INTRODUCTION
Smith College has a mission of “preparing women of promise for lives of distinction,” enrolling over 2,500 women from 48 states and 70 other countries. Research is a core practice of scientific education at Smith. We are guided by a shared understanding that the AAC&U (2011) initiative tells us to “aim high—faculty mentors as they do research with students during the summer? It is a fine balance. The main focus of attention ... time must be on the research happening in labs or in the field. But, are there general topics and activities that could ... larger science faculty members of the College has changed. As generalization, participants in the SURF Program have become more diverse, too. Figure 2 shows both first-generation science majors (red) and SURF Program participants who are domestic underrepresented minorities (URMs) and Asians Amercians rising along with the national increase. From 2002 to 2015, the percentage of SURF Program participants from non-major groups range from 10% to 40%. Over the same period, the absolute numbers of SURF participants who are URMs and internationals students range from 5 to 10 and 30, respectively. These data raise the question whether SURF has adapted appropriately to its new populations. For example, is access to the program equally open to students from different socioeconomic backgrounds? Is a SURF stipend (currently $3,000 for an 8 week program) adequate for a full grant recipient to support herself for the summer and, perhaps, make a personal contribution to the costs of next year’s education? Is the SURF stipend adequate for the international student on financial aid with limited legal options for part-time work to support herself? Are housing, meal plans, and co-curricular support suitable for the heterogeneous student population? There are further differences among students from the SURF Program population. All twelve science majors are well represented in the program. Rising sophomores, juniors, and seniors all participate in the program in substantial numbers (Figure 4). As a consequence, students participate in SURF with substantially different preparation for research; individual faculty members can have substantial teaching and supervision to bring a research project to fruition, which establishes higher levels of mentors to assist with teaching and supervision of less experienced researchers. The success of several new course-based research experience (CBRE) courses aimed at first-year students has tended to reinforce the number of rising sophomores who wish to participate in SURF. There are significant impacts on student participation and involvement. For many years, supply of supervision and available stipends was reasonably well balanced with the number of students applying for places on the SURF Program. In recent years, student demand has begun to outstrip supply by 10-20%, i.e. 15-20 students each with a very good reason are not able to become SURF participants. As the size of the SURF Program has grown, faculty availability to supervise undergraduate research under existing arrangements has become more and more a matter of concern. There is a long and strong tradition in the sciences at Smith of faculty and undergraduate collaboration on research, but there is a growing sense of approaching the limits of faculty capacity to supervise students in the summer. Full-time teaching in the sciences at Smith is 12 credits per quarter (20 hours per week). Figure 4: SURF Student Enrollment – Diversity Participation by Race and Citizenship

SCAFFOLDING STUDENT LEARNING
As Smith College’s SURF Program has grown and become more diverse, more attention – from various internal and external funders – has been called in work in concert to scaffold student learning during and around the SURF Program itself. Part of the impetus is practical: how can administrators and professional advisors help support faculty mentors as they work with students during the summer? It is a fine balance. The main focus of attention and commitment of time must be on the research happening in labs or in the field. But, are there general topics and activities that could be offered that would complement and reinforce the work that individual faculty mentors do with their students? Another piece of the impetus is pragmatic: the sciences at Smith completed a strategic plan in 2014 in which “developing knowledge and skills”— including the deep knowledge gained from undergraduate research— is ranked hand in hand with “fostering agency and identity” as a strategic focus. We want to find opportunities to work with students on exercises designed to help them develop the more general tools and knowledge that will help them navigate their path to graduate school and a profession able to articulate for themselves precisely what “being a scientist” means for them.

Size always presents challenges to an undergraduate research program: is it sustainable in funding and faculty participation? Once the program reaches a certain size, what impact does it have on student and faculty expectations about participation? Does it become “normal” for students to participate? If a program establishes a long history, what impact does it have on the wider curriculum? Figure 2 shows that the SURF participation appears associated with double the likelihood of completion of graduate degrees. Brodigan (2012) finds that 2007-2010 Smith students have a higher percentage GPA than students in other institutions, this may be due to the longer experience with research. Some studies have looked at the impact of SURF participation on students. At Smith, there is correlation between SURF participants and % of students entering graduate school. Clark Science Center. Figure 2: SURF Student Enrollment – First Generation Participation

DIVERSITY AS AN AIM AND AS A CHALLENGE
As its first principle of excellence, the Association of American Colleges and Universities’ Liberal Education and America’s Promise (AAC&U, 2011) initiative tells us to “aim high— and make excellence inclusive.” For Smith sciences at Smith, we are guided by understanding that persistence and the very best scientific thinking emerge from healthy dialogues that promote and sustain students during the summer? It is a fine balance. The main focus of attention and commitment of time must be on the research happening in labs or in the field. But, are there general topics and activities that could be offered that would complement and reinforce the work that individual faculty mentors do with their students?

The socioeconomic backgrounds, race, and citizenship of Smith science students have changed as generalization, participants in the SURF Program have become more diverse, too. Figure 2 shows both first-generation science majors (red) and SURF Program participants who are domestic underrepresented minorities (URMs) and Asians Amercians rising along with the national increase. From 2002 to 2015, the percentage of SURF Program participants from non-major groups range from 10% to 40%. Over the same period, the absolute numbers of SURF participants who are URMs and internationals students range from 5 to 10 and 30, respectively. These data raise the question whether SURF has adapted appropriately to its new populations. For example, is access to the program equally open to students from different socioeconomic backgrounds? Is a SURF stipend (currently $3,000 for an 8 week program) adequate for a full grant recipient to support herself for the summer and, perhaps, make a personal contribution to the costs of next year’s education? Is the SURF stipend adequate for the international student on financial aid with limited legal options for part-time work to support herself? Are housing, meal plans, and co-curricular support suitable for the heterogeneous student population? There are further differences among students from the SURF Program population. All twelve science majors are well represented in the program. Rising sophomores, juniors, and seniors all participate in the program in substantial numbers (Figure 4). As a consequence, students participate in SURF with substantially different preparation for research; individual faculty members can have substantial teaching and supervision to bring a research project to fruition, which establishes higher levels of mentors to assist with teaching and supervision of less experienced researchers. The success of several new course-based research experience (CBRE) courses aimed at first-year students has tended to reinforce the number of rising sophomores who wish to participate in SURF. There are significant impacts on student participation and involvement. For many years, supply of supervision and available stipends was reasonably well balanced with the number of students applying for places on the SURF Program. In recent years, student demand has begun to outstrip supply by 10-20%, i.e. 15-20 students each with a very good reason are not able to become SURF participants. As the size of the SURF Program has grown, faculty availability to supervise undergraduate research under existing arrangements has become more and more a matter of concern. There is a long and strong tradition in the sciences at Smith of faculty and undergraduate collaboration on research, but there is a growing sense of approaching the limits of faculty capacity to supervise students in the summer. Full-time teaching in the sciences at Smith is 12 credits per quarter (20 hours per week). Figure 3: SURF Student Enrollment – Diversity Participation by Race and Citizenship

At the heart of the SURF Program is the idea that students, with faculty mentors as they do research with students during the summer? It is a fine balance. The main focus of attention and commitment of time must be on the research happening in labs or in the field. But, are there general topics and activities that could be offered that would complement and reinforce the work that individual faculty mentors do with their students?

Size always presents challenges to an undergraduate research program: is it sustainable in funding and faculty participation? Once the program reaches a certain size, what impact does it have on student and faculty expectations about participation? Does it become “normal” for students to participate? If a program establishes a long history, what impact does it have on the wider curriculum? Figure 2 shows that the SURF participation appears associated with double the likelihood of completion of graduate degrees. Brodigan (2012) finds that 2007-2010 Smith students have a higher percentage GPA than students in other institutions, this may be due to the longer experience with research. Some studies have looked at the impact of SURF participation on students. At Smith, there is correlation between SURF participants and % of students entering graduate school. Clark Science Center. Figure 3: SURF Student Enrollment – First Generation Participation

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