Exploring Inclusive Spaces for LGBTQ Engineering Students

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Through her role as Associate Director for the Center for Project-Based Learning at Worcester Polytechnic Institute, Paula Quinn works to improve student learning in higher education by supporting faculty and staff at WPI and at other institutions to advance work on project-based learning. She believes project-based learning holds significant potential for increasing the diversity of students who succeed in college and who persist in science, technology, engineering, and math (STEM) fields, and she views her work with the Center as contributing to education reform from the inside out. She holds an M.A. in Developmental Psychology from Clark University and a B.A. in Psychology from Case Western Reserve University. Her background includes working in the field of education evaluation, where she focused primarily on the areas of project-based learning; STEM; pre-literacy and literacy; student life; learning communities; and professional development. She has worked on projects whose funding sources have included the National Science Foundation, the Institute of Education Sciences, and the U.S. Department of Education.

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Kristin Boudreau, David DiBiasio, Paula Quinn, Zoe Reidinger

Introduction
Although institutions of higher education are notoriously slow to change, the rapid pace of societal transformation can sometimes force institutional responses. Consider the case of LGBTQ+ engineering education. Engineering schools, supported by 20 years of federal funding to promote diversity, have worked hard to increase gender and ethnic diversity. But the priority of achieving diversity of sexual identity came later to national consciousness and has been more difficult to promote. Only four years ago, ASEE drew bitter criticism when its official magazine, Prism, published a letter expressing anti-gay opinions. The incident prompted not just criticism of the editorial staff but also observations that the community of engineering educators remains timid about discussing these most difficult topics of difference and inclusion. Such timidity, some engineering educators argued, discourages necessary change to support greater inclusivity within the engineering profession. In recent years, however, ASEE has dramatically altered its stance on issues pertaining to lesbian, gay, bisexual, transgender, and questioning (LGBTQ) students. Its “Statement on Diversity and Inclusiveness” now mentions “gender identity,” “gender expression,” and “sexual orientation” among the “visible or invisible differences” that must not lead to marginalization. Today, thanks to the NSF-funded project “ASEE Action on Diversity: Promoting LGBTQ Equality in STEM,” the ASEE hosts a virtual community of practice to link diversity research with faculty development. ASEE Action on Diversity teaches engineering educators how to promote LGBTQ equality and inclusion, implements Safe Zone Training for engineering educators, and provides resources for institutions interested in supporting their LGBTQ STEM students. The Principal Investigator of this project, Stephanie Farrell, is also the president-elect of ASEE. She points to the 2013 Prism letter as the incident that propelled her into her work on LGBTQ inclusivity.

Farrell’s reaction to political events is at the same time personal, political, and professional: it has moved her more deeply into the research of engineering education and the scholarship of engagement, which connects “the rich resources of the university

1 Amy E. Slaton, a historian of science and technology at Drexel University, was quoted in Inside Higher Ed as blogging that “The line between 'freedom of speech' on one hand, and the dissemination of hate speech on the other, vexes everyone who thinks about diversity in a democratic society, or at least it should.” Scott Jaschik, “Engineering Bigotry?” Inside Higher Ed September 24, 2013.
to our most pressing social, civic and ethical problems.” Although socially progressive scholarship is not new—it dates back to John Dewey’s work in the 1920s—it constitutes a sea change in engineering education, which is characterized by a “depoliticized” culture that is hostile not only to conversations about sexuality but indeed to anything smacking of the personal. And yet, when cultural change comes to institutions—universities, professional societies, and the government agencies that fund research—this change often happens because of individuals who bring their personal values to their work and who take risks to open doors to groups who had not been welcomed by previous generations. The same Prism letter that activated Stephanie Farrell’s research on LGBTQ inclusion in engineering education prompted many other academics to protest the editorial policies that had allowed such a letter to be printed. It also moved people at the National Science Foundation (NSF) who had already been thinking about new ways to promote diversity and inclusion in STEM education. Soon after the Prism letter, Donna Riley, a leader in engineering education who was the new NSF Program Director for Engineering Education Research, helped to organize an NSF Ideas Lab that would bring together stakeholders in undergraduate STEM education to devise innovative approaches to the “durable problem” of “social inequality in engineering education and practice.” Rather than thinking about particular groups that had been underrepresented in STEM, Riley and her team sought to convene thinkers to “focus on changing the system itself.” The first strong LGBTQ-themed funding proposal submitted to NSF’s Division of Engineering Education after the Ideas Lab was Stephanie Farrell’s “Promoting LGBTQ Equality in Engineering Through Virtual Communities of Practice.” It was submitted as an EAGER project, defined as “exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially ‘high risk-high payoff’ in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives.” As the Program Director, Riley lobbied to retain the explicit reference to “LGBTQ Equality” in the title of Farrell’s proposal, since EAGER was intended for “early research in new areas, and [this proposal] is looking at a new population.” The title remained, and the work, funded as NSF 1539140, continues to transform engineering education though its main professional society.

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7 Personal conversation with D. Riley, December 6, 2017.

8 Dear Colleague Letter: Preparing Applications to Participate in Phase I Ideas Labs on Undergraduate STEM Education. NSF 14-033. January 26, 2014.


10 Personal conversation with D. Riley, December 6, 2017.
These stories remind us that in spite of traditional engineering cultures, engineers and their teachers are above all human beings who bring our values to our work and to our interactions with each other. That recognition makes our work more valuable, not less so. The research we describe here originated with that recognition. Specifically, our students reminded us that they come to engineering education as complete beings, not simply learners of technical knowledge in a segmented environment. Unlike most engineering institutions, where openly LGBTQ people are rare, we had noticed in our own context a remarkable number of openly queer students. Worcester Polytechnic Institute is a small, private STEM institution where approximately 66% of the 4318 undergraduates are engineering majors. And yet, our campus is alive with openly queer students who are not only involved in the student LGBTQ organization, but are also active in all the dominant organizations, including fraternities and sororities. What could they teach us and other engineering educators about inclusivity in engineering education?

We report here on preliminary findings of an NSF-supported research study to understand the conditions that help LGBTQ engineering students feel comfortable in their educational institutions. While several thousand LGBTQ engineering students graduate each year from U.S. engineering schools, the emotional toll of being an LGBTQ engineer (either open or closeted) is so great that it threatens to drive LGBTQ engineers out of the field. Their departure from engineering for reasons that have nothing to do with qualification only makes the field more homogenous and therefore less creative, innovative, and risk-taking, at the same time diminishing a population that is already underrepresented in engineering. While researchers understand the conventions of

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11 WPI Fact Book 2017: Undergraduate & Graduate Student Enrollment, 17.
12 NSF 1640499, “Research Initiation: Understanding the Conditions for Inclusive Spaces for LGBTQ Engineering Students.”
13 This estimate is based on approximately 113,000 bachelors degrees being awarded annually in the U.S. in engineering (B. L. Yoder, “Engineering by the Numbers.” American Society of Engineering Education, 2016) and an average LGBTQ+ population in the U.S. of 3.5% (G. J. Gates & F. Newport, “LGBT Percentage Highest in D.C., Lowest in North Dakota.” Gallup News, February 15, 2013.
engineering culture that can damage non-heterosexual engineering students and engineers, they still know very little about how engineering cultures can support these same engineers.

Background and how we got involved
We became interested in this topic through formal and informal efforts to improve the climate in engineering at our institution, making it more inclusive and supportive of all students. We knew that until recently, studies of LGBTQ students in engineering were limited by small sample sizes, a predictable problem in environments that are not supportive of non-normative sexual identities. Where most LGBTQs are closeted, it is difficult to recruit LGBTQ study participants. Thus, Cech & Waidzunas (2011) studied 17 participants; Cech (2013b) studied 15; Bilimoria & Stewart (2009) studied 14 STEM faculty.16

WPI, in contrast, appears to have a strong openly queer population. Although we have not taken a campus survey to determine the proportion of LGBTQ students, our own observations and those of most people in WPI’s queer community are that students are comfortable being queer and discussing their experiences as LGBTQ engineering majors.17 We conducted an eye-opening, preliminary focus group in 2015 to access the feasibility of this work and discovered that students were not only eager to talk to us, but also very articulate and self-reflecting about their experiences. The WPI Alliance, a student organization of LGBTQ people and allies, whose main focus is to discuss and educate the community about themes related to sexual identity and orientation, averages about 25 students at each weekly meeting, with about 50 attending multiple meetings over the course of the year; at least seven of these, including the past president of the Alliance, are transgender students. Many other openly LGBTQ students are not affiliated with the Alliance because they have found a community of other LGBTQ students and allies in other organizations with different focuses. LGBTQ students are heavily represented at some of these, including the student team responsible for lighting and sound at campus events. As one LGBTQ student told us, “Not everyone needs a safe space” (WPI, 2015).

Our specific research plan emerged from our sense that the LGBTQ community at WPI is relatively large for an engineering school. We hypothesized that there may be a connection to the unique curriculum here, although we have never isolated the effects of our off-campus projects, our six-course humanities requirement, or our strong arts program on LGBTQ students. Rather, we have conducted surveys and interviews to hear from students about their experiences as queer engineering undergraduates. Beyond support for LGBTQ engineering students, our project points the way toward enabling

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16 More recently, an anonymous survey of students enrolled in eight engineering programs turned up approximately 150 LGBTQ student respondents. E. Cech, T. Waidzunas, & S. Farrell (2017), The Inequality of LGBTQ Students in U.S. Engineering Education: Report on a Study of Eight Engineering Programs. ASEE Paper ID #19483.

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engineering institutions to build environments that cultivate valuable skills that may be less teachable than developed when students inhabit open and diverse environments and learn to discuss and reflect on their experiences. These skills include the ability to work on diverse teams, to be attuned to social context, and to reflect and act ethically.

**Methods**

This paper reports on preliminary findings from a mixed-methods research study conducted at WPI. We began with an informal focus group of engineering students who identify as LGBTQ+, then conducted anonymous surveys as well as interviews and focus groups with administrators, staff, faculty, and openly queer engineering students to identify some of the important elements of the most inclusive and supportive spaces at our institution.

A preliminary focus group in spring 2015 with eight undergraduate engineering majors who identified as queer helped us develop our research questions, which include the following:

- Where are the places LGBTQ students go to feel welcome and supported as they reflect on the facets of their identity and try to nurture them without conflict? What are the elements of these places that make them especially supportive and inclusive?
- What experiences foster students' meaning-making capacities?
- How do these places or experiences support the development of sexual identity, resilience, confidence as LGBTQ engineers? How might they be extended into formal learning spaces?
- Beyond clubs explicitly aimed at LGBTQ students, how do other opportunities (student clubs, courses, events, etc.) support the emotional and intellectual development of LGBTQ engineering students?
- How do LGBTQ students develop emotionally during their undergraduate years? What experiences are most formative?
- How can courses and faculty provide these same elements of inclusivity?

**Anonymous survey:** In April 2017 we conducted an anonymous survey of people who had attended a WPI theatre performance, *The Showcase*. We did not have access to the identities of everyone who attended, but using email addresses of the 146 people who reserved tickets online, we surveyed this audience, receiving 80 responses for a 54% response rate. 22 of the 80 respondents indicated that they identify as LGBTQ+, including 15 current undergraduates (14 engineering majors) and 7 alumni. We deliberately surveyed this audience because we knew it would include a large proportion of LGBTQ+ respondents. *The Showcase* was a performance of original plays written and produced at WPI in the previous 34 years, with a twist: all 22 plays were selected by the WPI dramaturgs because they dealt with the theme of queer sexuality. *The Showcase* was a special, 34-year retrospective of LGBTQ-themed original plays staged by WPI’s annual original play festival, *New Voices*. We knew that the audience for this show would contain a large number of queer people and allies, and we were particularly interested in hearing from these people about their perceptions of the climate at WPI for LGBTQ+ engineering students. The questions we asked in that survey had to do with the climate at
WPI, including general questions about more and less supportive spaces and experiences, as well as specific questions about the role of the theatre program in promoting a supportive climate. We also asked respondents if they would like to be included in a follow-up interview or focus group. Six current engineering students and three alumni, all of them self-identifying as queer, indicated that they were interested in talking to us. We have subsequently identified other queer students, by word of mouth, for interviews. We have begun conducting these interviews and analyzing transcripts.

**Interviews:** Based on responses in the anonymous post-Showcase survey, we also began interviewing selected administrative and staff personnel, those who could tell us about institutional policies, practices, and services to support queer students. We spent summer 2017 interviewing these people, including three administrators from the Dean of Students Office, one Associate Dean of First-Year Programs, two from the Office of Multicultural Affairs, one from Career Services, two from Student Counseling Services, one from Residence Life, and two faculty. We also interviewed two transgender students who had done a junior-year research project on support for transgender students, and one non-identifying student who was responsible for bringing a queer poet to campus for Black History Month. During the months of August-December 2017 we continued our interviews, reaching 2 LGBTQ alumni. We will continue interviewing LGBTQ engineering majors and alumni during spring 2018.

**Focus group:** We are in the process of scheduling a focus group for students in The Alliance, WPI’s oSTEM-affiliated organization for queer students and allies.

**Preliminary findings:** Although we have only begun to analyze our data, our interviews and surveys are helping us learn in some detail about the experiences of LGBTQ engineering students and how curricular and co-curricular reforms can contribute to LGBTQ students’ experiences. Our preliminary findings identify those practices and spaces that are most conducive to the growth, success, and self-confidence of LGBTQ engineers, as well as suggest how their professional formation (along many axes including sexual identity) transpires. We have identified the following themes:

**Sexual identity and preference aren’t issues for most students**

“I feel like in a lot of spaces, it’s a non-issue being queer,” we heard from a nonbinary engineering undergraduate. This report was borne out by our various conversations with Student Affairs staff (Residential Services, Dean of Students, Counseling and Development) who reported no known cases of homophobic or transphobic conflict or judicial cases among students. In our 2017 anonymous survey of WPI theatre-goers, of the 14 respondents who identified as LGBTQ+ engineering majors or engineering alumni, 93% characterized WPI as “welcoming” for LGBTQ+ people, with 64% indicating that WPI was “fully welcoming” and 29% indicating that WPI was “somewhat welcoming.” One (7%) LGBTQ+ engineering major characterized WPI as “neither welcoming nor unwelcoming,” and no LGBTQ+ engineering majors perceived WPI to be an unwelcoming place for LGBTQ+ people. The ten comments supporting these characterizations indicated that the welcoming atmosphere was due primarily to an
absence of negativity or hostility towards queer students. Here is a representative comment from a student who found WPI “fully welcoming”: “I have never once felt belittled, judged, or out of place by anyone I have encountered while on campus for my sexuality/orientation.” Two of the comments explaining the choice of “somewhat welcoming” point out that transgender students have a more difficult time feeling welcome, while the third reports, “I think it’s a live and let live attitude.” The one respondent to choose “neither welcoming nor unwelcoming” explained, “There is not overwhelming visible support for the LGBTQ+ community at WPI, but when the topic comes up, no one has any issues with it.” We conclude that at its best, these students report campus to be warm and accepting; at it worst, people don’t want to talk about sexual preference or identity.

The influence of a changing world

Today’s students arrive on campus much more comfortable with the presence of LGBTQ people, thanks to changing social norms, the presence of queer celebrities, and certain legal protections for LGBTQ people. Our Dean of Students, now in his 24th year at WPI, noted “how we as a society have progressed in terms of things that we did not talk about that now we talk openly and talk about much earlier, so that in general our students coming in are much more socially savvy than we are, and are more accepting than [our generation]. So the things that we might think are a big issue, to them really aren’t because they’ve been used to navigating them at a much earlier age.” Many faculty and staff pointed to changes in the outside world, particularly changes at the federal level regarding the legalization of gay marriage, the lifting of “Don’t Ask, Don’t Tell” in the military, and the appearance of transgender celebrities in the news.

The importance of openly queer faculty and staff

The presence of well-regarded LGBTQ faculty and staff on campus helps establish an inclusive environment for a range of sexual identities. WPI’s first openly LGBTQ professor, hired by the Humanities Department in the 1980s, shared with us her experiences as a quietly queer person at WPI who over time became more confident in calling out student bigotry. “I never hid the thing,” she told us, “but if a student made a joke in class or something, I had a list of things that I would say that I practiced: ‘Be careful what you say, you never know who you might be talking to.’” Or, “One in ten, one in ten, you know.” Eventually, the students “knew that I wouldn’t brook any discrimination at all.” This same professor points to the appointment of an engineer some ten years after she started at WPI. This man was distinguished in his field, confident, and the first openly gay engineering professor at WPI. His presence, the humanities professor told us, “was a catalyst for people saying, you know, ‘there’s a prominent figure here, and so it’s okay that maybe other people are out.’” The more recent arrival of openly LGBTQ staff has also been a catalyst for change, most notably in the Residential

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18 In this survey, we asked students to choose how to describe WPI as a place for LGBTQ+ people, with the options being as follows: Not welcoming at all; Not very welcoming; Neither not welcoming nor welcoming; Somewhat welcoming; and Fully welcoming.
Services department. The first out staff person in that department, hired to oversee the residential halls, made sure that his sexual identity was “very evident” to residents so that he could be a resource to queer students. In subsequent years, the office deliberately recruited professional staff with a variety of sexual identities; today, half the people on that staff are openly LGBTQ. The sexual identities of these people are part of their commitment to diversity, equity, and inclusion, although this commitment extends well beyond expressions of sexual identity. The Office of Multicultural Affairs has also recently deliberately hired LGBTQ staff in order to extend the mission of their office beyond gender and racial diversity. In the words of one undergraduate dean, “there are some very well-regarded [LGBTQ] people here who are quite open about their own sexuality.”

The efforts of allies to advance an inclusive environment

Allies play an important role in establishing safe spaces and in advocating for fairness and inclusivity. In the early days of WPI’s student LGB group, an ally in the Student Affairs office helped facilitate group meetings by conveying to interested students the meeting time and place for this group, so that students could attend without having to out themselves. As the campus climate grew more accepting of queer students, this practice was abandoned and meeting times were brought into the open. But allies have continued to be important in advocating for policy changes and in promoting a campus climate of tolerance and inclusivity. Allies can have a powerful influence by modeling inclusive behavior, introducing themselves and their preferred pronouns, using examples of different identities when teaching or training, ensuring that their language is inclusive, and stepping in when they see divisive or intolerant behavior.

The importance of the humanities and social sciences within an engineering curriculum

When engineering students encounter the humanities and social sciences in meaningful ways, they are more likely to see the work of engineering as belonging to the whole person and the whole society, and to work towards inclusivity. The integration of the humanities and social sciences with engineering can have an important impact on students. Our Dean of Students noted that WPI students learn to appreciate “difference . . . and working with people who are different” when they encounter an integrated “project experience” and the humanities and social science coursework that prepares them for engineering projects. Even when not integrated with engineering work, an institutional emphasis on study in the humanities and social sciences can orient a community toward a preference for social justice. In the words of one engineering student, “Theatre is always on the cutting edge of social and cultural issues, and WPI’s program has never backed down. From my very first year in WPI theatre when we produced The Laramie Project, I have always seen the theatre push the discussion to the WPI community.” By emphasizing the importance of humanistic study, an engineering school can situate technological advances within clear human contexts, demonstrating the importance to engineering students of pursuing social justice in their engineering work.

Engineering assignments that include a social component
Engineering assignments set within a societal context give students opportunities to learn engineering disciplines within their broader human circumstances and to be changed by the experience. Although all engineering takes place within some specific context, faculty often simplify engineering material by abstracting the technical knowledge. What we gain in simplicity, we lose in other ways, as students forgo opportunities to see themselves and their values within the technical material. We found that when students are given the opportunity to frame a problem rather than merely solve a problem they receive, they are free to explore topics that are meaningful to them and to make institutional change on campus. We interviewed two transgender engineering students and the professor who advised their project, a proposal for campus-wide pronoun training and an LGBTQ+ resource center. Both students attested to their strong motivation to pursue this research; in one case, it provided a technically oriented channel for advocacy to a student who does not identify as an activist. “It felt meaningful when I was giving the presentation,” this student recalled, “standing there in the campus center for hours, just educating and hearing all the support. That was good.” These students also discovered that the community around them was changing its attitudes during the course of their 21-week project: at first, people surveyed about multi-stall gender-neutral bathrooms were opposed to the idea. According to their faculty advisor, the students “took that negative feedback and turned it into a solution that they could get around that. So, instead of focusing on multi-stall bathrooms, they focused on single-stall,” a small change that can be accepted by stakeholders. By the end of the project, attitudes within the community had softened toward gender-neutral bathrooms. As the advisor explained to us, “Nobody had ever asked that question of [survey respondents] before, so that was their gut reaction, instead of taking a moment to sit and think about the topic and how relevant it is . . . . That survey started the conversation . . . that contributed to people changing their mind or realizing, ‘Oh, this is not a bad idea.’”

A curriculum that gives autonomy to students
Students who develop expertise on some socio-technical issue can become expert consultants to campus decision-makers. The two student teams who researched the topic of transgender college students integrated their own values and aspirations with the technical expertise they developed in the course of the project. By the time they finished their projects, they knew more than any WPI employee about the needs of transgender students, the best practices at other institutions, the attitudes and desires of the WPI community, and what design changes might be most successful in that context. The work they had done was not only a valuable learning experience for them, but it introduced a campus-wide conversation about transgender students and it concluded with specific recommendations tailored for WPI’s particular institutional context. The report has prompted WPI’s administration to take a new approach to bathrooms: the campus now includes either single-stall or multi-stall gender-neutral bathrooms in 17 buildings and the university has made a commitment for gender-inclusive bathrooms in all new buildings. All gender-inclusive bathrooms are indicated on WPI’s interactive campus map. In other ways, students have influenced the development of more inclusive policies. Recently WPI implemented a “Preferred Name” initiative, bringing IT and Registrar staff together to work around technical impediments in the database system so that students can now designate a preferred name to go on all their official documents. New ID cards also
include the preferred name on the front, alongside a photo, and the legal name on the back. Both efforts happened in response to student requests. WPI’s Safe Zone is about to implement “pronoun training” on the recommendation of a student research team. When the curriculum empowers students to conduct original research on important matters, students experience the feeling of becoming experts, and faculty, staff, and administration often turn to their students for guidance about policy changes. WPI’s Director of Student Counseling and Development Services speaks for the attitude of many student affairs staff on campus: “We listen to what people are telling us about their experience.”

**Collaborative learning**

*Collaborative can help to shape an inclusive campus culture.* Since 1970, WPI’s curriculum has included three major projects, including two collaborative projects and one interdisciplinary project. Many courses also include team projects, interactive breakout sessions, and other forms of active learning that emphasize collaboration rather than competition. One of our alumni told us that he had been closeted at home and in school until his sophomore year at WPI. In a transformative experience, he was assigned to a group project in his first engineering course within his major. “Then just over the course of the term with us working together so much we became friends, and I met their friends and they became my friends. And so after meeting those people it was just tremendously easy to come out of the closet, and so I finally did I think at the end of my sophomore year.” Because his friends received the news easily, “it was just very easy to come out to other people after that, after I knew I had a good support system.” Even group assignments of shorter duration can be helpful in promoting an inclusive environment: one of our transgender students described the humanizing effects of small breakout groups in a large lecture: “It just feels more comfortable if you don’t go to a lecture hall and know no one, and just sit there and try not to be noticed. Instead, you don’t dread the moment that someone interacts with you, ‘cause they already know you.”

**Teamwork and support for well-functioning teams**

*Efforts to support well-functioning teams can promote a socially accepting campus environment.* Repeatedly we heard from faculty and staff across campus who are working to support effective student teams. The Student Counseling and Development Office, for instance, has enlarged its mission from simply working on student development to addressing community development. This work began as an effort to support healthy team dynamics. Counseling staff often work with faculty preparing to advise student teams off campus, and they also consult with dysfunctional student teams during the course of project work. Over time, the leaders of this office realized that their role in supporting students, particularly within a collaborative, project-based curriculum, required them to help the entire community be more supportive. “We value collaboration,” the Director of this office explained to us; “Top down, bottom up, that sense of we look out for each other, we engage with each other, which then breeds openness, acceptance, what I call social diversity. . . This is a very socially accepting environment.” Educational programming in the Residence Halls is another initiative that developed under the influence of both students and Residential Services staff. This work takes place in the training of student Resident Advisors, in the educational programming that happens in the dorms, and in conflict resolution services. In turn, the habits and
dispositions cultivated in these programs emanate out across campus, helping to shape a campus ethos.

**Teaching for inclusivity**

*When considering the education of the whole student, faculty and staff are partners, and all campus spaces can become classrooms.* Everybody does this differently, depending on their discipline and personality. But we found a strong commitment to inclusivity among many faculty and staff, and much conversation about how to guide students in this learning. The humanities professor described a trip to Europe with students in the 1980s. “It was interesting because people were freed, in this group, from conventions and they talked about stuff. You can imagine, when you’re together for that long, like, three weeks, going on busses, going on planes. I had a bunch of kids ask me about it, and so, we met in a bar, and I just said, ‘Yeah, do you have questions? Is it a problem?’ And then two or three people came out, and you know? When you get close, when you go through an experience together that is miraculous and wonderful, it’s so much easier, and differences don’t matter as much.”

**Close alignment between faculty and student support services**

*The skills that promote strong project-based learning outcomes are both academic and social, and must be taught by a diverse and collaborative team from across campus.* WPI’s tradition of project-based learning brings faculty together from across disciplines, so that humanists and engineers enjoy many opportunities to co-advice, to serve together on committees, to become friends, to co-teach, and to collaborate. The same is true of relationships between faculty and staff, so that library staff, counseling staff, instructional technology staff, and staff the global studies program work together and with faculty to ensure student success in and out of the classroom. These collaborations make it more likely that everyone responsible for the student experience is more likely to consider all of its dimensions, including intellectual, social, and psychological, and to know whom to call for guidance. “Students don’t compartmentalize themselves,” we heard from the Dean of Students. “They are here as a student, so they have academic interests, they have out-of-class interests, and for them it’s just a single existence. So in my work and our work, our academic partnerships are as important as our non-academic partnerships.”

**Universal commitment to the student experience**

We talked to a career counselor at the Student Career Services Center who has worked to develop resources for queer students preparing for the job market. In addition to talking to students about the decision to come out during a job interview, career counselors at WPI help prepare students to think about taking jobs in states that have fewer or no protections for LGBTQ+ people. “If they’re going to Oklahoma,” this person told us, “they need to understand the legal protections they don’t have there, that they do have here.” LGBTQ people are “a group that you can legally discriminate against in certain parts of the country still in terms of employment,” our source told us. In Residential Services, one of the professional staff organized a 5-week course on social justice and
diversity for university employees and student Resident Advisors. He was recognized for this work with a Diversity Award given by a professional organization.¹⁹

The capacity of institutions to make cultural change on their campuses

In spite of the dominant, heteronormative culture of engineering, engineering educators have immense power to change the climate of our campuses if we choose the right allies. Our conversations with Student Affairs staff helped us understand that Generation Z students, and particularly engineering students, are generally more accepting of differences than we might imagine. We heard repeatedly that STEM students, especially engineers, tend to be quite tolerant of differences, if only because many of them were marginalized as “nerds” in high school. When they arrive on campus, therefore, they want to be “part of the solution.” Engineering colleges can be a force for positive change, especially for young people who arrive at campus ready to reinvent themselves. To position ourselves to make this change, we need to work together as a team of faculty, staff, administrators, and student leaders all promoting diversity and inclusion that honors all varieties of sexual preference, identity, and expression. The leaders at WPI’s Student Development and Counseling Center have included “Community Development” as part of their mission for the past seven years, since thinking about what they might do to help prevent student suicide. Their solution was to actively engage the entire campus in student support, following the creation of a successful grant-funded Student Support Network program. This program trains 100 students and 15-20 faculty each year in “empathic responding,” which the Director of Counseling describes as “a skill that underscores acceptance of oneself and others. To be able to respond in a truly open and reflective way, to be curious about someone else’s experience in the world, those are essential elements of empathy.”

Although WPI’s 48 year-old project-based curriculum was clearly the impetus for a culture of inclusivity, we suspect that project-based learning is not necessary for the inclusive environment that has evolved here. People in favor of cultural change can work through existing institutions. One of the participants in our study explained how they use their role as a tour guide to encourage open-minded and to discourage closed-minded prospective students from enrolling. This person told us, “I will always mention that I am involved with the Alliance [WPI’s LGBTQ + allies club]. . . And I always mention that I’m an immigrant. I try to pull out as many [identities] as I can in the couple seconds that we get to introduce ourselves, just because I want to repel [intolerant] people and I also want to attract people to be like, way, really? I can do that.” We were particularly struck by the potentially transformative role of fraternities and athletic teams in a campus culture. Although the heteronormative traditions within these groups would seem to place fraternities and athletics among the least tolerant cultures on campus, WPI’s Director of Counseling identifies both groups as “a force of change.” Depending on how they are enlisted, both kinds of organizations, with their immense social capital, can become

¹⁹ The Northeast Association of College and University Housing Officers (NEACUHO) gave its 2017 Diversity Award to Jake Goldblum, WPI Complex Coordinator, for “exceptional service in the areas of social justice and diversity through advocacy, leadership, mentorship, educational initiatives or programming at the home institution.” NEACUHO website.
super-allies in the march toward greater inclusivity. In 2014, two WPI fraternity brothers, recognizing the important role that the Greek system played in creating unsafe campuses, established the Ethos Program at WPI to bring fraternity men together to help prevent sexual violence. Recognizing the need for more conversation and awareness about sexual violence on college campuses, these men founded a program, using the Greek word for “character,” that would convene fraternity brothers and male staff to talk about masculinity, sexual violence, and how their own behavior could help to create unsafe environments for women. Likewise, several fraternities, motivated by openly queer members, have scheduled Safe Zone training and taken other steps to become active allies. Several years ago, WPI fraternities and sororities organized “How to be a Greek Ally” for Ally Day. With strong support from the Student Counseling and Development Center, which has taken the unique position of moving beyond individual student counseling to make community change, fraternities and athletic teams have begun to prove themselves agents of positive cultural change. In the words of the Director of Counseling, these organizations “are tremendous potential allies . . . from a social and cultural point of view.”

The important role of individuals
Small and large, the institutional changes we have observed —at the ASEE, at the NSF, and in particular fraternities, courses, and administrative offices at WPI— began with an individual or small group of individuals who were moved to make a difference. We heard this repeatedly in our interviews: from the administrative staff member, inspired by a gay relative to help facilitate meetings of WPI’s gay student group in the 1980s when it wasn’t safe to be openly gay on campus, to students who alert administrators about exclusive policies and practices, to college staff who listen to students and work to make changes, to faculty in engineering education who make it their responsibility to counteract intolerant attitudes within their profession, to leaders at federal funding agencies who defy conventional practices to encourage this work. As Donna Riley pointed out to us, “how innovation has to happen, it does require some risk-taking. And a lot of people really did put their necks on the line for those initial LGBTQ funded projects.”

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