MII/Macromolecular Science and Engineering Plan to Satisfy Training Requirements for Scholarly Ethics, Integrity, Diversity, Equity, and Inclusion

Students in the Macromolecular Science and Engineering (MACR)program are required to fulfill the university's requirements vis-a-vis the Graduate School's training requirements for scholarly ethics and integrity as an expectation for graduation. The research ethics standards are satisfied through the curriculum administered in the first year, first semester of course work in MACR 5015 and in the first year, second semester course work in MACR 5016 – Macromolecular Science and Engineering Fundamentals Lab I and II, respectively. Topics covered in this course include but are not limited to:

1. Plagiarism and other violations of the Graduate Honor Code
2. Proper use of professional conventions in citation of existing research and scholarship, accurate reporting and ownership of findings, and acknowledgement of contributions to the work
3. Ethical standards in teaching, mentoring, and professional activities
4. Available avenues for reporting and alleged misconduct
5. Appropriate lab procedures and maintenance of lab notebooks and other research documentation
6. Fair use of publications, software, and equipment
7. Appropriate research protocols involving human and animal subjects; Institutional Review Board and/or Institutional Animal care and Use Committee certification
8. Guidelines for determination of authorship
9. Appropriate grant and contract management, including appropriately asserting personal or program capacities and competencies when applying for grants and contracts
10. Discipline – or field specific professional ethics*

**Guidelines (1-10) are from the Graduate School's Policies addressing scholarly ethics and integrity*

We have added additional modules to the MACR 5015/5016 series to include the topics of Industrial Perspectives on Diversity and Implicit Bias to build in a solid foundation of diversity, equity and inclusion from year 1 on.

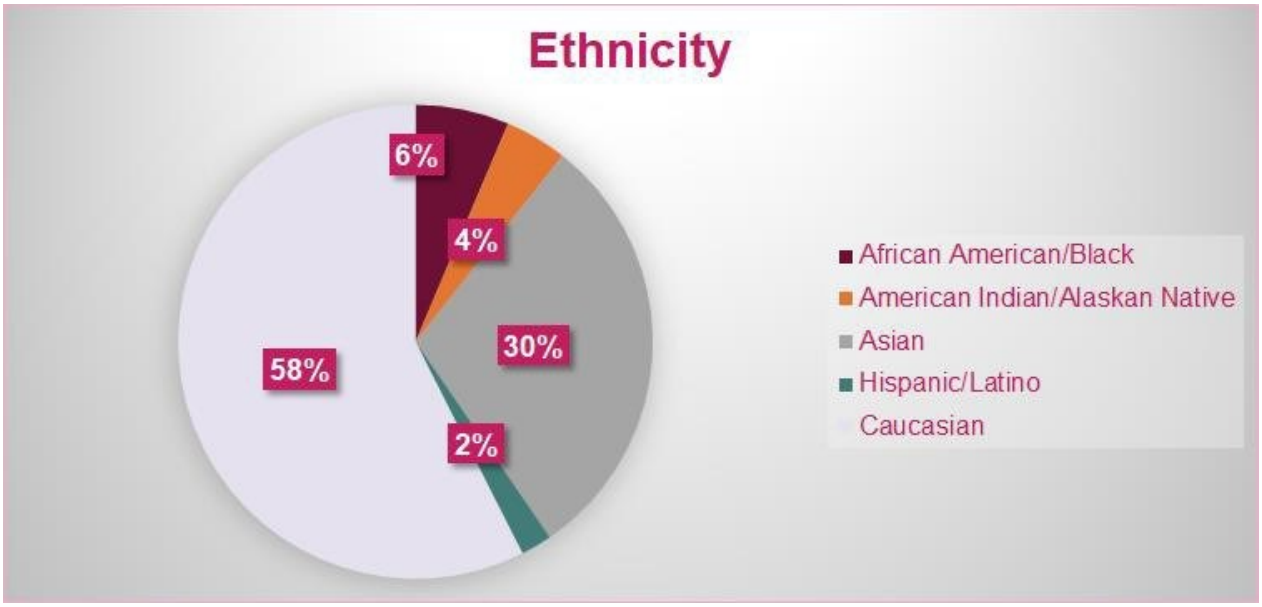
In addition to MACR 5015 and 5016, students are required to take MACR 5004 – Macromolecular Science and Engineering Graduate Seminar. This course reviews current topics and literature in macromolecular science and engineering while addressing content-specific issues that prioritize the lack of representation in the science, technology, engineering, and math (STEM) disciplines. Recognizing that there is a disproportionate number of minority groups that are underrepresented in STEM fields, this course reinforces principles and best practices for developing research plans, presentation skills, presenting results, and exposure to minority leadership in the field. The need for diversity, equity, and inclusion in science remains among the top priorities of the program. As a required course for all MACR students, it reaffirms our commitment to addressing the barriers preventing students from minority communities the access they need to ascend to leadership positions within their own careers by building the network and making the connections necessary at the onset of their graduate education. The academic pedagogy used to guide the topics covered in this course are centered around the understanding that effective scientific communication creates the pathways necessary to forge relationships in industry and academia.

The design of the MACR curriculum takes into account the VT principles of community (valuing human diversity and inclusion). Several minority industry leaders are brought in throughout the semester to connect with students and provide guidance, mentorship, experiential learning, research, and leadership skills in an effort to equip graduate students with the necessary tools that recognize and address issues around diversity and inclusion that are ingrained in society at large. Demonstrating an emphasis on the guiding values of the institution, guests include alumna, as well as allies and advocates in their respective disciplines.

The MACR program recognizes the institution's commitment to inclusion and diversity and have taken steps to increase visibility of underrepresented scientists, engineers, and chemists by inviting them to interact with our student population. We have included this through our diversity programming, curriculum, and seminar courses. We realize that there are a number of domestically underrepresented students as well as a vibrant international community of underrepresented students as well. Cognizant of the inherent lesser representation from international students, we have made a concerted effort to incorporate representation from countries around the world that would normally not have access to the caliber of research conducted here at the institution.

The seminar series reflects the diversity of our field with female and international representation. Lessons learned during COVID with virtual seminars revealed how removing travel requirements for women and other international professionals made it much easier to schedule them for our seminar series. The impact of increasing female and international representation showcases our commitment to an inclusive graduate education for all students while promoting the university's motto *ut prosim* (service).

Over the past five years we have maintained 25% representation of women. We have actively sought to increase the number of women in our program and achieved 50% of the 2021 cohort representing women. This is a significant increase from years past where we had only 30% in 2019, 0% in 2020 per cohort respectively. Our breakdown by ethnicity is still predominantly Caucasian as shown in the pie chart below, but we are building relationships within the HBCU Summit held every year here in Blacksburg to improve our pipeline for BIPOCs. Our international student population represents 7 countries which we value as part of diverse backgrounds.



We foster connections with diverse members of the scientific community in an effort to promote diversity and inclusion while opening doors in spaces that were traditionally closed to underrepresented communities. Inclusive practices that promote diversity and inclusion including guest lectures from underrepresented minority leaders in industry. We actively support internship opportunities and site visits within industry to build networks and exposure to larger ethnic communities.

Our program fosters and builds community through the MACR Student Council activities which we promote and support through the MII administration office. These activities allow us to celebrate diverse interests both from an academic and a cultural perspective. Activities include: team building through group activities, monthly MACR Student Council Meetings, New Graduate Student Orientation, Writing groups, Trivia nights, and bimonthly business meetings. Our office facilitates access to meeting room spaces, funds, and travel awards to assist in these activities.

As a virtual department, it is difficult to generate a cohesive atmosphere. However, we are strategic in our time together through the MACR Student Council, seminars, faculty meetings (1 per semester) and gatherings (~2 per semester) to build our community. Through interdisciplinary collaborative efforts, this form of inclusivity allows us to bridge the divides of understanding, modes of inquiry, and systems of value.

As we continue to build out our programming, we understand that it takes time to procure the resources necessary to further build and scale our programming to include more sustainable initiatives. We have unique challenges in that we are a conglomeration of several departments and therefore haven't acquired assigned faculty members to help sustain the programming we currently offer. Going forward, we anticipate that we will either acquire the faculty needed to either sustain the programming and design for our graduate seminar course, or, continue to drawn on existing resources offered through the Graduate School such as training programs, existing graduate curricula, InclusiveVT resources, and the required DiversityEDU course content.

We acknowledge that the academic environment should foster VT's Principles of Community (see the Graduate Student Handbook for the Principles of Community) and be upheld by both faculty and students. As such, avenues for redress are outlined in our Macromolecular Science and Engineering Handbook and

distributed to students during New Student Orientation prior to the start of the fall semester. Our approach includes upholding the dignity and professionalism of aggrieved parties and responding to all complaints within a timely manner. Understanding that every situation is unique, complaints brought to the Graduate School, the Department, or University officials will be reviewed on a case by case basis with the emphasis of confidentiality and the goal of conflict resolution front and center. Students can address their complaints with the department administrator, the director of the program, the director of the institute, the Graduate School, or anonymously through the University's Anonymous Tip Form should the situation warrant involvement of local authorities. We whole-heartedly support the larger university's goal and commitment to a bias-free experience "providing an environment of work, study, and leisure/recreation for students, faculty, and staff that is free from all forms of harassment, intimidation, fear, coercion, and exploitation."