

# LAFAYETTE

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# COLLEGE

Office of the Director of Engineering

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## **Lafayette Engineering Diversity, Equity, Inclusion, and Justice Commitment January 2022**

Engineering empowers society in unprecedented ways. It is at the core of innovation; is central to addressing domestic and global challenges; and provides new and imaginative ways to enrich people's lives. A fundamental requirement for growth of this enabling power as well as a core value of our community is to attract, engage, and retain people from all segments of society by actively embracing equity and justice in all of our endeavors.

This document includes many of the recent and ongoing efforts aimed at fostering a sustainable and inclusive climate for members of the community to thrive. It is not intended to draw conclusions on equity and inclusion in the Engineering Division but to foster conversations.

### Commitment

The premise of Lafayette Engineering's Diversity and Inclusion Initiative is that no single approach or program will create the desired result of a diverse and inclusive climate. In other words, there is no easy solution or "quick fix". Moreover, although progress can be made in the short-term, the goal of an authentically inclusive ecosystem will take years to achieve. This lag-time necessitates urgency, with efforts to fully engage all members of the community. As such, Lafayette's engineering programs are dedicated to providing and fostering a welcoming and inclusive climate for all to learn, teach, work, develop, and thrive. The engineering programs strive to empower students to be positive change agents, enabling them to develop sustainable solutions to socio-technical problems. This commitment to an inclusive culture has had a significant influence on decisions across the engineering programs, and is predicated on the fact that creating an inclusive environment touches every aspect of the programs, including: curricular offerings, facilities, admissions and financial aid programs, research opportunities, faculty and staff, and more.

Lafayette Engineering is committed to action and strives to take a leadership role in support of inclusion, equity, and diversity. Lafayette was among a small group of engineering schools that initiated the national [Engineering Deans Diversity Initiative](#) through the ASEE in 2015. Signed by over one hundred engineering deans in its first 10 days and over 250 since its launch, this national program has taken a systematic approach to foster an inclusive engineering climate and create real and lasting change. It has been signed by schools large and small, and Lafayette Engineering is proud to have been an integral part of its development. Through this program, Lafayette Engineering's has committed to:

1. Inspire diverse students at the K-12 level about STEM

2. Recruit, support and retain diverse students in Lafayette's engineering programs
3. Connect Lafayette engineering graduates with opportunities for employment and graduate school opportunities
4. Recruit, support and retain a diverse faculty through best practices

In the sections that follow, a broad range of efforts to achieve these goals are highlighted and are grouped loosely into categories, but in fact overlap multiple categories. For example, facilities improvements designed to create more inviting spaces are clearly meant to support a sense of belonging and therefore impact student retention. That said, these are also relevant to recruitment of under-represented groups. Another example is the Kate and Walter Scott Chaired faculty position, who serves as a mentor for underrepresented students. This faculty Chair is included under student retention, but also could be included in the Faculty and Staff category. These examples demonstrate the way in which equity and a sense of belonging touch every aspect of the engineering programs. The key in reading the sections below is that the goal is to create an inclusive culture that permeates all aspects of engineering programs.

### Financial Aid

- In 2021 Lafayette made two changes to improve access for low-income and middle-income families. Applicants who attend high schools at which 75% or more of students qualify for free or reduced lunch will no longer have to complete the complex College Scholarship Service Profile in order to receive financial aid. And applicants from families with total family incomes of up to \$150,000 and typical assets for families in this income group will have their financial need met through grants and work-study, without any loans.
- From 2015-2020, the Engineering Division raised \$5.6M specifically for need-based financial aid in order to recruit more students without regard for their ability to pay. This effort was part of the College's broader effort which raised more than \$85 million for student financial aid.

### Student Retention

- The Engineering Division developed an Engineering Peer Mentoring Program at the suggestion of student leadership. The program pairs first and second year students with junior and senior students to help them navigate various aspects of student life. These types of mentoring programs have been shown to increase student retention in STEM fields. Recent activities have included a wide variety of community building activities from tie dying to food trucks to picnics and outdoor games.
- The college established the Kate and Walter Scott Endowed Faculty Chair in 2016. ChE Associate Professor Lindsay Soh holds the position. This chair is responsible for mentoring students from diverse backgrounds, including the Minority Scientists and Engineers chapter, which serves as an umbrella group for the National Society of Black Engineers (NSBE) and the Society of Hispanic Professional Engineers (SHPE).
- In direct response to Instagram postings on *black.at.laf*, student leaders from TBP, NSBE, AIChE, IEEE, ASCE, and ASME met with the Director of Engineering to discuss suggestions for more equitable and inclusive support from the division. The initial

meeting was held in July 2020. Results of these meetings include:

- The formation of *Engineering Student Council (ESC)* as a parallel organization to *Engineering Council (EC)* (a long-standing group of the department heads and program chairs in engineering). The purpose of *ESC* is to serve as a formal leadership structure for all student organizations within the Engineering Division and provide a voice for students within the division.
- With the formation of *ESC*, two student representatives from this organization serve on *Engineering Council (EC)*, thereby giving students a voice in the “room where it happens”. This student input is already having a positive impact on things such as Admissions programs, facilities upgrades, course scheduling, and more.
- *ESC* has taken ownership of the Engineering Activities Fair and redesigned it so it is not duplicative of the college-wide involvement fair.
- Expansion of the peer tutoring study program.
- The Engineering Division implemented a formal peer mentoring program, see above.
- Discussions of adding a new role as Resource Representative. This person would have a broad knowledge base and serve as a liaison to help students make connections when uncertain where to turn.
- *ESC* and *EC* are working together to bring a greater representation of people and majors for on-campus speakers.
  - Diversity beyond gender (sexual, racial, socio-economic, etc) of speakers, particularly for the ES101 co-curricular activities.
  - More POC alumni talks on campus/Zooms.
- Advising
  - *EC* has discussed various ways of giving students more agency in selecting and changing their advisors. This process is a work in progress.

### Student Professional Development

- Each engineering department includes a graduate advisor who serves as a counselor for students considering graduate school, and meets with all interested students to discuss their future plans one-on-one.
- Lafayette Engineering established and maintains ongoing relationships with graduate schools including: Dartmouth College, Temple University, Worcester Polytechnic Institute (WPI), Lehigh University, Tufts University, University of Wisconsin, Duke University, University of Virginia, Cornell, Virginia Tech.
- The Lafayette-Tufts Bridge program was developed to facilitate Tufts’ recruitment of Lafayette students. Students in the M.S. Bridge Program receive guaranteed tuition scholarships, a streamlined application process, the ability to earn a master’s degree in as little as one year, as well as additional benefits.
- The division works with Lafayette’s Gateway Career Center to host professional development events in Acopian Engineering Center throughout the year, including professional development lunch talks, workshops, alumni career panels, corporate meet and greets, and more. One example is Gateway’s Making the Most of Conference

Attendance workshops held annually for students attending SWE, NSBE, SHPE, and other national conferences. The division provides logistical and financial support for these events.

- Chemical and Biomolecular Engineering Department's hosts Professional Development Seminars and an Annual CHE Symposium with a diverse (gender, race, industry, experience) array of alumni speakers and topic areas.
- All of the engineering programs have active student organizations to provide a greater sense of belonging and community. Groups engage in conversations on campus topics and events.

#### Conference support:

- For the 2021-22 academic year Lafayette Engineering provided financial support for 18 students to attend the SWE conference virtually, and is providing financial and logistical support for 8 students to attend the SHPE Convention. The Division will support students to attend NSBE in the spring, registration not yet available.
- During the pandemic in 2020, SWE and SHPE conferences were changed to virtual and students did not attend, and the NSBE conference was cancelled.
- In 2019 the division provided financial and logistical support for 19 women for the SWE Conference, six students for the SHPE Convention, and 11 students for the National NSBE Conference. (Attendance at the 2020 conferences, which went virtual due to the pandemic, was slated to be supported.)
- In 2018 Lafayette Engineering provided financial and logistical support for 11 students' attendance at the National Society of Women Engineers (SWE) Conference, eight students at the SHPE National Convention, and more than 20 students at the Black Engineer of the Year Conference.
- In 2017 William Jeffers Director of Engineering Scott Hummel and 17 students attended the Black Engineer of the Year Awards (BEYA) gala in Washington D.C. honoring [Dr. Eugene DeLoatch '59](#). The division provided financial and logistical support for students' attendance.

#### Faculty and Staff

- The division hosted [Safe Zone](#) training to assist faculty and staff in supporting LGBTQ+ identified community members in February 2020. The workshop was attended by one third of division faculty and staff, with an additional one third previously certified in Safe Zone training.
- The College implemented a mandatory diversity training program for all faculty and staff.
- The division and College work to bring best practices to faculty searches. All members of faculty search committees are required to participate in workshops on unconscious bias and other factors that can affect hiring.
- The Electrical and Computer Engineering department was successful in hiring two women faculty members in tenure-stream positions in 2020.

- The Engineering Division is among the top 15 engineering schools in the country for the percentage of women in tenure stream positions. ([Engineering By the Numbers 2020](#))
- The number of Black faculty at Lafayette, including Engineering, is an area where much improvement is needed. Lafayette engineering seeks to hire more Black and other under-represented faculty through the programs described below, as much progress is needed both at Lafayette and the national level. Specifically, the percentage of Black engineering faculty at both the national and local levels are approximately 2.5%. Lafayette Engineering strives to become a national leader in opportunities for Black and other under-represented faculty as it has for women over the last decade.
- Lafayette's Strategic Hiring Initiative seeks to recruit members of underrepresented populations in all programs and departments at the College, including Engineering.
- The College practices Target of Opportunity recruiting, an aggressive recruitment program in support of the College's strategic initiatives which include the goal of attracting a diverse faculty, broadly defined. In exceptional cases, candidates whose potential interest in the College is identified outside a normal search process may be offered appointments to the faculty without conducting a national search.
- The College opened the Hanson Center for Inclusive STEM Education and Studies in 2019. The Hanson Center is a hub for community and collaboration, coordinating support for students and faculty in STEM with excluded identities, faculty development of inclusive pedagogies and curricula, and faculty research in inclusive education and STEM studies, and will serve as both a resource and a collaborative partner.

### Curricular

- Engineering student leaders and Engineering Council collaborated to add a DEIJ component to ES101, a required course taken by all first-year engineering students. The program featured Office of Intercultural Development Director Robert Young '14 leading conversations around implicit bias and microaggressions. The inaugural workshop was included as a required component by all 11 instructors in 2021, and will be added to the syllabus in future ES101 courses.
- Departments within Lafayette Engineering are working to address equity and inclusion in their programs and courses. Below are a few examples to show the range of focus:
  - In the area of access, the ChE department has enhanced accessibility to course resources: Created textbook and video tutorial repositories, as well as open educational resources for multiple core courses. In addition, the program offers a wide range of elective offerings across various sub-disciplines, (bioE and enviroE) which typically yield higher percentages of women.
  - Much of Engineering Studies coursework and programming are aimed at a more equitable engineering profession in terms of demographic makeup and the kinds of work engineers do. Core courses and upper level electives are routinely structured for community engagement projects that teach students about including diverse voices into the design process, along with considering issues of race, class, gender, and disability as part of the character of technology and engineered work. The program furthermore leads efforts from the engineering division and across campus to build collaborations between the humanistic,

ethical, political, environmental, and cultural elements of engineered work. In addition, 34% of EGRS graduates have been female over the past 20 years, while 19% have been students of color over that same span.

- Integrative engineering is working to incorporate content on social and environmental justice into core systems courses, in particular in the context of the 300-level courses in each area of focus. The program advisory board is collaborating with ME Professor and Faculty Co-director of the Hanson Center for Inclusive STEM Education Jenn Rossman.
- BS Engineering/AB International Studies dual degree program mission statement includes “embracing the continuing globalization of engineering and technology, the program prepares engineering students, through foreign language study, internationally oriented coursework, and an abroad immersion experience, for lives and careers in non-English-speaking countries.” These aspects of the program require students to confront issues of diversity and inclusion throughout the program. Specifically,
  - Required coursework in International Affairs addresses concepts such as racism, colonialism, critical theory in globalization, race in the context of colonial power, environmental/climate justice and global activism.
  - In many cases, these courses require students to attend various guest lectures that discuss concepts of DEI.
  - The required immersion experience exposes students to cultures, ideals and norms that are not their own. Reflective writing on their immersion experience provides an opportunity to contextualize their experience through a number of different lenses.
- Mechanical and the Electrical & Computer Engineering departments are having extensive renovations to make their spaces more inviting and welcoming. These spaces will be well lit, have casual gathering areas for students to foster community, and are designed such that students feel comfortable and safe.
- Mechanical Engineering department is updating their advising approach to make explicit the numerous “pathways” to completing the BS degree in order to invite and better support students with different secondary education experiences. The department is also working to bring diversity, equity, inclusion, and justice concepts to core courses in which content has traditionally been restricted solely to math/science theory. The department recognizes these and additional changes require a reflective and educated faculty and its members are already attending the development opportunities being sponsored by the College to become better informed and identify best-practices.
- Integrative engineering with focus areas was introduced in fall 2019. One of the factors in determining the focus areas was selecting those that would attract more women and under-represented groups (*Solving the Equation*, AAUW, 2015). This degree program fosters connections across disciplines, more fully integrating engineering and the liberal arts. Students choose a thematic focus in bioengineering, environment, energy, or robotics. Environmental engineering and bioengineering have the nation’s highest percentages of women compared to

other engineering programs, with rates of 51.7 percent and 48.1 percent respectively ([Engineering By the Numbers 2020](#)). Additionally, these two fields also have the highest percentage of doctoral degrees granted to underrepresented minorities, and therefore, one can presume that faculty hiring of underrepresented people will be more likely with the Integrative Engineering program now in place.

- Civil and Environmental Engineering Department conducted a survey among faculty members to collect information regarding how individual ES and CE courses address issues of equity, social justice, racism, discrimination and bias. The information is being used to further departmental discussions and improvements. A few examples of DEI in CE course content include:
  - ES 101: In discussion life cycle assessment, the impacts on marginalized groups that may result from processes related to material extraction for, manufacturing of, and disposal of products are discussed.
  - CE 321: Students learn about current issues of environmental racism and environmental justice in a lab and research an environmental racism case.
  - CE 321: Includes a lab session and movie on social and environmental justice followed by discussion.
  - CE 351: Uses a case study of the Flint water public health crisis emphasizing environmental justice.
  - CE 474: Students do readings on DEI and listen to podcasts on implicit bias and on workplace diversity. They submit their notes and reflections on each of these topics relating the topics to their own experiences and to previous coursework both in and out of engineering. Students take two implicit bias attitude tests (one on race and one on gender -- <https://implicit.harvard.edu/implicit/>) and submit a memo conveying the results of their tests and their reflections on those results. Students ask their alumni partner how the partner's company handles issues of DEI and report to the class on that information.
  - CE 462: Includes the levee floodwall/failures during Hurricane Katrina and the social and engineering lessons learned.
- ES101, which is required for all engineering majors, was redesigned to demonstrate the relevance of engineering and its impact on society, which has been shown to be effective in improving the persistence of underrepresented students in STEM fields ([Solving the Equation, AAUW, 2015](#)).
- ES102: Introduction to Spatial Visualization Skills is offered every fall. It has been shown at the national level that improving Spatial Visualization Skills (SVS) increases student persistence and contributes to student retention in STEM. Increased SVS also contributes to greater self-efficacy in students' beliefs in their abilities to succeed in courses dependent on strong SVS like engineering graphics. Preliminary student data from Lafayette on persistence and grades in upper class STEM courses indicate that those who take the course do better than those who are offered the course and choose not to take it.

## Co-curricular Offerings

- The Engineering Division's 2021 Resnik Lecture featured Leland Melvin, engineer, educator, former NASA astronaut, and NFL wide receiver.
- The Engineering Division co-sponsored The Hanson Center for Inclusive STEM Education event: Ainissa Ramirez: Scientific Storytelling and The Alchemy of Us in September 2021.
- The Engineering Division's 2016 Resnik Lecture featured the first black woman in space, [Dr. Mae Jemison](#).
- The Engineering Division provides financial and logistical support for student professional organizations that provide opportunities to traditionally under-represented groups including: Society of Hispanic Professional Engineers (SHPE), National Society of Black Engineers (NSBE), Society of Women Engineers (SWE), and the local Minority Science and Engineering (MSN). Additionally the Engineering Division has provided financial and logistical support to students to attend conferences such as the Black Engineer of the Year Award (BEYA) in Washington, D.C.
- The division cosponsored the November 2018 Hidden Figures Week featuring panel discussions, lectures, and a keynote address by [Margot Lee Shetterly](#), author of *Hidden Figures*.
- The division cosponsored the [April 2019 Women in STEM Week](#). The program featured panel discussions, lectures, and luncheons exploring issues related to underrepresented groups in science, technology, engineering, and math.
- Lafayette Engineering co-sponsored [Dr. Ruha Benjamin](#), associate professor of African American Studies at Princeton University, with the Hanson Center for Inclusive STEM Education and Studies as the 2020 Resnik and Landis Lecture Series. Dr. Benjamin, a sociologist who specializes in the study of science, technology, and medicine; race and gender; knowledge and power, is the author of several books, including *Race After Technology*. A course on this topic is planned to be offered in academic year 2021-22.
- Through suggestions and coordination efforts with students and the Engineering staff, the Division celebrates and recognizes Black History Month, Women's History Month, and Hispanic Heritage Month through social media outlets. It is envisioned that this activity will lead to the invitation of several guest speakers.
- The Division hosts annual lecture series such as the Resnik lecture series and is committed to bringing a more inclusive array of speakers. The Division encourages members of the community to recommend speakers through the Engineering Student Council, Engineering Council, or the director of engineering's office.

## Research Opportunities

- The [Clare Boothe Luce Research Scholars Program](#) (CBL) was established in 2016 to provide summer research opportunities and mentoring for women engineering students. The program strives to equip women with the best possible preparation to pursue graduate education and careers in STEM research. More than 50 women have



participated in the program through summer 2019.

- Lafayette was awarded another three-year Clare Boothe Luce grant beginning fall 2021. Lafayette's expanded CBL program not only supports women, but also adds an ally component providing opportunities for male allies to participate and support the community.

### Facilities

- Since 2019 Acopian Engineering Center has undergone several large renovations to create more inclusive and welcoming spaces. Renovations included:
  - Collaboration rooms featuring glass walls and natural light designed to reflect a culture of inclusion.
  - Gender neutral, improved restroom facilities.
  - More welcoming decor and wall hangings, including the addition of the 3' x 7' framed diversity statement near the entrance of the building.
  - Multiple gathering spaces for students to study and collaborate in a safe and welcoming environment.
  - New computer labs with better lighting and visibility to foster usage by a more diverse array of students.
  - Reconfigured several classrooms into flex-labs featuring convertible work tables with stowable computers.

### Student Recruitment

- The Engineering Division works closely with the Admissions Office, which prioritizes access and inclusion for underrepresented populations through:
  - Targeted recruitment outreach in urban and rural schools
  - Partnerships with organizations that champion the needs of historically underrepresented students (Posse Foundation, Sponsors for Educational Opportunity, Global Citizen Year)
  - Coordination of on-campus visits with high schools and community organizations to give students whose families do not have the means for traditional visits the exposure to the possibilities of college
- Lafayette has engineering-specific admissions programs that match women students with prospective high-school girls, including an overnight program and an accepted-student event that foster a supportive community of engineering women on campus and help prospective students form early connections.

### K-12 Mentoring

- [CE's ACE \(Architecture, Construction, and Engineering\) Mentoring program](#) focuses on "engaging, exciting and enlightening high school students to pursue careers in architecture, engineering and construction." Lafayette students team with Turner Construction, Alma Architecture, and AEGIS, and work with Easton Area High School students. The team hopes to expand the program to include students from Phillipsburg High School in the coming year.
- [Lafayette's Society of Women Engineers](#) chapter hosts local Girl Scout troops with hands-on activities in engineering such as building wooden bridges/vehicles with household and recycled objects. Participants range from 5th to 8th grades.

Approximately 50 students participate annually.

- [Lafayette's Society of Environmental Engineers and Scientists](#) (SEES) hosts local elementary and middle school students 2-3 times a year for enrichment activities. Lafayette students lead the younger students in interactive projects and the events are faculty supervised. Topics have included: studying (safe) chemical reactions, renewable energy, food choice, and landfill waste reduction.
- Lafayette Engineering partners with the Bethlehem Area Vocational Technical School (BAVTS) to offer a year-long Introduction to Engineering course to high school students. Approximately 25 high school students participate in the program each year.
- The Landis Center for Community Engagement partners with the Easton Area School District and extension programs to provide and promote STEAM learning in a variety of contexts with programs through Third Street Alliance, Phillipsburg High School, the Easton Library, and the YMCA. Some examples of these programs and initiatives include Girls Who Code at Paxinosa Elementary, the STEM Initiative at Third Street Alliance, and DNA Day with March Elementary.

## Data

As indicated by this partial summary document, Engineering's efforts to nurture an inclusive, equitable, and just culture is wide ranging, covering all aspects of the Engineering Division and its programs. While enrollment and hiring data do not reflect whether or not members of the community have a sense of belonging, improvements in the number of women and other underrepresented groups is a necessary, albeit insufficient, measure of success of the Division's effort.

Today, Lafayette's engineering programs consist of approximately 38% of students who identify as female, which is up 50% from a decade ago and nearly double the national average. Nearly 25% students are from traditionally underrepresented groups in engineering. Half of Lafayette's civil engineering students are women, one of only a handful of civil engineering programs in the US with gender parity. One third of full-time faculty members in Lafayette's engineering programs are women as compared to 14% nationally according to American Society of Engineering Educators [ASEE]. The 2017 ASEE summary, "Engineering By the Numbers," reported Lafayette College among the top 20 schools in percentage of bachelor degrees awarded to women and ninth among all engineering colleges and universities in percentage of women tenure-stream faculty. Lafayette was also recognized by the ASEE Diversity Recognition Program for its efforts related to diversity and inclusion. Again, these facts do not show that the Division has reached its goal of having an equitable and inclusive climate, however, they serve as a positive sign that, particularly with regard to gender, that the Division is moving in the right direction. Moreover, these data prove that higher levels of diversity are achievable. Ten years ago the Division began making sustained efforts to move toward gender parity. As described in the data above, Lafayette Engineering has become one of the most gender diverse engineering programs in the nation. This serves as inspiration and positive evidence that with its steadfast commitment, the College can and will be successful in increasing the level of diversity with respect to Black, Indigenous and people of color.

## Closing

It is not enough simply to want members from all identities, perspectives, backgrounds and experiences to feel welcome, the Division must continue to actively foster a climate where people can see themselves reflected in it and feel a sense of belonging to it. Many elements have and continue to go into cultivating a welcoming climate: physical spaces, curricular and co-curricular offerings, research and professional opportunities, role models, and much more. Lafayette Engineering's commitment as well as its ongoing and emerging efforts are intended to support an authentically inclusive, equitable, and just climate, encouraging individuals of all backgrounds, life experiences, approaches, and perspectives. The Engineering Division welcomes continued conversations with all members of the community.