

Montclair State University

Facilities and Resources

OPEN-NJ.R: Access, research skills, and professional development: pathways to achievement in chemical industries

Nina Goodey (PI)

1. Montclair State University

New research university designation. Montclair State University was founded in 1908 and is a leading institution of higher learning in New Jersey. The research activity at the university has been growing over the past decade. In 2017, the State of New Jersey designated Montclair State a Public Research University and in 2019, the Carnegie Classification of Institutions of Higher Education recognized Montclair State as a Doctoral University. These designations indicate the increased research activity at Montclair State.

Commitment to serving underrepresented populations. There are more than 21,000 students currently attending MSU, which is located in a 252-acre campus in suburban Montclair, only 12 miles from New York City. Montclair State became a Hispanic-Serving Institution in March 2016. This designation highlights the institution's commitment to providing underserved populations access to affordable higher education. Montclair State is the largest four-year HSI designee in New Jersey. U.S. News & World Report listed Montclair State as #23 in the country in Top Performers on Social Mobility. Montclair State was named to the Campus Pride Top 30 LGBTQ-Friendly Colleges and Universities list in 2018. Also in 2018, Diverse: Issues in Higher Education named Montclair State a "Top Degree Producer" in its ranking of institutions that confer the most degrees to minority students.

2. The Department of Chemistry and Biochemistry

Montclair State Department of Chemistry and Biochemistry consists of 17 faculty members who are experts in different areas of chemistry. Of the 17, 16 are active in research and excited to offer MS students excellent research experiences in their laboratories. The department is housed across three buildings: CELS, Richardson Hall and Science Hall. There are four dedicated teaching laboratories in the MSU Chemistry and Biochemistry department. Each laboratory houses instrumentation specific for the course including an NMR, MS, HPLC, FPLC, fluorescent plate reader, centrifuges, UV-VIS spectrophotometers, fluorescence spectrophotometers, freezers, refrigerators, electrophoresis equipment, and others.

The department has a dedicated computer room with 15 computers that can be used by students in the department. Students use this room to socialize and work together. The computers are connected to MSU's local network, which is a 10 gigabit fiber optic backbone connecting all academic buildings via high speed switches and routers and have software programs used in chemistry and biochemistry courses including ChemDraw and Dynafit. The computer room also has wireless access and a large conference table and an overhead projector. In this room, there is seating for approximately 24 people. The department also recently acquired another conference room with seating for 22 people with conferencing facilities. This room can be reserved for meetings and workshops. A larger meeting room, The Sokol Seminar room of the College of Science & Mathematics (CSAM) is available for speakers, workshops and other CSAM activities and holds up to 56 people.

3. Human resources

Nina Goodey (PI) is a Professor of Chemistry and Biochemistry at Montclair State University (MSU) where she has worked for the past 13 years. One of her research interests is in STEM education. She has published articles on student preparedness and inquiry learning in biochemistry laboratory courses. She has served as the PI on two National Science Foundation DUE grants and as coPI on two additional NSF grants. She is the PI of the OPEN-NJ grant, which is ending this summer and provided the foundation for OPEN-NJ.R. She teaches undergraduate and graduate biochemistry courses and mentors students in biochemistry laboratory research. She will lead the research activities for this project and have overall responsibility for administering the project and for interacting with NSF.

Dr. Siekierka (coPI) has been serving in a STEM administrative role for 13 years as the Director of the Montclair State Sokol Institute of Pharmaceutical Sciences. He interfaces with our Dean's office on matters related to MS student research and professional development. He is an expert in Pharmaceutical Biochemistry and will serve as mentor to students in the Biochemistry concentration. He also holds a position of Professor in the Department of Chemistry and Biochemistry. Prior to his position at Montclair State, he worked in multiple Pharmaceutical companies in New Jersey. He brings to the project a deep understanding of needs of the pharmaceutical industry and a large number of connections to local professionals who will serve on the advisory panel. He serves as a coPI on the OPEN-NJ project.

Dr. Rotella (coPI) is a Professor of Chemistry with a focus on organic chemistry. He is a highly accomplished researcher and has successfully mentored several MS students in research. Before his career at Montclair State University, he was employed in the pharmaceutical industry in New Jersey. He brings to the project a deep understanding of the pharmaceutical industry and connections to individuals who will serve on our advisory panel.

Dr. O'Neil (coPI) is an Assistant Professor with a focus on analytical chemistry and a growing interest in chemistry education research. He has successfully mentored on MS student in research. He brings his expertise in Analytical Chemistry education to the project and will facilitate student general chemistry review. He will serve as a mentor to students in the Chemical Analysis concentration.

Dr. Schneemeyer (coPI) is a Professor of Chemistry with a long and successful research career in inorganic chemistry and materials science. Before her career at Montclair State, she worked at Bell Laboratories and has brought to the project many connections to industry professionals in our area. Dr. Schneemeyer also brings to the project significant administrative experience and connections from her prior positions as the Associate Dean of the College of Science and Mathematics at Montclair State. She has a keen interest in supporting students in studies in Chemistry and will serve as a mentor in the Professional Science in Chemistry MS program. She has experience in designing professional MS in science degrees and will lead these efforts in this program.

Inform Evaluation & Research (Inform) will be responsible for directing the evaluation. For more than 15 years, Inform has worked with STEM and environmental education organizations through program evaluation and education research. Inform's clients include organizations small and large, local and national, non-profit and corporate. Inform conducted many types of evaluation from short-term, front-end needs assessments to multi-year summative evaluations. Inform brings a utilization focus to every evaluation they undertake, aiming for the process and

products to have real impacts on the organizations they serve. Inform's evaluation team represents both academic and practitioner-based backgrounds. This allows Inform to navigate the complexities of program evaluation while understanding the practicalities of the contexts within which their clients work.

Dr. Brian Johnson (Inform) will lead all project evaluation activities. Dr. Johnson has more than 20 years of experience researching, evaluating and managing informal and formal science education programs in the US and the UK. He served as PI on NSF DRL 1451313 (Investigating the Long-term Impacts of Informal Science Learning at Zoos and Aquariums) and co-PI on NSF DRL 1421017 (Project TRUE: Teens Researching Urban Ecology).

Dr. Joy Kubarek (Inform) will assist with the project evaluation. Dr. Kubarek brings both practical experience working in science education for nearly 15 years, as well as research and evaluation experience studying science education in both formal and informal settings.

Dr. Scott Herness is the Vice Provost for Research and the Dean of the Graduate School at Montclair State. Dr. Herness has agreed (see letter) to advocate for the Chemistry and Biochemistry Department as we work to create their 15-month MS program in supporting our new summer course, which may initially have low enrollments as we establish this new "rapid MS" track. He has also agreed to work with the PIs to forge connections with the National Professional Science Master's Association as we create the Professional MS in Chemistry and facilitate the dissemination of our findings through this organization. Finally, the graduate school at Montclair State will continue to work with Dr. Goodey in recruiting students for the program and Dr. Herness will oversee and facilitate these efforts.

Dr. Lora Billings is the Dean of the College of Science and Mathematics at Montclair State University. She will foster connections for the PI team with local professionals in the chemistry, biotechnology, and pharmaceutical sciences industries, in part through members of the College of Science and Mathematics Advisory Board. These individuals will offer the PI team valuable insights on the current and future needs of the chemistry-related industries in our local area in Northern New Jersey. Dr. Billings also oversees College of Science and Mathematics Career Services and has agreed to support the professional development events proposed. She will also offer support to the PI team as they work to create their 15-month MS program, especially in supporting their new summer course, which may initially have low enrollments. Dr. Goodey has already established a strong, working relationship with financial aid and the graduate school through her prior S-STEM program OPEN-NJ. Dr. Billings will facilitate and help resolve any administrative challenges as the PI team adapts their Chemistry MS program to the modern research environment and help make connections where necessary (see letter).

Dr. Saliya DeSilva is the Chair of the Montclair State University Chemistry and Biochemistry Department. He will facilitate the work, communication, and decision making process of the Chemistry MS committee, the Departmental Curriculum Committee, and the Department of Chemistry and Biochemistry as the team works toward changing our MS programs to be more accessible to talented students and to better prepare students to enter the positions in industry and academia in our local area. He will facilitate the scheduling of graduate courses, where possible, to support the objectives of the proposed work. He will also help foster connections between the PI team and local chemistry professionals, who will be able to provide insights into the most important skills students need to be well prepared for positions after graduation (letter attached).

Student assistant will be hired to do administrative tasks to make sure student scholarships get paid, to schedule project meetings, to assist in scheduling professional development events, and to collect and store project data. The assistant will also visit local campuses, including LSAMP meetings, to inform students about our programs. This student will also help increase presence of our program in social media including LinkedIn.

Student tutor will be hired to offer one-on-one tutoring to students in the OPEN-NJ.R program. She will also work with students as they complete their review of General Chemistry II as they enter the program.

Office for Faculty Advancement

Created in 2007, the Office for Faculty Advancement at MSU supports MSU faculty and instructors interested in faculty development or learning about and researching teaching and learning in higher education. The Office coordinates for faculty from across campus to meet and discuss pedagogical issues in higher education through the Engaged Teaching Fellows Program, class observations and external speakers. The Office organizes the yearly teaching showcase where instructors from MSU and other local institutions present on education research projects and will facilitate the dissemination of this project.

Instructional Technology and Design Services (ITDS) is a subdivision of Information Technology that offers multimedia services for courses within the university. ITDS helps the University community effectively integrate innovative instructional strategies and technology into the teaching process. ITDS' focus is on promoting learning-enhanced educational principles and strategies, adapting emerging and promising technologies to the curriculum, and demonstrating best pedagogical uses that will facilitate learner-centered educational environments.

4. Computers and offices

MSU has several computer labs on campus where students can use computers to work on assignments and print their papers. The main computer lab and library also have a computer loan program that allows students to check out laptop computers for limited time periods. Within each building, faculty offices, classrooms, and computer laboratories are connected via 100 BaseT Ethernet network, the infrastructure of which is supported by the Office of Information Technology. Students can utilize their network identification, NetID, to access University resources including University's e-mail service, grade and course information, library resources including journal articles and databases, and Canvas, online course management system. All MSU faculty members have personal computers on loan from the university. The PIs and students have computer and technology support. The Office of Information Technology at MSU provides technical assistance to all faculty, staff and administration, including support for supported software, desktop environments and peripherals, network connectivity, computer password maintenance, and hardware and software configurations.

All PI's and other participants listed above have one-person offices in their respective departments and institutes.

5. Building facilities

The College of Science and Mathematics at MSU occupies four buildings on campus, The Center for Environmental and Life Sciences (CELS, built and opened in the fall of 2015), Science Hall (built in 1999), Mallory Hall (recently renovated), and Richardson Hall, which houses the departments of Mathematics (including Physics), Chemistry and Computer Science.

The Computer Science department moved into the renovated and expanded Mallory Hall in 2019, a state-of-the-art, four-story 43,800 square foot instructional and research facility that houses classrooms, computer labs, faculty offices, meeting rooms, and student study and project spaces, as well as specialized research labs. Tutoring and workshops will be carried out in our brand new computer labs and various specialized research labs. The various meeting rooms in CELS will be used for student mentorship meetings. The CELS atrium with views of the New York skyline and a nearby conference room will be used for the Alumni Networking Event.

6. Library facilities

The collections contain over 400,000 volumes in all subject areas that are taught at the University and support the research and education needs of the students and faculty. Through its online catalog, the Library provides access to materials in all formats (monographs, serials, media and software), including online publications (“e-books”) and to selected Internet sites. All faculty members and students have access to original articles via electronic journal databases, including JSTOR, ERIC, EBSCO, ProQuest, Academic Search Premier, and PsycINFO. The Library subscribes to over 3,000 serials (magazines, journals, newspapers, annuals, and yearbooks) in print and microform formats. Several thousand additional periodicals are also available through online index and abstract databases or through individual online subscriptions. Increasingly, serials are added in the online format rather than in print or microform. The Library subscribes to over 50 online indexes and abstracts that provide bibliographic citations to thousands of serial/periodical publications.

7. Institutional support

Montclair State University offers the PI Dr. Goodey 3 credit hours of teaching release to serve as the Associate Director of the PSEG Institute of Sustainability Studies. MSU implements a teaching release program, the Faculty Scholarship Program (FSP), for faculty members actively pursuing research. All PIs in this program participate in this program, which releases them from teaching one course (three credit hours, 25% of teaching load) per semester. PI Goodey also holds “Doctoral Faculty” status in MSU’s Transdisciplinary PhD program in Environmental Management, and received an additional three credit hours per year of teaching release time while advising doctoral students. These release times enable her to work on this project.

The College of Science and Mathematics and the University further support faculty and student research with small internal seed grants for developing new lines of research and preparing grant proposals. A modest amount of faculty and student travel funds for meeting presentations are available annually from the College of Science and Mathematics. The MSU Office of Research and Sponsored Programs office provides assistance with budget development, institutional statistics, and NSF policies and guidelines. If this project is funded, they will continue their assistance by ensuring that all NSF requirements are met along with other post-award support. A modest amount of travel funds for meeting presentations are available annually from the College of Science and Mathematics.

The Chemistry Department has a Graduate Program Coordinator (GPC), Dr. Jim Dyer, who receives reassigned time to advise students in the Chemistry MS program. He will be providing valuable academic mentorship to students. Some of the Chemistry MS students will be eligible for Graduate Assistantships that provide additional support with tuition/stipend if they meet the requirements.