-Cost ratio and Return on Investment will increase. Clearly, the BSLI: ADVANCE made an excellent choice in creating the mini-grant portion of their program.²¹

11. Future Needs/Recommendations

During the course of the evaluation visit, interviewees made observations and recommendations about what would be necessary to improve the climate for advancing women in leadership at MSU. The following section summarizes those comments.

- Continuing internal support for the most promising activities and for the individuals who have emerged as leaders and valuable resources for the institution.
- Increased staff or training for social science administrative staff on grant management. This was regarded as particularly important since those departments don't have much experience with the logistics of handling large amounts of grant money.

²⁰ The second recipient did not respond to the evaluators' request for an estimate of attribution. However, in her interview with the evaluators, she stated that the mini-grant had helped her acquire a new grant for \$765,677.00.

²¹ Further evidence of this type may be useful in helping MSU determine whether or not to continue funding the BEST awards. The estimates presented in this report can be improved over time by asking mini-grant participants who win future grants to give estimates of attribution, which can then be used to recalculate Benefit-Cost and ROI.

- A presence in Montana Hall (MSU Administration) focused on faculty development, including facilitating spousal hires, leadership development, and mentoring of junior faculty through tenure process.
- Subsidized day care for faculty and staff.
- Organized panels to review *all* grant applications before they are submitted. The suggestion was to create one panel of experienced faculty members for NIH, another for NSF to give feedback and advice to applicants.
- Expand the workshop invitation list beyond the Women's Faculty Caucus. Since one of ADVANCE's program goals is to increase women getting NSF grants, it would seem reasonable to include research as well as teaching faculty.

12. References

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13. Appendices

13.1. Evaluator Biographies

Amy M. Gullickson is a doctoral candidate in Interdisciplinary Evaluation at Western Michigan University in Kalamazoo, MI. Her background is diverse, including a BA in English, a Master of Divinity, and work as a corporate trainer. Her evaluation experience is varied as well. She has worked for the Center for Creative Leadership, meta-evaluating their Open Enrollment Program. Over the past four years, she has spent a total of more than four months conducting impact evaluations of Heifer Project International operations in Thailand, China, Vietnam and Indonesia. As a doctoral fellow, she served as the internal evaluator on the Tri-Corridor Center of Excellence in Simulation Research project, which sought to bring aviation's team training model into hospitals. When not gallivanting to Montana and Asia, she is at work on her dissertation entitled "Mainstreamed Evaluation: A Mixed Methods Study of NSF's Advanced Technological Education Centers."

Jerry G. Horn holds bachelors and masters degrees from Oklahoma State University and a doctorate from the University of Colorado. He taught science, primarily biology, in the Denver (CO) Public Schools and had a long career of more than twenty years as a professor and administrator at major universities in South Dakota, Kansas, and Texas. He joined The Evaluation Center at Western Michigan University in 1994 as a senior researcher and continued that relationship until his retirement from WMU in 2008. Now residing near Stillwater, Oklahoma, he works periodically as a private consultant in the area of evaluation and owns and operates a miniature horse farm.

Among recent projects for which he has directed the evaluation are NSF ADVANCE projects at the University of Arizona and the University of Montana and the SD NSF EPSCoR project. Through the years, he has served as the external evaluator of projects sponsored by the Environmental Protection Agency (EPA), NASA, NSF, U.S Marine Corps, the Department of Energy, Argonne National Laboratory and others. This work has included projects funded by governmental agencies and private foundations with locations in such states as Michigan, Connecticut, Ohio, Mississippi, Louisiana, Pennsylvania, Illinois, Montana, South Dakota, Texas, North Carolina, Virginia, etc. He has served as president of three national organizations and as a member of the Board of Directors of several professional organizations. In addition, he has directed or served major roles in implementation and development projects in the areas of science education, teacher education, rural education, evaluative research capacity building and distance education, among others.

13.2. Values Synthesis Map

NSF Intellectual Merit (IM) and Broader Impacts (BI)	BSLI: ADVANCE Goals (G) and Broader Impacts (BI)	SYNTHESIS
IM: advances knowledge and understanding	BI: enhancement of the research programs of women scientists and engineers	ADVANCE Knowledge- Discovery- Understanding
BI: enhance the infrastructure for research such as facilities, instrumentation, networks, and partnerships	BI: development of sustainable, crosscutting networks of researchers	
BI: advance discovery and understanding	BI: advancement of interdisciplinary science	
BI: promoting teaching, training, and learning	BI: innovative mentoring program G: development and delivery of intensive training workshops, the initiation and development of mentoring relationships BI: curricular development in women’s research leadership BI: enhancement of the broader intellectual climate of MSU’s campus through public dialogue and workshops G: connect women scientists and engineers with mentors who can advise them as they pursue new career challenges, with a focus on involvement in the leadership of crosscutting research areas. G: provide opportunities for women scientists and engineers to enhance their human and social capital with respect to research leadership and administration through skill enhancement and network building.	ADVANCE Women
BI: broaden the participation of underrepresented groups	G: focus on the specific needs of women scientists and engineers, with close attention paid to career stage transitions	
BI: enhance the infrastructure for education, such as facilities, instrumentation, networks, and partnerships	G: create an active network of participants, mentors, sponsors and others interested in advancing women into research leadership	
BI: to increase the representation and advancement of women in academic science and engineering careers	BI: unique training opportunities for women faculty G: encourage women scientists to seek senior leadership positions in research in public and private institutions and within the agencies that support the nation’s research infrastructure.	

13.3. Parameters of the Cost Analysis

In any financial analysis, the parameters chosen influence the estimates. The following points describe the parameters, assumptions and range of the estimates presented in the financial analysis.

1. The size of Recipient B's grants gives the estimate produced by this analysis a large range. For example, if Recipient B had attributed 0% of her new grants to the mini-grant, then the overall Benefit-Cost = .45; ROI = 45%; if she attributed 50%, then Benefit-Cost = 3.99; ROI = 399%. However, since she did verbally attribute 'some' of her new grant to work from the mini-grant, equating her attribution to that of Recipient B seemed reasonable.
2. The Benefit-Cost estimate divides the attributed new monies by the total amount of mini-grants awarded. The total includes \$25,083.20 in grants made this year; those recipients have not had time to generate external grant income as a result. Therefore, their inclusion makes the estimate presented in the report conservative. Excluding the new grant money gives a Benefit-Cost = 3.46; ROI = 346%.