

Chemistry Department Diversity Action Plan for 2019-2020

Submitted June 7, 2019

Overview

The Chemistry Department strives to create and maintain an inclusive environment for all of our students, faculty, and staff. We want our classrooms, laboratories, and offices to be safe and welcoming places for all, regardless of how we may differ in age, cultural identity, ethnicity, gender, gender identity, faith, neurological make up (neurodiversity), disability status, geographic background, political and ideological perspectives, race, sexual orientation, and social and economic status. This document provides background and context regarding our department's past and present efforts in the area of diversity and sets achievable goals for the 2019-2020 academic year and beyond.

Context

Chemistry is proud that our graduating classes at the B.S. level have been approximately half female over the last several years, mirroring the national trend of gender equity at the undergraduate level in chemistry (W&M 10-year average = 48% female). We have also made progress on the racial diversity of our majors. Data provided by the Dean of Undergraduate Studies shows that our percentage of minority students increased from 10 to 34% from 2006 to 2018. Over the same time period, the percentage of minority students in Arts & Sciences increased from 17 to 28%. Over the last 10 years, an average of 8% of our graduating senior class has been comprised of minority groups underrepresented in the sciences (Black or African-American, Hispanic/Latinx, and Native American), a more narrow definition than that used by the Dean. Within faculty ranks, Chemistry continues to improve the gender diversity of our department. For the 2019-2020 academic year, our combined TE and continuing NTE faculty ranks will be 42% female, outpacing the proportion of women in Ph.D.-granting chemistry departments (19%) and matching that in top predominantly undergraduate departments (42%) (source: Eisenhower, T. Proceedings of the National Conference on Undergraduate Research, 2016). Like most chemistry departments, we have been far less successful in expanding the racial and ethnic diversity of our faculty and must continue to work towards this goal in years in which we are able to hire.

Process and Work to Date

Chemistry's pre-2017 diversity efforts relied on the work of individuals, with some faculty members independently participating in diversity-related activities on and off campus without coordination of effort. The department's inaugural diversity plan was adopted by the faculty in spring 2017 with the top action item being the establishment of a committee to lead diversity efforts in Chemistry. The 2018-2019 academic year marked the second year of work for the Diversity, Outreach, & Publicity (DOP) committee, which was comprised of tenured faculty members (Profs. Doug Young and Elizabeth Harbron, who served as committee chair), a senior lecturer (Prof. Dana Lashley), tenure-eligible faculty (Profs. Nathan Kidwell and Rachel O'Brien), a staff member (administrative coordinator Claudia Smith), a graduate student (Lisa Graves), and undergraduate students (Naa-Kwarley Quartey, Sophie Padilla). DOP committee members used the 2018 Diversity Action Plan as a guide to establish the agenda for the department's 2018-2019 efforts, which are summarized below:

Curriculum

- In order to perform research within the Department of Chemistry, students enroll in a research course that includes attendance at a weekly seminar series featuring external speakers. In conjunction with seminar coordinators and the entire faculty, the DOP committee worked to

diversify the slate of seminar speakers. The 2018-2019 seminar series included 9 women out of 12 total speakers. The department celebrated the 100th anniversary of women on campus with a 4-week series of seminars by leading women in chemistry. The student chapter of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCChE) invited and scheduled a speaker, who unfortunately had to cancel due to a scheduling issue.

- During '17-'18, DOP members successfully proposed the on-campus COLL 300 theme of "Scale," which was accepted for spring of 2020. Since the on-campus COLL 300 program addresses global or cross-cultural issues, we see our participation as a mechanism for promoting diversity and inclusion within our department and across campus. During fall of 2019, DOP members worked with CLA fellow and Chemistry colleague Kristin Wustholz to invite Dr. Ana Moore of Arizona State University for the "Scale" semester.

Assessment and Communication

- DOP members worked to make our departmental online presence and communications more inclusive. In this spirit, we rewrote a draft of the department's new mission statement and then worked with the entire faculty to reach a consensus on language. At the suggestion of student members, we created a new listserv to distribute departmental information to interested students. We also created a new Diversity page for the departmental website and posted the 2018 Diversity Action Plan.
- The department obtained demographic data for Chemistry majors and for Arts & Sciences as a whole from the Dean of Undergraduate Studies (see Figure 1, below). We have regularly had a relatively high percentage of women chemistry majors with most years hovering near 50 percent. However, there has been relatively little variation in socioeconomic status, as demonstrated by percentage of Pell Grant recipients as well as percentage of first generation students. Our recent adoption of low-cost, open-source OER (OpenStax) texts for our general chemistry curriculum as well as lower-cost workbooks for organic chemistry might help attract more lower-income students to chemistry. The one area in which we have clearly improved is attracting more minority students with a steady increase that is more substantial than that at W&M as a whole.

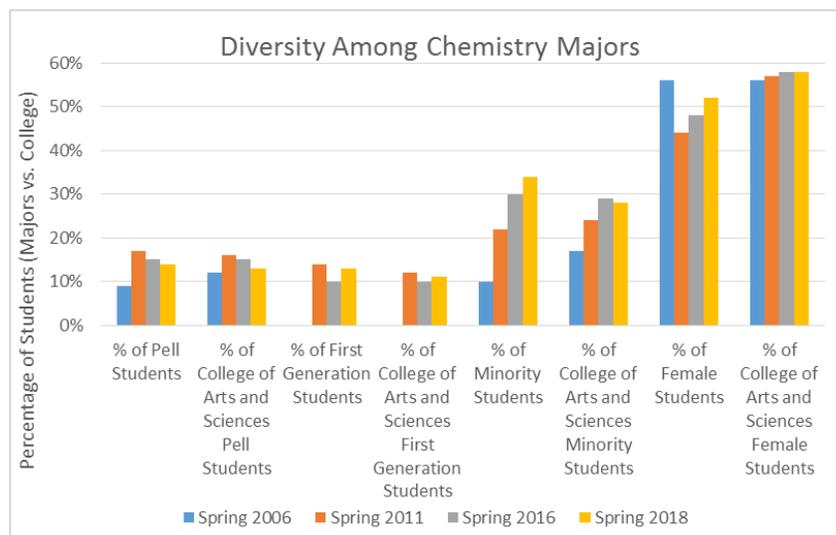


Figure 1. Diversity among chemistry majors.

- A major goal for '18-'19 was for the DOP committee to learn more about climate surveys and how Chemistry might conduct one. Members Elizabeth Harbron, Rachel O'Brien, and Claudia Smith met with representatives of other departments who have conducted climate surveys, including Geology, English, and Psychological Sciences. In all three departments, faculty developed and then vetted the questions, and at least one faculty member learned Qualtrics to execute the survey. Like Chemistry, Geology and English did not have any faculty members who are trained in survey design and data analysis. Both of those departments hired experts to analyze the data. DOP member Dana Lashley reached out to the greater Chemistry community on Twitter and received several offers from other departments willing to share their climate survey questions and experiences with designing and administering them. Like some other W&M departments, Chemistry is interested in using a survey to assess our departmental climate and to provide data useful for long-term planning efforts that will get underway in '19-'20.
- The DOP committee is developing draft language to be available for faculty to include in their syllabi with a focus on neurodiversity. The completion of this, as well as some language for gender identity, is a goal for '19-'20. As the standards for pronoun use evolve, it is very important for the department to stay current. The DOP committee is well positioned to communicate any new cultural shifts so that the chemistry faculty at W&M can meet the needs of all students.

Student Recruitment, Support, and Retention

- Three student members of NOBCChE and faculty advisor Prof. Dana Lashley traveled to the National Meeting in Orlando in the fall of 2018 to network, participate in professional development seminars, and present their research in a very diverse and welcoming atmosphere. The W&M Chapter of NOBCChE was chartered and recognized as an official NOBCChE student Chapter in September 2018 during the National Meeting. It is our goal to travel to the next National Meeting in St. Louis in November 2019 with a number of NOBCChE students and build on our experiences and networking. Faculty Advisor Dana Lashley now also serves as a member of the National NOBCChE membership committee, which will give us more knowledge of and access to sponsored NOBCChE activities.
- The Focus Program at Georgia Tech is a fully-sponsored graduate recruitment program for underrepresented students. Under the auspices of NOBCChE, two W&M students applied for and were accepted for the spring 2019 Focus Program. Prof. Lashley and the two students attended the program and reported an extremely positive experience. Based on this experience, NOBCChE will advertise next year's program and encourage more minority students to apply for the program.
- Transfer students from community colleges are an important part of the diverse W&M student body. As part of W&M's efforts to facilitate transfers from Richard Bland College, Prof. Bev Sher served as a Promise Fellow during spring of 2019. Each Promise Fellow teaches a freshman COLL course on the Richard Bland campus and serves as an academic advisor to these students, providing an additional support network after they transfer.
- In an effort to lower the barriers that may prevent students from getting involved in research, the department initiated a new poster session for research recruitment in fall of 2018. In the

ISC3 atrium each chemistry research group presented a research poster staffed by students already engaged in research. The department also provided pizza for attendees. We hoped that this event would be seen as an informal, non-intimidating environment for student peer conversations about available research opportunities and how to become involved in a research group. Faculty feedback was mixed after the first event. Some faculty had new students join their research groups as a result of the event while others did not. The department will sponsor this event again in the fall of 2019 and will likely make some changes to promote student attendance.

Outreach

- NOBCChE, the Chemistry Club, and individual faculty conducted multiple outreach activities on campus and throughout the Williamsburg/James City County area. Some of these activities – such as NOBCChE’s outreach with Campus Kitchen – involved children from groups underrepresented in the sciences. Another big outreach effort was the participation in Physics Fest in collaboration with the Physics Department. This Homecoming event was a great success, and we foresee continuing this collaboration in the foreseeable future. The DOP committee began tracking all outreach efforts and maintained a listing of all activities on the bulletin board in the Chemistry office and on the department server. With so many activities taking place, the DOP committee felt that we should standardize the practice of chemical safety in outreach activities. Prof. Doug Young developed new safety guidelines for these activities. The committee also clarified with the department that undergraduate students who conduct research for the purpose of developing new outreach/demonstration activities can receive research credit through CHEM 290.
- The DOP committee met with a few members of the VIMS Diversity and Inclusion committee and discussed partnerships with them for outreach activities. Some of their activities include “science under sail” with the Yorktown Schooner Alliance Chesapeake Bay National Reserve. These are night time programs for kids. Every month they have an evening seminar geared to the general public. They also have graduate students who take part in outreach at breweries with “A scientist walks into a bar”. These and other outreach activities with VIMS faculty will be pursued in the future.

2019-2020 Plan

Curriculum

Undergraduate chemistry curricula are fairly rigid and hierarchical because knowledge and skills must be acquired in a specific order as students build towards a thorough understanding of chemical principles. Like all undergraduate programs certified by the American Chemical Society (ACS), W&M's chemistry department requires majors to complete foundational coursework in the five disciplines of chemistry as well as labwork and in-depth coursework that builds on the foundation. The chemistry department strives to find innovative mechanisms to include and integrate diversity into our curriculum while continuing to meet the disciplinary requirements set forth by the ACS.

1. One of the major mechanisms to address diversity issues within the chemistry curriculum is through our contributions to the COLL curriculum. Already included in the curriculum are CHEM 314C: Biochemistry at the Bar (COLL 200) and CHEM 360: Bodies in Science (COLL 300), which both examine the impacts of chemistry within a sociological context, emphasizing the impact of science on diverse populations. Biochemistry at the Bar examines the role of science in the OJ Simpson trial within the context of racial and socioeconomic issues. On-campus COLL 300 courses like CHEM 360 must address a specific theme in a global or cross-cultural context. The content of these courses will be monitored by the DOP committee to ensure the continuation of content associated with a wide range of diverse groups. (DOP committee and faculty teaching these courses)
2. Efforts will continue to incorporate diversity issues in future courses developed when appropriate, including new COLL 100, 150, 200 and 300 offerings. For example, members of the DOP committee proposed the campus-wide COLL 300 theme for Spring of 2020 ("Scale"). Chemistry has committed to offering at least one COLL 300 course for the themed semester next year. Faculty members involved with the theme proposal will be working across campus to inspire others to develop additional COLL 300 courses for "Scale". (Elizabeth Harbron, Rachel O'Brien, Nathan Kidwell, Kristin Wustholz)
3. Chemistry has a long-standing commitment in welcoming students of all learning styles into the classroom through the use of different teaching methods and techniques. To further facilitate an inclusive classroom that respects differences in learning and information processing, Nathan Kidwell will compose diversity language to be included in course syllabi describing the on-campus resources available to neurodiverse students. This work will be completed in consultation with members of the William and Mary Neurodiversity Working Group, including Dean Janice Zeman and Prof. Joshua Burke. It is the hope of the DOP to distribute this language to faculty for inclusion into syllabi for the 2019-2020 academic year. (Nathan Kidwell)
4. In order to perform research within the Department of Chemistry, students enroll in a research course that includes attendance of our weekly seminar series. Consequently, the department will strive to emphasize diversity in chemistry through our selection of seminar speakers. During the 2018-19 academic year, for example, we emphasized the importance of women in science (in parallel with the 100th anniversary of women enrolled at the college) and hosted 9 prominent female scientists as speakers for a special seminar series throughout the year. The DOP committee will offer 1-2 names for potential speakers each year to facilitate this effort in addition to coordinating with the student chapter of NOBCCHE, which will also invite a speaker.

These seminars will also be advertised to a broader audience and neighboring institutions. (DOP committee in coordination with seminar committee)

Assessment and Communication

These goals involve an internal focus on the current state of our department and an external focus on how we communicate our values and efforts to others.

1. Our major focus for this area in 2019-2020 will be to develop a departmental climate survey. We plan for this effort to serve dual purposes: to assess our departmental climate and to provide data for long-term strategic planning efforts that will be getting underway during '19-'20. We will begin by defining and discussing the goals of this work with the entire department. We will then translate these goals into questions we should ask, using the climate survey questions we have obtained from other W&M departments and other chemistry departments around the country. These questions will be vetted by the Chemistry department, and we will also seek feedback from other W&M groups such as the Office of Diversity & Inclusion. The DOP committee will explore options for Qualtrics training and the hiring of an expert to assist with our efforts. (DOP committee)

Student Recruitment, Support, and Retention

All prospective, undergraduate, and graduate students should feel welcomed and safe within our department.

1. Student members of NOBCChE will travel to the National Meeting in St. Louis in November 2019 to network, participate in professional development seminars, and present their research in a very diverse and welcoming atmosphere. NOBCChE will also encourage minority students to apply to attend the Focus Program at Georgia Tech, following up on successful participation during 2018-2019. (NOBCChE and faculty advisor Dana Lashley)
2. Transfer students from community colleges are an important part of the diverse W&M student body. As part of W&M's efforts to facilitate transfers from Richard Bland College, two chemistry faculty will serve as Promise Fellows. Each Promise Fellow will teach a freshman COLL course on the Richard Bland campus and serve as an academic advisor to these students, providing an additional support network after they transfer. Prof. Bev Sher taught on the RBC campus in the spring of 2019, and Prof. Randy Coleman will do so in the spring of 2020, with the full support of the department. (Bev Sher and Randy Coleman)
3. The Chemistry Department will seek opportunities to lower the barriers that may prevent students from getting involved in research. In conjunction with Chemistry's Director of Undergraduate Research, the Chem Club, and NOBCChE, we will participate in the planning of Chemistry's 2nd annual poster session in which research group posters will be staffed by students already engaged in research. Events such as this will offer an informal, non-intimidating environment for student peer conversations about the research opportunities available and how to become involved in a research group. (DOP committee, Director of Undergraduate Research, NOBCChE, Chem Club)

4. The department will maintain a consistent faculty presence at on-campus events involving diverse groups of prospective and current undergraduate students. For prospective students, events include Monroe and 1693 Scholars recruitment and WMSURE research recruitment events. To reach current students, we will maintain our ongoing presence in the WMSURE program and continue to liaise with other science-specific student groups such as oSTEM (out in STEM) and the Wren Scholars. (all faculty, coordinated by chair Rob Hinkle and associate chair Elizabeth Harbron)
5. The Chem Club already participates in student-targeted activities that promote STEM diversity and will be encouraged to continue these efforts. Current activities include making liquid nitrogen ice cream and answering science questions for students involved with the Lemon Project, maintaining a booth at the campus Pride festival, and offering free tutoring sessions. The Chem Club has also hosted local Boy and Girl Scout groups to generate excitement for STEM at an early age and to underrepresented children to aid in the development of a lifelong passion for science. All Chem Club activities are evaluated annually by the American Chemical Society for club accreditation. The DOP committee will continue to work in conjunction with the Chem Club and its advisor to promote these activities to underrepresented groups. (DOP committee, Chem Club, and faculty advisor Doug Young)
6. The department will continue our strong tradition of academic advising by vigorously participating in the pre-major and major advising programs so that all students interested in chemistry can develop a strong relationship with a faculty advisor. (all faculty, ongoing)
7. The College's current HHMI grant provides support for underrepresented students to take their first year of chemistry during summer school. Chemistry will continue to support this effort by providing appropriate staffing for summer school lecture and laboratory courses. Some chemistry faculty are currently working with HHMI-supported Wren Scholars in their research labs and will continue to do so. (chair and faculty, ongoing).
8. The DOP committee wishes to aid in the overall recruitment efforts of diverse students. We are currently in contact with Tish Lyte in the admission office and hope to establish novel mechanisms for faculty members to aid in the admission office's student recruitment efforts. (Doug Young and DOP committee)
9. Prof. Nathan Kidwell (Chemistry) and Prof. Myriam Cotten (Applied Science) were selected to participate in the 2019 Cottrell Scholars Collaborative COMPASS Faculty Workshop, which provided tools and discussion regarding student career mentoring. Several inter-departmental and department-specific implementation ideas are briefly described. **(i)** Invite an ACS representative to William & Mary to present a seminar on a skills and career assessment online tool "ChemIDP" (IDP = Individual Development Plan). ACS representative Joerg Schlatterer is willing to come to William & Mary free-of-charge to discuss ChemIDP and "nontraditional" career paths. Implementing ChemIDP in graduate (CHEM 650) and undergraduate (CHEM 390 and Prof. Kidwell's COLL 300) is envisioned as well. **(ii)** Invite industry representatives to the yearly Undergraduate and Graduate Spring Research Symposia to promote interaction between students and industry professionals. The Career Center (Don Snyder) will be leveraged to assist in advertising the Symposia to industry representatives. Student and industry representatives will interact at an informal networking hour before the Symposia. Furthermore, students will have the opportunity to discuss their work with representatives, which could lead to an

interview or internship possibilities. **(iii)** Develop and initiate a “Student Career Mentoring for Faculty” monthly luncheon program beginning Fall 2020 that provides a forum to discuss career mentoring topics of interest to faculty. The agenda will include topics such as diversity and inclusion, individual development plan (IDP) tools, lab safety, assessment, communication, “nontraditional” career paths, etc. An Action Plan developed by Prof. Kidwell and Prof. Cotten more fully describes the implementation timeframe.

Outreach

As chemists, we have the opportunity to promote STEM subjects and careers to diverse audiences through on-campus and community-based presentations, activities, and workshops. These activities have the potential to promote chemistry and our department to diverse groups of future students. A living document of all the activities will be maintained in order to facilitate new and continued participation by chemistry faculty.

1. Chemistry will maintain its commitment to educational outreach activities in area high schools with continued participation in the Governor’s School for Science and Technology Research Mentorship Program. This year-long program pairs gifted STEM junior and senior high school students with faculty to provide authentic research experiences and access to resources not typically available in the schools. Ultimately, this provides a forum to spark further student interest in pursuing STEM degrees and careers. (Nathan Kidwell and Dana Lashley have participated in the past; other faculty welcome)
2. The department will continue to promote faculty participation in ongoing outreach efforts through the W&M School of Education, including the annual Focusing on the Future conference for junior high and high school students (February) and the mini-Focusing on the Future associated with Camp Launch, a residential camp for gifted STEM students who are from groups underrepresented in STEM (July). Chemistry faculty will also continue to participate in other outreach efforts and are encouraged to develop off-campus outreach programs (e.g., at Williamsburg Regional Library). (multiple faculty, ongoing)
3. The student Chemistry Club will be encouraged to continue their outreach work, which currently includes participating in College Day, when students from underrepresented groups visit campus, and visiting local elementary schools to perform demonstrations. (Chem Club and faculty advisor Doug Young)
4. The W&M NOBCChE Chapter supported by the department will carry out several outreach activities during 2019-2020, including demonstrations and activities at Physics Fest during Homecoming. (NOBCChE and faculty advisor Dana Lashley)