The Women in Science and Engineering (WISE) graduate student initiative began with the WISE Program in 1999-2000. The WISE Program was developed by Drs. Shobha Bhatia and Cathryn Newton at the request of the Deans of the Colleges of Arts and Sciences and Engineering and Computer Science to improve the academic climate for women in science and engineering (S&E).

WISE is divided into three separate, but interlocking groups organized according to participants' academic career course: (a.) Undergraduate WISE; (b.) Graduate WISE; and (c.) Faculty WISE. Each branch shares the same overall goals and objectives, namely:

- Establish and recognize the dynamic presence of women in the sciences and engineering at Syracuse University at all levels
- Promote new scholarship initiatives in learning, pedagogical, mentoring and advising approaches in the sciences and engineering to maximize the educational and career success;
- Initiate change in the university climate and environment to nurture both women and men’s participation in STEM fields.

This document discusses the second prong of the WISE initiative, the Graduate Student WISE Program and its activities. In general, the Graduate-WISE Program includes programming tailored specifically for the expressed needs of graduate students in the natural sciences and mathematics (NSM) and engineering and computer science (ECS).
While graduate students in the natural sciences, mathematics, engineering and computer sciences, as well as from women’s studies and other human and social science fields, have participated in WISE programming since its inception, intense programming began with an early assessment conducted in the 2004-2005 academic year.

In 2004 –2005, Emily Chase Coleman of the Graduate School helped Shobha Bhatia, Marina Artuso, and Corri Zoli design, conduct, and analyze surveys of women graduate students studying in the natural sciences or mathematics (NSM) and engineering and computer science (ECS) at Syracuse University.

The prime purpose of the survey was to assess women graduate student perception of the climate (friendliness, openness and inclusiveness) towards women in their departments, their general satisfaction with their graduate programs, as well as their view of the university climate as a whole. A total of 90 graduate students responded to the survey’s quantitative and open-ended questions. Their comments made it clear that many women graduate students had a significant interest in having more WISE programming tailored to their specific needs and interests. Respondents also expressed interest in having closer contact with women faculty role models at Syracuse University—either in a mentoring, advising, and/or networking capacity.

As is clear from the following graphs, MA and Ph.D. students’ ratings of their own “intellectual experience” in their degree programs across the S&E fields were adequate, but not as high as we would like to see. The first graph shows the percentage of women respondents who rated this item as 6 or 7, in a 1 to 7-point scale, which ranges from “very poor” to “excellent” (social science is included here as a reference point). Doctoral students in NSM are assessing this issue as very good to excellent over 80% of the time, but we would like to see all areas achieve the 90 percentile or above on this item. Likewise, “career advising” in their degree programs was also not as high as we would like to see.

Exposure to Women Faculty Members:
The findings also revealed that women graduate students in both categories were more likely to have a male than a female advisor. Furthermore, 56% of ECS and 33% of NSM women graduate students reported that they do not interact with any women faculty members on a regular or consistent basis.

Climate for Women: Department, Field, and University Wide: Importantly, less than 35% of doctoral students overall rated the climate in their departments as “excellent.” Similarly, 35% of doctoral students overall rated climate
WISE Leadership Retreat with Coach Tracey Manning, James MacGregor Burns Academy of Leadership, University of Maryland, April 2005

Faculty selected their graduate students to participate with them in this special opportunity for leadership self-assessment, training, and development.

Syracuse University was a recipient of a National Science Foundation-ADVANCE multi-institutional award to develop a national women and leadership development conference and curriculum in S&E in 2004. The aim of the conference was institutional transformation: the idea was to advance women academic leaders in S&E to innovate and diversify the climate for all members of the university community. Since this event amassed impressive interdisciplinary speakers and participants, including National Research Council researcher Charlotte Kuh, Dean of Georgia Tech Sue Rosser, diversity specialist Myra Gordon, and Duke University Dean Christina Johnson, as well as guests from Maxwell, The College of Law, and the College of Engineering & Computer Science, we decided to replicate the experience for women S&E faculty and their selected graduate students at Syracuse University. A luncheon retreat and workshop was organized by WISE for graduate students and faculty April 1, 2005 with this theme: “Leadership Challenges for Women & Diverse Faculty in the Sciences & Engineering: Theory, Practice, and Self-Assessment.” The workshop was facilitated by senior leadership scholar and coach Dr. Tracey Manning from the James MacGregor Burns Academy of Leadership, University of Maryland (College Park).

Department Strengths and Weaknesses: Overall, respondents were most satisfied with the intellectual experiences of their academic programs. This included, in particular, professional interactions with faculty and social interactions with other graduate students. In fact, respondents in both the NSM and the ECS categories mentioned the friendly, collegial, and supportive environment as the characteristic that they liked most about their departments. Interestingly, this view of the supportive climate was mentioned more often by those graduate students who had a female advisor (44%) than it was by those graduate students with a male advisor (29%). Respondents also, however, reported being the least satisfied with the following department elements: career advising; social interactions with faculty; and the communication of program and degree-completion requirements.

Open-ended Comments: Strengthen WISE: The bulk of the open-ended comments at the conclusion of the survey revealed respondents’ expressed desire to have a stronger WISE Program that was tailored to the specific needs of graduate students in NSM and ECS and which included more interaction with positive women role models. These comments also noted an appreciation for the survey and for WISE programming thus far, including:

- Speaker series, luncheons, seminars, career planning activities, peer networking, and faculty mentoring. These examples of programming are all designed to provide women in S&E Masters and Doctoral students with the resources and relationships they need to succeed and excel in these fields.

Mission: From the survey, WISE facilitators developed the WISE Graduate Program mission: to partner with S&E graduate student women to help them develop their own academic roadmap for success, including proactive planning for careers in academia and industry, and preparing them to address quality of life issues such as work-family balance now and in the future.

for women at SU as “excellent.” Finally, less than 25% of doctoral students overall rated the climate for women in their fields as “excellent.”

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WISE Leadership Retreat (2005)
Each year, WISE organizes a year-long seminar series focused on some aspect of research, education, current issues, and/or advancement for S&E graduate student women and those from underrepresented groups. Typically, speakers are distinguished women conducting cutting-edge research. A series of events (formal and informal) are organized around the speaker’s visit to prompt a sustained conversation with graduate students. In the past, seminars have been organized around such issues as career planning, work-family balance, negotiating for a job, etc. These events enable students to interact with advanced women who have successfully navigated some of the professional and personal challenges that women and diverse groups face in the S&E fields. By attending these events, graduate students gain exposure to the varied lives and careers of persistent women with high self-efficacy.

- The Seminar Series are made possible through a collaborative partnership with the Graduate School and Associate Dean Stacey Lane Tice and Associate Director Derina Samuel
- Speakers for the seminars are chosen from a range of S&E fields and both from industry and academia
- Graduate students are encouraged to pose prepared questions for speakers during the ample time reserved for Q&A
- Usually, an informal lunch or dinner event is also scheduled alongside the lecture or panel so that graduate students and WISE faculty have opportunities for interaction
- The seminars also provide a platform for women S&E faculty at SU to raise issues, connect and network with invited speakers, share their experiences, and provide valuable guidance to students

The interactions that emerge from the seminars reinforce the WISE mission of providing resources and relationships to students as they are mentored for excellence in their choice field.
SEMINAR SERIES I: Negotiations in Academia and the Profession (2006-2007)

Fall Seminar: Why Women Don’t Ask? Negotiation in Academia and the Profession (2006): In the fall semester of 2006, the first Seminar Series was successfully launched with the Graduate School partnership. Two prominent speakers visited for the seminar:

- Sara Laschever, journalist and co-author with Linda C. Babcock of the best-seller Women Don’t Ask: Negotiation and the Gender Divide
- Judi McLean Parks, Reuben C. and Anne Carpenter Taylor Professor of Organizational Behavior, Olin School of Business, Washington University, St. Louis, Missouri

Both speakers highlighted the hidden costs of not negotiating aspects of their professional life at every stage of their career. Laschever noted that women are underrepresented in the senior positions of most organizations, and that they tend to achieve educationally at earlier stages of their careers only to fall behind in holding positions of prestige, authority, or seniority in organizations. Women hold 50% of law degrees, for instance, yet are partners in only 15% of the firms; likewise, 46% of all doctorates are earned by women, but only 23% of full professors are women. McLean Parks emphasized the fundamental differences in how men and women act at the negotiating table, arguing that women need to be more assertive, ask for what they want, and set optimistic targets. In this popular seminar, over 60 graduate students and faculty attended and, in follow-up surveys and discussions, participants expressed extremely favorable reviews of the event and strong interest in a follow-up seminar on related material. For instance, feedback from respondents praised speakers’ breadth of knowledge, accessibility, and the usefulness of the information provided, and suggested these future programs:

- Negotiation advice targeted toward mid– and senior-level careers
- Special sessions on how to negotiate with their co-workers rather than for salaries with their superiors.

Spring Seminar: Negotiating Your Future—Self-Assessment and Professional Planning (2007): With the resounding success of the fall semester seminar, a second follow-up seminar on the S&E industry context was organized for the Spring, focused on future career planning and self-assessment toward those ends. Panelists included:

- Dr. Eileen Gilligan, President, Domco, Inc., Syracuse, NY
- Dr. Nidhi Shah, Career Consultant, Syracuse, NY
- Ursula Bongiovanni, President, Experience Innovative Automation, Inc., Taylor, MI
- Roberta Lee Weston, Manager, Specialty Engineering, Gentex Corporation
- Latasha Rourke, Director, EW Sensors and Programs, Lockheed Martin, Syracuse, NY.

The seminar focused on how to conduct career “negotiations” at multiple levels in a S&E job in the corporate context. Panelists expressed such ideas as the important role of “give and take” in a negotiation, how to negotiate in a collaborative fashion, the value of defining interlocking goals which cannot be accomplished independently, win-win negotiations, etc. Panelists discussed a range of in-depth issues in practical terms, all of which addressed the ‘give and take’ process for negotiating a settlement:

- Weston addressed the importance of moving to a paradigm not based on compromise, or force (i.e., forcing the other side to comply with demands), but to modify an opposing position en route to creating a new solution that meets all sides’ objectives.
Shah and Gilligan advocated “mutual adjustment” as a key way to define success during a negotiation, and they acknowledged the importance of recognizing that both sides can influence outcomes.

An effective negotiator, all the panelists argued, attempts to understand how participants will adjust and re-adjust their positions during negotiations.

Rourke noted the role of information exchange during the negotiation and encouraged participants to watch how information evolves, including how each side proposes changes to the other party's position and makes changes to its own.

Bongiovanni reflected on the breaking off of negotiations when a party’s proposal is rejected, or the other party fails to offer an alternate.

All panelists noted that en route to a negotiated settlement, parties typically focus on underlying interests, issues, and positions, and use cooperative and/or competitive processes to come to agreement.

All the panelists accentuated the fact that for a successful negotiation to occur, the parties must work toward a solution collaboratively that takes into account each party’s requirements and optimizes the outcomes for all.


**Fall Seminar: Working in Academe: Teaching, Research and Service:** The second year of the WISE graduate student Seminar Series was organized around the theme “Making Choices,” and the first seminar was entitled Career Planning in Academe: Teaching, Research, and Service. Speakers included Associate Dean/Formosa Plastics Professor of Civil & Environmental Engineering at Louisiana State University Kelly Rusch and Jennifer Schwarz, Assistant Professor of Physics at SU.

- Rusch emphasized utilizing available resources such as mentoring and networking to decide the right path.
- Schwarz noted the positive effect of good mentors/role models.
- Participants reported being impressed with the speakers, their choices in career planning, their openness in providing 'lessons learned' from their lives, and the range of choices that were made—often in unexpected ways or under difficult conditions.

**Working in Industry: Skills, Commitment & Challenges:** Additionally, WISE held a Career Planning Seminar II focused on “making choices” in the course of charting one’s career in the S&E corporate or industrial context. Panelists included:

- Margaret Carrillo-Sheridan, P.E., Vice President, ARCADIS BBL
- Shannon R. Magari, ScD, MS, MPH, Principal and Vice President, Health Sciences, Colden Corporation
- Corinn Fahrenkrug, Engineering Leader, Product R&D Group, Welch Allyn Inc.
- Donna Francher, Vice President, Global Product Development, Astra Zeneca Pharmaceutical LP

 Speakers provided practical insight into their own career planning process, emphasizing the right skill set, persistence in facing challenges in the workplace, the impact of a well-written resume, maintaining a good network of mentors and peers, refusing to let gender biases influence work quality, and utilizing travel opportunities as a learning and advancement tool, etc. Participants enjoyed the seminar and, especially, speakers’ insights and candor in excelling and advancing in the workplace.

- **Spring Semester: Panel Discussion—Balancing Personal and Professional Life (22 Feb 2008):** In the Spring, the WISE Graduate Program focused on this critical issue for women graduate students and academics in the S&E fields. A diverse set of panelists responded to this issue from their own experiences. They included:
  - Andria Costello, Associate Professor of Civil & Environmental
In 2007, WISE developed a WISE Future Professoriate Program (WISE-FPP) with Associate Dean Stacey Lane Tice and Associate Director Derina Sara Samuel of the Graduate School. This collaborative program, organized and supported by WISE, the Graduate School, and the Colleges of Engineering & Computer Science and Arts & Sciences, provides a place where women graduate students in S&E can develop peer and faculty mentoring relationships, establish a “roadmap” for successfully completing their degrees, and engage in career planning, either for faculty research positions or careers in industry. Faculty members from S&E nominated doctoral and second year-masters students for participation in the WISE-FPP as an “Associate.” The WISE-FPP Associates then plan various activities and events for the year, tailored to their needs, including the WISE Seminars already mentioned. They also develop with WISE facilitators seminar themes, informal events with faculty and visiting scholars, and networking activities with peers, faculty members, and industry representatives.

In the pilot-year of the WISE-FPP, 14 doctoral students from S&E are participating Associates:

WISE-FPP Associates, 2007

WISE-FPP Associates participate in all seminars, lectures, and WISE Graduate Program formal and informal events, including luncheons and dinners with speakers and faculty. They also have one-on-one interactions with visiting speakers, dedicated time for informal Q&A with them, and peer-networking activities, including gatherings at local coffee shops, and creating other events to “share notes” on degree completion, career planning, and developing future events.

WISE SEMINARS [CONT.]

- Engineering, Syracuse University, with research in bioremediation, global biogeochemical cycles, and changes in microbial communities
- Patricia Conklin, Associate Professor of Biological Sciences, SUNY-Cortland, with research in reactive oxygen species, plant antioxidants, and plant molecular genetic studies
- Kelly Donaghy, Assistant Professor, Inorganic Chemistry, SUNY-ESF, with research in Boron hydride chemistry, solid state materials and alternative fuels
- Ashley Spring, Graduate Student, Biology, Florida Institute of Technology, with research in aquaculture and stock enhancement of queen conch in the Caribbean.

Some important issues that panelists addressed included having and prioritizing a personal life in academia, separating personal and professional identities, knowing the many roles women are asked to play and resisting the pressure to be ‘perfect’ in all of them, assessing future jobs for “family-friendly” policies, and making time for personal and family life.
In addition to structured activities, WISE-FPP is also designed to help Associates critically reflect upon their own individual progress toward degree completion and future career planning. This includes developing a personal-professional academic and career planning portfolio, tailored to Associates’ fields and career-course in academia or industry. To complete these portfolios, Associates interview their advisors for department and field requirements and showcase a final project that exhibits their research, writing, and or teaching expertise.

A large and important part of the WISE-FPP is networking, at the academic, career, faculty and peer levels. WISE graduate students and WISE-FPP Associates involve themselves in networking opportunities made available through WISE-sponsored activities. WISE facilitators are careful, for instance, to plan formal and informal networking opportunities associated with other events, holding gatherings, dinners, luncheons, and coffee/dessert chats with invited speakers, for instance. Additionally, WISE Associates plan their own informal peer networking activities to discuss a range of issues from event planning to career paths to dealing with an academic problem. WISE graduate students have participated in networking discussions with S&E faculty, for instance, to address such common issues as finding a job that fits one’s lifestyle, balancing family and academic life, dual academic couples, stress management and gender politics. These activities are generally valued as some of the most important events by WISE-FPP Associates and WISE graduate students in general.

Often following a lecture, for instance, WISE facilitators will organize graduate student opportunities for informally interacting with the speaker over lunch or dinner. Some recent examples this year include:

- Breakfast meeting with geographer professor Naomi Miller and Shobha Bhatia
- Faculty luncheon for Distinguished Professor of Physics at City College of CUNY, Dr. Myriam Sarachik, accompanying her visit for the SU Physics Colloquium. At this event, Sarachik gave a short talk about the status of women in S&E, with a special emphasis on her personal journey and experiences.
- Graduate student interactive lunch on “Successful Interdisciplinary Collaborations in S&E” which was scheduled alongside visiting speaker NSERC-Hewlett Packard Canada Chair for Women in Science and Engineering Dr. Valerie Davidson’s lecture for the WISE annual Norma Slepecky Memorial Lecture and Undergraduate Research Award Seminar. Davidson is a Professor of Engineering with research in computational intelligence in food processing systems at the University of Guelph, CA.

Generally, WISE networking activities include informal gathering, luncheons, faculty dinners, seminars and colloquiums. These events provide students with an opportunity for peer interaction, interaction with women faculty members and speakers. These networking activities enable students to build stronger links, enhance their connectivity, enable them to share thoughts and nurture ideas. These activities have been rated highly by graduate students as a means of interacting one-on-one with distinguished faculty and professionals.
The WISE Graduate Program plans, organizes, and co-sponsors lectures with other departments on campus and professional organizations. WISE and Sigma-Xi chapter of Syracuse organized a 13 Nov 2007 event for Senior Research Scientist Dr. Naomi Miller at the University of Pennsylvania Museum of Applied Science for Archaeology (MASCA). WISE-FPP Associates attended a breakfast meeting with Miller, the following morning. Associates expressed interest in the research and experiences of this archeologist as a female “Indiana Jones,” and many questioned why more women had not joined this field.

Additionally, WISE partnered with SU’s Earth Sciences and SUNY-ESF’s Women in Environmental and Scientific Professions Speaker Series to join the March 2008 distinguished lecture by Doherty Senior Research Scientist Dr. Robin Bell at Columbia University’s Earth Institute. Bell directs major research programs on the Hudson River, in Antarctica, and she heads the NSF-ADVANCE Program at the Earth Institute. WISE graduate students reported that they gained a great deal from hearing about how Bell integrated her research with institutional transformation efforts, as well as how this initiative cultivated women in S&E for leadership positions.

WISE support and participation in lectures and seminars organized by other departments and professional bodies spreads the opportunities for women S&E graduate students and allows them to define their own academic and professional horizons by seeing first hand what other women have done. These events are widely acknowledged by WISE graduate students as beneficial in providing opportunities to interact more closely with women S&E faculty on campus, to engage with visiting role models, to develop peer support networks, and to help deepen a sense of their chosen fields.

In many cases, WISE graduate students help to structure the content of these initiatives. At the WISE Graduate Student Symposium (2006), for instance, the five successful women panelists from academia and industry answered questions developed by about 20 WISE graduate students. This format ensured that those questions that graduate students felt were most important—and often, most intimidating and difficult—would be placed front and center in discussions of academic progress and future career course. This event resulted in very usable advice for graduate students on academic progress, career planning and choosing role models and mentors. Equally, important it established a model for graduate student direction of future WISE Graduate Program event planning and priorities.
A core component of the WISE Graduate Student Program is developing a supportive peer network. As mentioned, WISE participants play a role in organizing informal events and ‘get-togethers’ as a means to develop their own peer-support system and network. Recent activities, for instance, include: ‘coffee chats’ to discuss discipline-specific issues like academic progress or choosing a dissertation advisor; social activities like getting to know the city of Syracuse and activities that give back to the community; informal discussions with faculty, or various career planning activities. WISE Associates have taken on various event-planning roles in achieving the success of WISE initiatives, including contacting potential speakers, brainstorming about priority activities for the year, and contacting caterers and press for an event. Through these activities, WISE graduate students create important and sustained bonds with each other and with WISE faculty and facilitators.

**CONCLUSION**

The purpose of the WISE Graduate Program is to foster an interactive support system for diverse women graduate students in S&E where they can—in a self-directed fashion—participate in their own academic success and career advancement. Through the kinds of planned events and activities mentioned, many of which are developed by women S&E graduate students themselves, WISE participants benefit from a variety of experiences designed to ultimately increase their self-efficacy, persistence, and advancement. This distinctive aspect of the WISE Graduate Program, the fact that it is a product of graduate students’ own vision, enables students to take seriously their own perspectives, needs, interests, and priorities for success in the S&E fields academically and professionally. Moreover, the events and activities planned are developed through an ongoing and often informal dialogue between graduate student and WISE faculty and facilitators. It is for this reason that WISE comprises a broad and diverse set of initiatives and events that change yearly, according to participant’s vision. These include, for instance, organizing visiting lectures; asking for feedback on a developing research project from multiple faculty members in the field; requesting time to interact with a faculty role model, creating peer support networks; choosing to publish a paper, attend a conference; or writing for a grant with a core group developed from the WISE network of students and faculty.