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Welcome to the "Good Stuff for PIs" Resource Document

The resources here are intended to help you prepare successful grant proposals. While these documents cover a range of grant-related topics, they are not meant to be comprehensive. We have paid specific attention to compiling resources for PIs that address the broadening participation/broader impact criterion built into many requests for proposals. Some programs (e.g., ADVANCE, S-STEM at the NSF) are focused almost entirely on increasing the breadth and diversity of individuals involved in grant-supported programs. In others, such as NSF's Major Research Instrumentation Program, the "participation" and related education components may be smaller elements. Regardless, funding agencies typically expect detailed plans that describe how the proposed project will address this topic.

The "Table of Contents" is a good way to get a sense of the type and range of documents included here.

One important caution: None of the University of Rochester materials here should be considered boilerplate text. Instead, this information needs to be custom fit to the goals and activities of your own proposal. An additional reason to treat these documents as resources (and not pre-written text for proposals) is the increased attention of funding agencies to plagiarism, inadvertent or otherwise.

Each document provides points of contact, people with whom you can consult for specific aspects of your proposal. We recommend that you contact these individuals as early in the grant writing process as possible.

If you know of additional resources or samples related to broadening participation criterion as it relates to grant proposals, please let us know. We appreciate any feedback you are willing to share.

We hope you find these resources useful!

The Research Team

K-12 Science, Math, Engineering Outreach

David T. Kearns Center for Leadership and Diversity in Arts, Sciences and Engineering
http://www.rochester.edu/college/kearnscenter/Resources/Contact.html
Points of contact [POC]: Beth Olivares, Anthony Plonczynski-Figueroa, Danielle Daniels

Overview: The University of Rochester's Kearns Center houses programs that engage in a year round effort to increase the numbers of Rochester City School District (RCSD) students who apply to and gain admission to college. The programs, which include Upward Bound (UB), Upward Bound Math/Science, and Talent Search which funds two College Prep Centers work with students in the 5th through 12th grade. The Center serves over 1,000 students annually; 95% of whom are low-income according to federal guidelines, 98% are potential first-generation college students, 100% demonstrate academic need and approximately 90% are underrepresented minority students. 90% of the participants in UB are also underrepresented in science.

Available data: Census data and additional RCSD and school-specific information on graduation rates, persistence and retention rates, Regents passing rates, AP rates, and more are all available for targeted proposals.

Rochester City School District (RCSD)

The Rochester City School District services a city with the one of the highest child poverty rate and lowest graduation rates in the nation, and the highest poverty rate for NYS. Overall, only 54% of RCSD students graduate from high school within 4 years (data as of January 2019). Both New York State and the Federal Department of Education list the RCSD as a District in Need of Improvement. In 2015, data indicates that the passing rates for Biology were at 56% compared to 81% across the state, with much worse disparities in the advanced science courses. (Similar statistics available for other fields of study). Facts available at http://www.rcsdk12.org/domain/8

Students served by the Upward Bound programs demonstrate a 95% high school graduation rate and a college attendance rate of 95% as well. Without the targeted mentoring and exposure to science both in and out of the classroom provided by the Kearns Center's programs, students will continue to have limited opportunities to prepare themselves for a college degree in biology or any other STEM field.

Available data: Through the Kearns Center

Sample Options for PIs

Summer mini-course for high school students

Each summer the PI will teach an interactive, inquiry based mini-course in XXX called "XXX" to high school students in the Upward Bound Classic and Upward Bound Math/Science Projects (UB). This course will be one week long, two hours each day, and will have multiple components (DESCRIBE). Approximately ## students will participate in the course.

STEMtern Program:
Summer or academic year lab experience for 1-3 (other ##) high school students
Either during the summer or the academic year, high school students (**STEMterns**) can be placed in labs, to work alongside undergraduate researchers. Details can be arranged per the PI's goals and objectives.

Workshops/demonstrations for high school students during academic year

During the school year, the PI will present two-hour demonstrations on XXX through an ongoing UB program "STEM Workshop" to students at high schools in the Rochester City School District. We will work with Danielle Daniels, the Science Specialist in the Kearns Center to develop an appropriate demonstration. This activity will reach XX students per school and up to XXX students each year.

Workshops or other experiences targeted towards girls, boys, pupils at a specific RCSD school, etc. Based on the PI's interest and capabilities, specific programming can be designed.

Impact Assessment
The Kearns Center has a strong assessment infrastructure in place that includes ongoing evaluation of the success of its programs. Students within the program are tracked each semester using course reports, progress reports, and attendance reports. They are also tracked after they leave the program and enter postsecondary education. Summative reports are created and evaluated by UB staff. A specific tracking/evaluation plan will be created as appropriate for targeted proposals.

Overall, these broader impact activities help to advance NSF's goal of increasing the participation of underrepresented minorities in STEM and advance NSF's goal of improved K–12 STEM education.

Other Important Information
The Kearns Center has a signed Memorandum of Agreement with the Rochester City School District, which enables us to work directly with students and teachers. We are also covered by the University's Policy on Minors.

In order to effectively implement any of the strategies, please arrange a meeting at your earliest convenience with the points of contact. Some budget will need to be allocated from your grant to these activities. Kearns Center staff will provide the infrastructure for student selection, management, tracking, and evaluation. Staff support is also provided during the implementation of activities and workshops.

Undergraduate Students

Institutional Research - Arts, Sciences & Engineering
Available Data: POC: Thisie Schisler-Do (t.schisler-do@rochester.edu)

Source data can be accessed via **Institutional Research** for Arts, Sciences & Engineering. AS&E Graduation and retention rate data is available by ethnicity and gender; migration patterns between and among disciplines; percentage of students completing independent study; number of students participating in undergraduate research; other data available upon request. Please allow ample time for data requests-generally two weeks in advance of when the data is needed.

Programs in Support of Increasing Participation in STEM
Early Connection Opportunity (ECO):
POC: Norman Burnett (norman.burnett@rochester.edu)

A pre-freshman summer program for participants in the Higher Education Opportunity Program (HEOP) and selected other students, the Early Connection Opportunity (ECO) provides admitted students with a taste of college life in the summer between high school graduation and freshman orientation. HEOP and ECO students typically are low income and have a somewhat weaker academic profile than the average UR student. The residential program includes coursework in math and science (typically chemistry, biology and/or engineering), as well as study skills assistance and an introduction to residential college

life.

PIs can provide mini courses, graduate student instructors/tutors, or workshops on success in college level courses in their fields.

Undergraduate Research:
POC: Sina Ghaemmaghami (sina.ghaemmaghami@rochester.edu) and Ann Robinson ann.robinson@rochester.edu

Undergraduate research is a robust endeavor in all domains at UR. A variety of programs exist in departments. Opportunities for students to work on faculty-led research are widespread, and can be done as a volunteer, for pay, or for credit (via the independent study). The Office of Undergraduate Research sponsors a variety of activities in support of these endeavors, including the Discover Grants (made to students, faculty, or teams of students and faculty) in support of student research. PIs can fund undergraduates in their research labs during the academic year or the summer.

The Ronald E. McNair Post-baccalaureate Achievement Program:
http://www.rochester.edu/college/kearnscenter/CollegePrograms/McNair.html
POCs: Anthony Plonczynski-Figueroa (a.j.plonczynski@rochester.edu),
Beth Olivares (beth.olivares@rochester.edu)

The goal of the McNair Program is to increase the numbers of low-income, first-generation, and underrepresented minority students who pursue a doctoral degree, with the long-term goal of helping to diversify the nation's college and university faculty and researchers. The program provides intensive advising and academic support, as well as a mentored research opportunity, the opportunity to travel to research conferences, and a myriad of other supports that help students achieve their academic potential. Since the program's inception at UR in 1992, the program has served over 400 students, with approximately 84% enrolling in graduate study within two years of earning their bachelor's degrees. As a comparison, the average graduate school attendance for McNair scholars nationally is just under 45%.

PIs can provide research experiences for McNair scholars; workshops and guidance on the path to the doctorate, support for research presentations at conferences and professional meetings, and connections to research programs at other institutions.

Kearns Scholars:
POCs: Anthony Plonczynski-Figueroa (a.j.plonczynski@rochester.edu),
Beth Olivares (beth.olivares@rochester.edu)

The Center provides small scholarships for students, which are used to meet unmet financial need or to reduce loan or work study burdens. Scholarship recipients participate in a series of workshops throughout the academic year, which explore ongoing research projects conducted in AS&E and Medical Center, students' career goals, and the balance between academic and social expectations. In addition to these discussions, Kearns Scholars work with Center staff to develop summer research and internship applications, consider graduate school opportunities, and prepare for graduate school entrance exams. Since 2007, the Kearns Center has been able to provide scholarships to approximately 150 undergraduate students. 82% of our graduates have earned a STEM degree, and 75% have enrolled in graduate study.

Chemistry Study Groups:
POC: Danielle Daniels (Danielle.daniels@rochester.edu)

The Chemistry Study Groups are offered as an opportunity for students to work in small groups (no more than five) for ninety minutes, twice a week with a graduate student (advanced Ph.D. hand-picked by our faculty in the Department of Chemistry) to review class materials and practice problems for their first and second year chemistry sequences: General Chemistry (131 & 132) and Organic Chemistry (203 & 204). These chemistry courses are required for students who want to major in the majority of STEM majors that are offered here at the University. We believe that our interventions have yielded considerable results over the past 6 years for student persistence and graduation in these disciplines.

PIs can provide support for similar study groups in the introductory courses in their fields, in which data indicate that minority and low-income students fare less well.

Kearns Engineering Research Fellows Program (Formally Xerox Fellows):
POCs: Anthony Plonczynski-Figueroa (a.j.plonczynski@rochester.edu),
Beth Olivares (beth.olivares@rochester.edu)

This provides Hajim undergraduates with an opportunity to participate in an intensive research experience under the guidance of a faculty member during the summer preceding their junior or senior year. Selection for this program prefers students who have not had a significant research experience at UR prior to the submission of the application. During the summer, Kearns Fellows also participate in a professional development seminar series. This research is often continued into the fall semester as an independent study to prepare students for the challenges of juggling research and a full course schedule. PIs in Hajim can host one or more Kearns Fellows, and can assist with the professional development activities for these budding engineers. http://www.rochester.edu/college/kearnscenter/CollegePrograms/XeroxFellows.html

NSF Funded REU Site Programs
Various programs administered through the Kearns Center:
See: https://www.rochester.edu/college/kearnscenter/undergraduate/reu/index.html

Kearns Summer Research Scholars Program
POCs: Anthony Plonczynski-Figueroa (a.j.plonczynski@rochester.edu),
Beth Olivares (beth.olivares@rochester.edu)

The Kearns Summer Research Scholars program would allow faculty and their undergraduate student researchers to take part in an impactful and holistic research experience at UR. The program allows faculty and students to become part of the growing and robust summer research communities created under the McNair, Kearns Fellow (formally Xerox), REU Photonics, REU Nano to Network, and REU Data Science programs supported by the Kearns Center.

Faculty and students receive assistance in establishing a structured program over the summer that bridges the academic and research exposure that students receive with social, emotional and cultural enrichment supports. Some of the highlights of the program are GRE prep, guidance on navigating the academy, excursions off-campus that include the Rochester International Jazz Festival and the ability to present at the Kearns Summer Research Symposium.

For more information on program resources provided, an overview can be found by our website:
http://www.rochester.edu/college/kearnscenter/undergraduate/summer-programs.html

Graduate Students

Institutional Research - Available Data
POC: Thisie Schilsler-Do (thisie.schisler-do@rochester.edu)
Source data can be accessed at Institutional Research for Arts, Sciences & Engineering
Possible data points: Time-to-degree for PhDs; Completion rates for PhDs; Admissions numbers (applications, offers, enrollments) for Master's and PhD
All of the above broken down by: All; M/F; URM/non-URM; US citizen or permanent resident/international.

Graduate Students
- Development as Researchers
- Development as Teachers
- Diversity, Recruitment and Retention
- Student Clubs and Support

Graduate Studies
POC: Nick Vamivakas, Dean of Arts, Sciences, and Engineering Graduate Education and Postdoctoral Affairs, nick.vamivakas@rochester.edu

Available Data:
POC: Thisie Schilsler-Do (thisie.schisler-do@rochester.edu)
Source data can be accessed at Institutional Research for Arts, Sciences and Engineering
Possible data points: Time-to-degree for PhDs; Completion rates for PhDs; Admissions numbers (applications, offers, enrollments) for Master's and PhD
All of the above broken down by: All; M/F; URM/non-URM; US citizen or permanent resident/international.

Development as Researchers
http://www.rochester.edu/college/gradstudies/professional-development/index.html

NSF Fellowship Workshop:
One-hour workshop that discusses the process of applying for an NSF Graduate Research Fellowship, including a discussion of the NSF review criteria: Intellectual Merit and Broader Impacts. This workshop features a panel of faculty who have reviewed NSF fellowships and students who have been awarded NSF fellowships, all of whom provide tips on how to write a successful application.
NSF GRFP Information Workshop
NSF GRFP Spring 2019 Workshop

Graduate Writing Project:
http://writing.rochester.edu/services/GraduateStudentServices.html
POC: Rachel Lee, Graduate Writing Project Coordinator, rachel.lee@rochester.edu
Liz Tinelli, Graduate Writing Project Coordinator, liztinelli@gmail.com

The Writing, Speaking, and Argument Program offers a range of programs designed for graduate-student writers at the University of Rochester. The Graduate Writing Project organizes writing workshops, supports writing groups, and hosts dissertation boot camps. They provide support for graduate students from Arts, Sciences and Engineering at any stage in their program, working on any kind of academic writing and research, from abstracts and article submissions to theses and dissertations.

Future Faculty Initiative Workshops:
https://www.rochester.edu/provost/faculty-development/future-faculty-workshops/
POC: Adele Coelho, Faculty Outreach Coordinator, adele.coelho@rochester.edu
A series of workshops focused on preparing students and postdoctoral appointees for academic careers. Topics have included Understanding the Faculty Role, Teaching Fundamentals: Tools to Demystify Course Planning and Assessment, Managing Your Scholarly Identity, Making Mentoring Work, and Flourishing at Work and Being Present at Home.

Responsible Conduct of Research Citi Training:
Completion of a 10 module course on how to conduct research in an ethical and responsible manger is required for all postdocs at the University of Rochester and for all students supported by NSF grants.

Researcher Mobility Travel Grants:
http://www.rochester.edu/college/pumpprimer/one.html
POC for Arts and Sciences: Debra Haring, Assistant Dean for Grants and Contracts, debra.haring@rochester.edu
POC for Engineering: Cindy Gary, Assistant Dean for Grants and Contracts, cindy.gary@rochester.edu

Researcher mobility travel grants provide AS&E faculty the opportunity to conduct overseas research visits of one – three months in duration. Awards of up to US$5,000 cover economy air travel, visas, accommodation, and subsistence costs. Collaboration can be with any overseas institution in any discipline. **These grants may support graduate student or postdoctoral travel**, **but only if it directly benefits the research group, per his/her advisor.** In all cases, a case must be made on how the award will be leveraged for future external funding for the research group.

Development as Teachers

TA Training
One-day workshop for all first-time teaching assistants led by the AS&E Office of Graduate Education and Postdoctoral Affairs and the Center for Excellence in Teaching and Learning. Topics include the role of the TA, academic honesty policy and procedure, responding to difficult situations, and effective teaching practices.

Center for Excellence in Teaching and Learning:
https://www.rochester.edu/college/cetl/

The Center for Excellence in Teaching and Learning (CETL) strives to promote quality teaching and learning for graduate students with resources to support their work as classroom TAs, laboratory TAs, and instructors. CETL offers two teaching programs, including Foundations in Teaching and Advanced Teaching. Graduate students who complete the requirements for either (or both) receive a notation on their transcripts recognizing completion of the particular teaching program. All participants (including graduate students and post-docs) receive a certificate of completion upon meeting the requirements for the different programs.

Center for the Integration of Research, Teaching and Learning:
https://www.rochester.edu/college/cetl/cirtl/index.html
POC: Rachel Remmel, Assistant Dean and Executive Director, rachel.remmel@rochester.edu

The Center for the Integration of Research, Teaching & Learning (CIRTL) uses graduate education as the leverage point to develop a national STEM faculty committed to implementing and advancing effective teaching practices for diverse student audiences as part of successful professional careers.

Our local learning community, CIRTL@UR, strives to engage our graduate students and postdocs in teaching and learning activities, both on-line through the CIRTL Network and locally, through on-campus events and through local learning communities. There are two ways for faculty to get involved with CIRTL@UR:

1. Teach an on-line workshop on a topic of interest, reaching students at all the CIRTL institutions.
2. Propose a project for our local CIRTL@UR Teaching-as-Research Fellows Program, mentoring a graduate student or post-doc in their development as an effective teacher.

Diversity, Recruitment and Retention
POC: Beth Olivares, Dean for Diversity in Arts, Sciences and Engineering, beth.olivares@rochester.edu
Gretchen Briscoe, Director of Graduate Education and Postdoctoral Affairs for Arts, Sciences and Engineering, gretchen.briscoe@rochester.edu
Liz Daniele, Assistant Director for Graduate Diversity, liz.daniele@rochester.edu

Success, Opportunity, and Access in Research (SOAR)
https://www.rochester.edu/college/kearnscenter/graduate/soar.html
POC: Liz Daniele, Assistant Director for Graduate Diversity, liz.daniele@rochester.edu

Each September, we hold a visitation program, where we host approximately 10 students who are low income, first-generation college or underrepresented minority for a weekend of department visits, information sessions, and tours of campus. Since the program began in 2009, we have hosted over 100 students from across the country. Of these students, more than 70% submitted an application to the University, and many students were offered acceptance into their program of choice. Part of the goal of the SOAR program is to make a positive impression to increase yield of high promise students if Rochester makes an offer. If faculty are networked with colleagues who work with high-promise undergraduates, professional association listservs or other avenues to advertise SOAR, applications typically open in January for a visit the following September.

A GEM Participating University
http://www.gemfellowship.org/
POC: Liz Daniele, Assistant Director for Graduate Diversity, liz.daniele@rochester.edu

Another means of recruiting students of diverse and underrepresented backgrounds is through the University of Rochester's association with the National GEM consortium, which offers fellowships to US citizens and permanent residents from underrepresented groups (American Indian/Native, African-American/Black, Hispanic-American/Latino). GEM fellowships are awarded in fields of science and engineering and come with $20,000. Fellows must complete an internship, which usually is done the first summer of graduate study.

Graduate Visitation Program for Administrators (GVP-A):
POC: Liz Daniele, Assistant Director for Graduate Diversity, liz.daniele@rochester.edu

An approach to attracting top graduate students of diverse backgrounds is to spread the word about our University among administrators who work with very talented undergraduates across the nation. Each spring, we host an invitation-only program for program directors who work with underrepresented students at various campuses across the country. The directors come to the University of Rochester and learn about our graduate degree programs. The goal of GVP-A is to showcase our outstanding faculty and students and excite these Program Directors about the possibilities of their students applying to and joining a graduate program at the University of Rochester.

Retention
https://www.rochester.edu/college/kearnscenter/graduate/gsoc.html
http://rochester.edu/gradstudies/adse/
Gretchen Briscoe, Director of Graduate Education and Postdoctoral Affairs for Arts, Sciences and Engineering, gretchen.briscoe@rochester.edu
Liz Daniele, Assistant Director for Graduate Diversity, liz.daniele@rochester.edu

Liz works with our underrepresented graduate students, serving as a mentor and point of contact for these students, facilitating events and professional development opportunities for them, and working to ensure a positive climate for all students on our campus. Additionally, she serves as an advisor to our Graduate Students of Color organization and is a staff advisor to the UR chapter of Alliance for Diversity in Science & Engineering.

In an effort to ensure that our underrepresented students remain at the University of Rochester until the completion of their degree, the Kearns Center has placed a special emphasis on retention. As compared to undergraduate study, graduate school is marked by increase rigor and specialization. It can also be characterized by greater independence and even isolation. Due to a smaller student body that is not concentrated in residence halls, fewer student organizations, and arguably less time to connect outside their department, graduate students face unique challenges. Graduate Students of Color offers a community for students to meet and discuss the unique issues faced by underrepresented students, offer support to one another, and recharge intellectually and holistically.

Student Clubs and Support

Graduate Student Association:
The Graduate Student Association exists to act as an advocate and liaison for, and to promote interaction among, the graduate students in departments of Arts, Sciences and Engineering at the University of Rochester. GSA participates in major administrative committees, acts as an advocate for graduate students, and organizes regular academic, social, and cultural events. http://www.rochester.edu/gsa/

Postdoctoral Association:
The Postdoctoral Association was established in 2006 to provide career development and networking opportunities, as well as professional recognition specifically for postdoctoral appointees. Through these efforts they hope to contribute to the professional advancement of postdoctoral appointees and highlight their contributions to scientific research at the University of Rochester.
http://www.rochester.edu/gradstudies/pda/

Association for Diversity in Science and Engineering:
The mission of the Association for Diversity in Science and Engineering is to increase the representation and visibility of underrepresented groups (women, African Americans, Latinos/as, Native Americans, members of the LGBTQA community, people with disability, and DREAMers) in the STEM fields. The UR chapter serves as a platform for the scholarship and professional development of minority students in the pursuit of advanced degrees and careers in STEM. Our goals are to connect scientists across our campus, showcase non-traditional career paths and minority experiences in academia, industry and government, and to educate students at all levels about opportunities in STEM.

Graduate Students of Color:
The mission of Graduate Students of Color is to establish an open and inviting community to all new and current graduate students of color on-campus; to raise awareness in regard to diversity in higher education throughout the community and the university; to serve as a voice and advocate for students of color

regarding university policies; to provide resources for the professional development of graduate students throughout the University of Rochester community; and to mentor younger students to support them through their academic career.
POC: Liz Daniele, liz.daniele@rochester.edu
http://www.rochester.edu/college/kearnscenter/GraduatePrograms/GSOC.html

Other Recognized Graduate Groups

- Association of Latin American Students
- Biomedical Engineering Graduate Student Council
- Chemistry Graduate Association
- Chinese Students and Scholars Association at UR
- Data Science Club
- Graduate History Society
- Materials Research Society
- OnFilm
- Persian Student Association
- Physics and Astronomy Association for Graduate Engagement
- Rochester Indian Association (RIA)
- SPIE UR Student Chapter of the International Society for Optics and Photonics
- UR InterVarsity Graduate Christian Fellowship

Student Support
POC: Katie Mott, Assistant Director of Student Support Services, katie.mott@rochester.edu
Katie provides support for AS&E graduate students experiencing academic or personal concerns. She also offers educational programming for students, staff, and faculty on campus resources, self-care practices, and recognizing and supporting students in distress. She is a member of the CARE Network, the Title IX Education Assessment Committee, the Mindful University Project Advisory Council, and the Food Pantry Committee. She also advises the Graduate Student Association and other recognized graduate student groups.

Career Support:
POC: TBA, Program Director, Graduate Career Education and Professional Development,
This is a dedicated staff member for AS&E graduate student career services. It provides individual career counseling to graduate students and is focused on growing student engagement with the career center. The position manages a virtual on-boarding curriculum on career development resources and support for incoming students and offers graduate student-focused workshops, which include industry and alumni engagement activities. Examples of past workshops include, Academic Job Search Faculty Panel, Professionalism and Communication in the United States, and Graduate Student and Alumni Networking Night.

Institutional Resources

Writing, Speaking and Argument Program
Graduate Writing Support
Graduate Writing Project
POC: Rachel Lee, Graduate Writing Project Coordinator: rachel.lee@rochester.edu
Liz Tinelli, Graduate Writing Project Coordinator: liztinelli@gmail.com

The Writing, Speaking, and Argument Program (WSAP) offers a range of programs designed for graduate-student writers at the University of Rochester. The Graduate Writing Project organizes Writing Workshops, supports Writing Groups, and hosts Dissertation Boot Camps. They provide support for graduate students from Arts, Sciences and Engineering at any stage in their program, working on any kind of academic writing and research, from abstracts and article submissions to theses and dissertations.

CIRTL, Center for the Integration of Research, Teaching and Learning
https://www.rochester.edu/college/cetl/cirtl/index.html
https://www.rochester.edu/college/cetl/

POC: Rachel Remmel (rachel.remmel@rochester.edu)

The University of Rochester is a member of the national CIRTL Network, a group of 22 institutions across the country committed to training the next generation of STEM faculty. CIRTL, an NSF-funded consortium, has as its mission the enhancement of undergraduate education through the development of a national faculty committed to advancing effective teaching practices as part of successful and varied professional careers, particularly in the STEM disciplines.

Our local learning community, CIRTL@UR, strives to engage our graduate students and postdocs in teaching and learning activities, both on-line through the CIRTL Network and locally, through on-campus events and through local learning communities. There are two ways for faculty to get involved with CIRTL@UR:

- Teach an on-line workshop on a topic of interest, reaching students at all the CIRTL institutions.
- Propose a project for our local CIRTL@UR Teaching-as-Research Fellows Program, mentoring a graduate student or post-doc in their development as an effective teacher.

Teaching Recognition Programs
http://www.rochester.edu/college/cetl/graduate/teaching-programs.html
POC: Jenny Hadingham (Jennifer.hadingham@rochester.edu)

The University of Rochester has developed two teaching programs: Foundations in Teaching and Advanced Teaching. Graduate students who complete the requirements for either (or both) receive a notation on their transcripts recognizing completion of the particular teaching program. All participants (including graduate students and post-docs) receive a certificate of completion upon meeting the requirements for the different programs.

Researcher Mobility Travel Grants
http://www.rochester.edu/college/pumpprimer/one.html
POC: Arts and Sciences assistant dean Debra Haring (debra.haring@rochester.edu)
Engineering assistant dean Cindy Gary (cindy.gary@rochester.edu)
Researcher mobility travel grants provide AS&E faculty the opportunity to conduct overseas research

visits of one – three months in duration. Awards of up to US$5,000 cover economy air travel, visas, accommodation, and subsistence costs. Collaboration can be with any overseas institution in any discipline. **These grants may support graduate student or postdoctoral travel**, **but only if it directly benefits the research group, per his/her advisor.** In all cases, a case must be made on how the award will be leveraged for future external funding for the research group.

Support for Teaching and other Educational Programming

Center for Excellence in Teaching and Learning
http://www.rochester.edu/college/cetl/
POC: CETL Directors: Rachel Remmel, Assistant Dean and Executive Director, Stuart Jordan, Faculty Director
Instructional Development:

- Rachel Remmel, Assistant Dean and Executive Director
- Stuart Jordan, Faculty Director
- Jenny Hadingham, Assistant Director for Educational Development
- Greer Murphy, Asst Director for Faculty Development, Director of Academic Honesty

The Center for Excellence in Teaching and Learning (CETL) promotes excellence in teaching and learning through a range of programs for faculty and students. Of most relevance for grant seekers are our programs that help faculty to improve the courses they teach and develop new courses in their disciplines. PIs can best use CETL by contacting us early in the grant-writing process. CETL can assist at all stages of the process of developing the educational components of grants. Further, CETL has several on-going programs that PIs can participate in as part of the activities they propose to funding agencies. These programs include:

- Occasional workshops on teaching -- including workshops on course design, classroom technique and student assessment;
- Teaching consultancy and coaching, in which instructors engage CETL staff to observe and assess their classroom practices and gather and evaluate feedback from students;
- Mini-grant program, in which instructors can hire undergraduates to develop new instructional materials and learning activities;
- Faculty learning groups, in which small groups of faculty collaborate to deepen their mastery of teaching concepts and practices;
- Training in teaching for graduate students.

CETL also assists instructors in running workshops -- small, peer lead problem-solving groups that compliment a course by engaging students in the task of solving difficult problems collaboratively. As part of this program, CETL trains advanced undergraduates to serve as group facilitators who guide their peers in their efforts to master course material. Workshops are a highly successful and well-regarded course component, and can be readily adapted to contribute to learning in any course.

UR Mentors

http://www.rochester.edu/diversity/faculty/mentoring/POC Vivian Lewis MD (vivian_lewis@urmc.rochester.edu, 273-2760)

The overarching goal is to build a community of dedicated, expert faculty research Master Mentors who are maximally effective at enhancing the careers of their protégés. UR Mentors will function as faculty resource persons within their respective departments, be able to coach less experienced mentors and advise department chairs, training program directors, or deans who wish to develop mentoring programs.

By completing the UR Mentors program, faculty will increase their confidence, knowledge and skills as research mentors to be able to:

1. Initiate and maintain effective communication skills
2. Develop skills for aligning mentor/protégé expectations
3. Foster protégé transition to independence
4. Recognize role of diversity and bias in mentor-protégé relationships
5. Promote protégé professional development

Participants will be eligible for continuing education credits and will receive a certificate of completion. Continuing professional education credit is available (up 17.5 CE credits).

Program curriculum: The course will use case material from the Rochester CTSI mentor development course, the University of Wisconsin-Madison and others as appropriate. There will be a series of meetings over several months. Required and complementary material and references will be posted on blackboard.

Applicants should be Associate Professors or Professors who have some experience as mentors and whose application is supported by their department chair, center director, or Dean.

Community Outreach
POC: Glenn Cerosaletti, glenn.cerosaletti@rochester.edu

Available Data: number of UR students involved in community outreach. The Rochester Center for Community Leadership (RCCL) organizes and oversees multiple programs for student engagement in the community. https://www.rochester.edu/college/rccl/

Program(s)
LEAP (Learning and Exploring at Play): An early childhood literacy program through which approximately 40 undergraduates tutor pre-school and kindergarten students at Rochester City School #45 for 8-10 hours per week in a small team of 6-10 students format.

Rochester Urban Fellows program: A ten-week, intensive summer program that engages undergraduates in the civic life of Rochester, promotes learning about multicultural issues, and fosters an appreciation for urban living. Students spend four days per week undertaking projects at various community organizations, not-for-profits, or municipal offices. These are supported and complemented by weekly seminars on various urban issues, facilitated by faculty and community leaders.

Rochester Youth Year Fellowship program: A full-year, full-time fellowship for recent graduates of the Rochester-area, bachelor's-degree-granting institutions. Fellows serve with various not-for-profit organizations or municipal offices to expand their capacity to engage and empower low-income youth. Projects focus on health care, economic development and education. The Fellows are also intended to serve as a resource and conduit to strengthen University-community partnerships. The program is federally sponsored by the U.S. Corporation for National and Community Service. Visit https://www.youthyear.org/ to learn more.

In addition to the Rochester Center for Community Leadership, other centers or departments on campus also support community outreach projects, notably: the Office of Government and Community Relations, the M.K. Gandhi Institute for Nonviolence, the Susan B. Anthony Center for Women's Leadership, the Kearns Center, the Warner School, the Center for Community Health, the SMD Department of Psychiatry, the School of Nursing, and the Hoekelman Center in the SMD Dept. of Pediatrics, and the Eastman School of Music.

TOUR (Transition Opportunities at UR): A program to support students with intellectual disabilities in transition from high school to independent living through integration at the University; in partnership with the UR Institute for Innovative Transition and Monroe County BOCES #1.

Student Clubs
Community Service Network: The Community Service Network serves as umbrella organization which provides resources, funding, and support to student groups aiming to better the Rochester and the international community. CSN's main goal is to help the campus become aware of socioeconomic, health-related, and educational issues salient to individuals in the greater Rochester and to provide a framework within which empowered students can channel their energy and benefit their environment. While working with RCCL, CSN hopes to foster long-term civic engagement and a sense of commitment to pressing social issues within U of R students.

Partners in Reading: An organization focused on childhood literacy outreach; partners with RCSD Schools #33 and #19.

Refugee Student Alliance: Our primary programs are volunteering with families and individuals who came to Rochester as refugees, and tutoring/mentoring programs and on-campus events for former

refugee students in local schools. Our secondary activities include organizing fundraising and charity events to help raise needed items for local refugees, and inviting guest speakers and former refugees to deliver talks on campus.

UR Rotaract: A service club affiliated with Rotary; student members undertake a variety of service projects, including tutoring.

Circle K: A service club affiliated with Kiwanis; student members undertake a variety of service projects, including outreach at the Ronald McDonald House.

Alpha Phi Omega service fraternity: A chapter of the national service organization, whose membership includes Bill Clinton among others; students undertake a variety of service projects in greater Rochester.

Students Helping Honduras: A student organization affiliated with a national network of the same name and partnering with an NGO in Honduras for development projects there. They also undertake outreach in Rochester, principally at School #33.

STEM Initiative A community service organization focused on outreach to middle school students with an emphasis on the STEM disciplines.

Centers
The Rochester Center for Community Leadership, a unit of the office of the Dean of Students in the College, is the primary resource center for students undertaking community outreach projects. Its mission is to educate students to become engaged citizens and leaders capable of creating positive social change in their communities. In addition to advising student organizations with a focus on politics or community service, the Center serves as a clearinghouse for community service opportunities and a resource center for leadership development for students. The Center also coordinates various programs and initiatives (listed above).

Events
Wilson Day is a day of community service for students new to the University. It serves to introduce students to both their new Rochester home and their campus residential community.Part of new student orientation, this 30-year-old University tradition serves to help students strengthen campus and community connections Students are placed at nearly 100 agencies throughout the city of Rochester and perform a variety of tasks including setting up classrooms, painting houses, gardening, and exploring the city.

Institutional Resources
https://ccc.rochester.edu/organizations
Campus Co Connection (CCC) is the website that serves as the clearinghouse for all student organizations at the University. Users can search by type of organization to find those categorized as “community service.” The Rochester Center for Community Leadership developed a website to catalogue community outreach opportunities for undergraduate students:

The College is also developing strategies to support and expand experiential learning opportunities through which faculty will connect students to the community in new or existing courses. This will be based in the Rochester Center for Community Leadership, with support from the Center for Excellence in Teaching and Learning.

Community Resources
Finger Lakes Regional Volunteer Center, housed at Foodlink

Rochester Cares, Rochester's affiliate of the Hands-On Network
United Way of Greater Rochester
Rochester Community Foundation
ACT Rochester—a joint initiative of the United Way and the Community Foundation, ACTRochester.org is a vital source of data on community indicators in Rochester and the nine-county region

Resources for and about Postdoctoral Fellows

For NSF proposals a postdoctoral mentoring plan must be uploaded as a special supplementary document if the PI is budgeting for a postdoc from NSF funds. For NIH, many programs also require a postdoctoral mentoring plan or an additional education plan. In addition to specific mentoring and coaching that the PI supplies, a myriad of professional development activities are available institutionally at UR.

POC: Nick Vamivakas and Gretchen Briscoe, Graduate Education and Postdoctoral Affairs
nick.vamivakas@rochester.edu; gretchen.briscoe@rochester.edu

Available Data: Data is not managed at a central office as Postdoctoral Fellows are classified as employees. There may be case studies and data available about postdocs at the department level.

Possible data points: Average number (years) of postdocs per discipline; number of postdocs per department. All broken down by: All; M/F; URM/non-URM; US citizen or permanent resident/international, etc.

Program(s)
Professional Development Programs at UR:
http://www.rochester.edu/college/gradstudies/professional-development/index.html

Responsible Conduct of Research Workshop: Completion of a 10 module CITI course on how to conduct research in an ethical and responsible manger is required for all postdocs at the University of Rochester and for all students supported by NSF grants.

http://www.rochester.edu/college/gradstudies/professional-development/conduct.html

Academic Writing Workshops and Boot Camps: Several workshops offered throughout the year focusing on academic writing skills, including papers and dissertations. Dissertation boot camps provide a dedicated time and space for writing and a workshop on the first day to on how to create specific and concrete goals for the Boot Camp.
http://writing.rochester.edu/services/GraduateStudentServices.html

Future Faculty Initiative Workshops:
A series of workshops to prepare students and postdoctoral appointees for academic careers. Topics have included: Understanding the Faculty Role, Teaching Fundamentals;Tools to Demystify Course Planning and Assessment, Managing Your Scholarly Identity, Making Mentoring Work and Flourishing at Work and Being Present at Home.
https://www.rochester.edu/provost/faculty-development/future-faculty-workshops/

UR Year One:
Series of workshops designed for new faculty, but to which postdocs are welcome to attend. Through learning and networking activities UR Year One aims to increase knowledge and foster alliances that fuel career progress.
https://www.rochester.edu/provost/faculty-development/ur-year-one/
POC: Adele Coelho, Faculty Outreach Coordinator – adele.coelho@rochester.eu

Student Clubs
https://ccc.rochester.edu/Organizations

Events
http://www.rochester.edu/gradstudies/pda/events.html and various

Institutional Resources

Writing, Speaking, and Argument Program:
http://writing.rochester.edu/index.html
POC: Deborah Rossen-Knill deb.rossen-knill@rochester.edu
The Writing, Speaking, and Argument Program provides resources to build a strong community of writers, readers, and researchers, guided by advice from an interdisciplinary faculty committee. The program does this by teaching writing courses, advising writers, holding writing events, sponsoring an annual writing colloquium, providing support for writing in the majors, and providing a comfortable place to write. CIRTL, Center for the Integration of Research, Teaching and Learning:
POC: Rachel Remmel, rachel.remmel@rochester.edu
https://www.rochester.edu/college/cetl/cirtl/index.html
https://www.rochester.edu/college/cetl/faculty/index.html

UR is a member of the national CIRTL Network, a group of 22 institutions across the country committed to training the next generation of STEM faculty. CIRTL, an NSF-funded consortium, has as its mission the enhancement of undergraduate education through the development of a national faculty committed to advancing effective teaching practices as part of successful and varied professional careers, particularly in the STEM disciplines.

Our local learning community, CIRTL@UR, strives to engage our graduate students and postdocs in teaching and learning activities, both on-line through the CIRTL Network and locally, through on-campus events and through local learning communities. There are two ways for faculty to get involved with CIRTL@UR:

1. Teach an on-line workshop on a topic of interest, reaching students at all the CIRTL institutions.

2. Propose a project for our local CIRTL@UR Teaching-as-Research Fellows Program, mentoring a graduate student or postdoc in their development as an effective teacher.

Career:

https://www.rochester.edu/careercenter/graduates/index.html
Postdocs are welcome at the UR Career Center. The Center provides resources for those seeking positions.

Community Resources:
The National Postdoctoral Association:
http://nationalpostdoc.org/

Samples and More Information - See Appendix I

Proposal Development: Data Sharing Management Plans
Most federal agencies now require a data management plan. Examples of the sponsor's expectations are included in sponsor Guidelines. For NSF, DOE and NIH, failure to provide this plan may result in your proposal being returned without review.

Events
Once p/semester Data Sharing Management Plan workshop presented by Library Staff
POC: Adrienne Canino, Data Librarian, Carlson Library acanino@library.rochester.edu

Institutional Resources
UR Portal Data Sharing Management Tool (DMT) http://www.library.rochester.edu/data-management/DMPTool
Sponsor Resources: http://www.library.rochester.edu/data-management/funderrequirements
Guidance from ORPA: http://www.rochester.edu/orpa/proposals/#oth

Community Resources
DMT Tool National Site https://dmp.cdlib.org/pages/funder_requirements

Samples and More Information - See Appendix II

River Campus Core Research Facilities
https://www.rochester.edu/college/research/core-facilities.html

Confocal and Conventional Microscopy Core (CCMC)
https://www.urmc.rochester.edu/confocal-conventional-microscopy/
The **Confocal and Conventional Microscopy Core** provides an Olympus FV1000 laser scanning confocal microscope, an Olympus fluorescence microscope, and capability for large specimen imaging of gross and comparative histological samples. Current software capabilities include: StereoInvestigator, Image Pro Plus, full FV1000 software on workstation, and Image J. All users are provided the ability and expertise to characterize biologic specimens using sophisticated fluorescence and/or brightfield microscopy. Assistance with all imaging procedures, as needed by the investigators, is provided.
POC: V. Kaye Thomas, 585-275-1317, Kaye_Thomas@URMC.rochester.edu

Rochester Center for Brain Imaging (RCBI)
https://www.rcbi.rochester.edu/
The **Rochester Center for Brain Imaging (RCBI)** provides researchers at the University of Rochester, as well as neighboring institutions, with access to a state-of-the-art 3T magnet for research using magnetic resonance imaging (MRI). The RCBI is a 6,000-square-foot facility housing a Siemens 3T whole-body horizontal-bore Trio magnet.
POC: John J. Foxe, (585) 275-1964, john_foxe@urmc.rochester.edu

S.W. Barnes Research Laboratory
http://www.sas.rochester.edu/pas/about/facilities.html
The **S.W. Barnes** facility is a resource managed by the Department of Physics and Astronomy. It consists of Drafting, Machine and Electronic Shops.
Drafting Shop: The drafting shop is a mechanical design facility, staffed by one engineer, which serves any interested users, capable of producing drawings up to E-size.
Machine Shop: Two machine shops and one highly-qualified instrument maker serve mainly the Physics department, but also accept orders from anywhere within UR. In addition, a technician can provide assembly services as well as light machining in wood, metals or plastics.
POC: William Burrows, w.burrows@rochester.edu
Electronic Shop: An electronics shop is available for use. Printed circuit layouts using AutoCAD, as well as design and assembly or prototype units, constitute most of the workload in this shop.
POC: Bob Flight (Drafting & Engineering), 585-275-3689, robert.flight@rochester.edu
POC: John Gresty (Machine Shop), 585-275-3386, john.gresty@rochester.edu

C.E. K. Mees Observatory
http://www.pas.rochester.edu/about/observatory.html
UR's **C.E.K. Mees Observatory**, devoted to research, teaching, and public instruction, is located 40 miles south of Rochester in the Bristol Hills at an elevation of 701 m (2260 ft). The Observatory houses a 61-cm Boller and Chivens Cassegrain reflector, dedicated May 8, 1965. In March 2000 the telescope was upgraded to computer control by DFM Engineering.
POC: Kurt Holmes, 585-374-2433, kurtholmes@facilities.rochester.edu

Integrated Nanosystems Center (UR Nano)
http://www.rochester.edu/urnano/about/index.html
The Integrated Nanosystems Center consists of a nearly 1,000-square-foot metrology (measurement) facility and a 2,000-square-foot, cleanroom fabrication facility located in Goergen Hall. The center's array of electron microscopes, sputtering tools, etchers, advanced X-ray photoelectron spectrometer (XPS), and other equipment is tailored to assist key UR and regional research interests, including development of biosensors, fuel cells, nanoscale filter membranes and light emitters. Applications range from GPS

systems to detection of lethal biological warfare agents, and from portable dialysis devices to more efficient energy use.
POC: Brian McIntyre, Director of Operations**,** 585-275-3058, mcintyre@optics.rochester.edu

Laboratory of Laser Energetics (LLE)
http://www.lle.rochester.edu/
The **Laboratory for Laser Energetics (LLE)** is a unique national resource for research and education in science and technology. LLE has a five-fold mission: (1) to conduct laser-fusion implosion experiments in support of the National Inertial Confinement Fusion (ICF) program; (2) to develop new laser and materials technologies; (3) to provide education in electro-optics, high-power lasers, high-energy-density physics, plasma physics, and nuclear fusion technology; (4) to conduct research and development in advanced technology related to high-energy-density physics; and (5) to operate the National Laser Users' Facility (NLUF). LLE houses the Omega 60 and Omega EP systems.
POC: James Stein, 585-275-5286, steinj3@lle.rochester.edu

X-Ray Analysis Laboratory
The Department of Mechanical Engineering supports and houses the **X-Ray Analysis Laboratory** with two Philips x-ray diffractometers, a Materials Research Diffractometer and a Multi-Purpose Diffractometer. The instrumentation was funded from National Science Foundation, Division of Materials Research and the UR with equipment help from Bausch & Lomb. The Materials Research Diffractometer, MRD, is well suited for very high-resolution work especially for thin films and single crystal multilayer diffraction analysis; the Multi-Purpose Diffractometer, MPD, is for powder or polycrystalline diffraction analysis at room or non-ambient temperatures with controlled atmospheres. These instruments have a wide range of applications: they perform qualitative and quantitative analysis of powder diffraction data, high resolution rocking curves for electronic epitaxial wafers, quantifying defects and perfection in high quality crystals, measuring thin film thickness, layer densities and interface quality.
POC: Stephen J Burns, 585-275-4082, stephen.burns@rochester.edu

Optical Fabrication Shop
The **Optical Fabrication Shop** has the capability of fabricating specialized optics. This includes the polishing of substrates up to 300 mm in diameter to a flatness of //20 and a rms surface roughness of 0.5nm. The fabrication of small optics, e.g. lenses, prisms, wedges, mirrors, lenslet arrays, laser oscillator rods, etc., is done with a variety of glasses and crystals.This shop contains two Rogers and Clark annular-ring continuous-polishing machines of 36 inches and 60 inches, respectively. Finish polishing on these machines is supported by an array of single-spindle grinding and polishing stations. A new capability for grinding and polishing barrels and cylinders was recently acquired. The facility is equipped with a fume hood for acid etching and a Zygo Mark IV xp interferometer.
POC: Alex Maltsev, 585-275-2313, amal@lle.rochester.edu

Mechanical Engineering and Design Shop
The **Mechanical Engineering and Design Shop** provides the full range of mechanical design, engineering, fabrication, assembly and testing capabilities. The shop specializes in the design and construction of unique and precision components and structures and has resident CAD and FEA engineering specialists to support research projects. The services of the Mechanical Engineering and Design Shop are available to any UR customer seeking the broad range of skills from design to prototype sample and in-house metrology. The present shop rate is $93/hour. Estimates are available by contacting the point of contact below. Services are requested by providing an account number and approving the estimate.
POC: Milton Shoup, 585-275-9636, shoup@lle.rochester.edu

Optical Manufacturing Shop
The **Optical Manufacturing Shop** has the capability of supplying optical devices in dimensions up to 75 cm. This includes: Deposition of metal and high laser damage threshold multilayer dielectric thin film coatings. High quality reflectors, polarizers, and antireflection coatings are produced by reactive evaporation with an electron-beam gun onto heated substrates. Ion-assisted deposition routinely supplements this process when required. POC: Alex Maltsev, (585) 275-2313, amal@lle.rochester.edu

X-Ray Crystallographic Facility
http://chem.chem.rochester.edu/~xray/Main.htm
Equipment: Experiments are run on a Bruker-AXS SMART Platform diffractometer equipped with an APEX II CCD area detector. Molybdenum radiation is delivered by a fine focus X-ray tube powered at 50 kV and 30 mA. A Kryo-Flex low temperature device is operated at 100.0(5) K, with an available range of 90-300 K. Samples are examined with a polarizing microscope; air-sensitive materials are prepared under an inert atmosphere.

Experiments: Typical data collections take 8-24 hours, controlled by the APEX2 software package from Bruker-AXS. Data manipulation and structural solution and refinement are performed with the SHELXTL package from Bruker-AXS.

Samples: On average only a few crystals are required to find an acceptable specimen; more is better, bigger is better. Crystals are accepted dry or in mother liquor. Samples are not returned unless the submitter requests it.

Report Files: The submitter receives via email a CIF (crystallographic information file) and full report file (PDF and DOC formats). The former is for journal and database submission and the latter contains experimental data, ORTEP diagrams, bond lengths and angles.
POC: 585-273-4715, xray@chem.rochester.edu

Laser Facility
http://www.chem.rochester.edu/about/facilities.php
The **Laser Facility** in the Department of Chemistry houses laser systems for absorption, fluorescence, and Raman spectroscopies, nonlinear four-wave mixing, electro-optic sampling, time-resolved electron diffraction, photoelectron spectroscopy, temperature-jump studies, photoacoustic calorimetry, and the initiation of photochemistry.
POC: Ken Simolo, 585-275-4256, kenneth.simolo@rochester.edu

Mass Spectrometer Facility
http://www.chem.rochester.edu/about/facilities.php
Shimadzu QP2010 GC/MS with direct probe
Shimadzu QP2010 GC/MS
Shimadza LCMS 2010 with electro spray and APCi
HP Quadrapole LC with electrospray and APCI Model 1100
POC: Terry O'Connell, 585-275-5358, terry.oconnell@rochester.edu

Nuclear Magnetic Resonance Spectrometer Facility
http://www.chem.rochester.edu/about/facilities.php
Varian Innova 500 Mhz spectrometer
Bruker Avance 500 Mhz spectrometer
(2) Bruker Avance 400 Mhz spectrometers
Bruker Amx 300 Mhz spectrometer

CENTC Elemental Analysis Facility
http://chem.chem.rochester.edu/~ealab/
The **Center for Enabling New Technologies through Catalysis** is a NSF Phase II Center for Chemical Innovation. CENTC brings together researchers from across North America to collaboratively address the economic, environmental and national security needs for more efficient, inexpensive and environmentally friendly methods of producing chemicals and fuels from a variety of feedstocks. The CENTC includes: PerkinElmer 2400 Series II Analyzer, PerkinElmer Model AD-6 Autobalance, and dedicated VAC Atmospheres glovebox loaded with Ar (argon) gas.
POC: (585) 273-4715, ealab@chem.rochester.edu

Stable Isotopes in the Environment, Analytical Laboratory (SIREAL)
http://www.ees.rochester.edu/SIREAL/
The **Stable Isotopes in the Environment, Analytical Laboratory (SIREAL)** is a shared resource for the entire University as well as non-affiliated clients. The lab was established originally for analysis of geological materials, but has diverse capabilities that are of general interest to the University research community. SIREAL offers users training in the preparation of samples for analysis as well as training for the use of the instrumentation (under certain circumstances). This may be of value for projects requiring large numbers of analyses, as we offer discounted prices for University Clients as well as further discounts if our own staff need not prepare the samples. The cost for analysis is on a per-unknown sample basis (not hourly).
POC: Penny Higgins, 585-275-0601, pennilyn.higgins@rochester.edu

Surface Analysis Facility
We have X-ray Photoelectron and Auger Electron Spectroscopy (XPS and AES) for surface analysis. XPS and AES are surface sensitive techniques that can be used for quantitative and semi-quantitative elemental and chemical analysis. Standard sample heating and Ar ion sputter-cleaning are available. For more sophisticated electronic structure analysis Inverse Photoemission Spectroscopy (IPES), Electron Energy Loss Spectroscopy, and Ultraviolet Photoemission Spectroscopy (UPS) are also available. The sample size equipment is typically 1 cm X 1 cm X 1mm. Circular samples with 1 cm diameter can also be accommodated. The cost is $85 per hour.
POC: Yongli Gao, 585-275-8574, ygao@pas.rochester.edu

Electronics Shop (LLE)
The **Electronics Shop** provides the full range of electronics services from engineering, design, manufacture, assembly, and test to repair. The shop specializes in design and fabrication of highly sensitive and fast instrumentation, detection, data acquisition and control systems employing embedded microprocessor hardware and software, power supplies, RF analog designs, etc., to support specialized research projects. Printed circuit board layout and manufacturing facilities exist in-house. The services of the Shop are available to any University customer. Please contact Robert Peck for the current cost per hour.
POC: Robert Peck, 585-275-8956, rpec@lle.rochester.edu

SEM Lab
http://www.bme.rochester.edu/research/facilities.html
The electron microscopy facility for the University of Rochester is located in the Institute of Optics' Wilmot Building. The facility serves the entire academic campus as well as some Medical Center activities.

Engineering Fabrication Lab
http://www.rochester.edu/rettnerhall/about.html

Located in Rettner Hall, the building features an **engineering fabrication lab** where students can build project prototypes, a multipurpose learning studio, group study areas, and exhibit space for students to display their projects. The new building will also contain sound and video recording studios, high-end computers, and 3-D printers, which represent the latest manufacturing technique to convert digital design software into actual models. Rettner Hall will also contain sound and video recording studios, high-end computers, and 3-D printers, which represent the latest manufacturing technique to convert digital design software into actual models.
POC: http://www.rochester.edu/college/rettnerhall/contact.html

Center for Integrated Research Computing (CIRC)
https://www.circ.rochester.edu/
Center for Integrated Research Computing (CIRC) provides technical expertise, computing technology, collaboration opportunities, and community-building activities. Currently, UR is one of only two universities in the US who have an IBM Blue Gene/Q supercomputer, an advanced computational tool that will lay a foundation for ubiquitous petascale computing in the coming decade and beyond. UR's Blue Gene/Q is now tied for second place on the Green500 list (www.green500.org) of the world's most efficient supercomputers for a sustainable future. Through CIRC, UR has an ongoing partnership with IBM Watson Research Center and researchers have regular collaboration with IBM staff. CIRC provides researchers with hardware, software, training, and support necessary to utilize computational science and computing technology in research activities in all areas of academic scholarship. CIRC supports over 750 users across the Medical Center and River Campus from over 40 departments and centers, including disciplines from medicine, engineering, and the biological and physical sciences. The Center currently maintains systems with an aggregated computational performance of 420 teraFLOPS, 2 petabytes of disk storage, and a variety of advanced scientific software applications and tools. CIRC hosts a monthly symposium where faculty and students showcase their research to the University community, learn about the application of computing technology to research problems, and participate in discussions that lead to collaborative opportunities. The Center's expertise, consultation services, collaboration, and community building activities are essential for facilitating the research mission of the University.
POC: Will DiGrazio Jr., 585-275-9043, wdigrazi@rochester.edu

Health Science Center for Computational Innovation (HSCCI)
http://www.rochester.edu/hscci/
HSCCI is an evolving partnership between the University and IBM. The center is home to IBM Blue Gene/Q super computers, making it one of most powerful computer systems in the world. Data science and high-performance computing hold the potential to revolutionize the way diseases are studied, monitored, and treated by allowing scientists to sift through and analyze huge volumes of data and create complex models and simulations that would previously not have been possible. Opened in June 2014, the Visualization-Innovation-Science-Technology-Application (VISTA) Collaboratory, is a 1,000-square-foot data visualization lab located in Carlson Library, completes the creation of what is essentially a massive scale, integrated, high performance supercomputing system. The display in the new lab consists of an array of 24 monitors, is 20 feet wide and 8 feet tall, and has a resolution (50 megapixels) approaching that of IMAX theaters. The visualization lab has a direct high speed fiber optic connection to the University's Data Center, linking the display with an IBM Blue Gene/Q – which, with 16,384 processing cores, is one of the most powerful supercomputers on the planet – and the new IBM "BlueHive 2" Linux supercomputer cluster – which has a data storage capacity of 2 petabytes or 2 million gigabytes. To put this in perspective, 1 petabyte could store the complete human genome – which consists of 3 billion base pairs – of every individual in America.
POC: David Topham, 585-273-1403, david_topham@urmc.rochester.edu

Visualization-Innovation-Science-Technology-Application (VISTA) Collaboratory
http://www.rochester.edu/hscci/visualization-lab.html
Opened in June 2014, **VISTA** is a 1,000-square-foot data visualization lab located in Carlson Library, completes the creation of what is essentially a massive scale, integrated, high performance supercomputing system. The display in the new lab consists of an array of 24 monitors, is 20 feet wide and 8 feet tall, and has a resolution (50 megapixels) approaching that of IMAX theaters. The visualization lab has a direct high speed fiber optic connection to the University's Data Center, linking the display with an IBM Blue Gene/Q – which, with 16,384 processing cores, is one of the most powerful supercomputers on the planet – and the new IBM "BlueHive 2" Linux supercomputer cluster – which has a data storage capacity of 2 petabytes or 2 million gigabytes. To put this in perspective, 1 petabyte could store the complete human genome – which consists of 3 billion base pairs – of every individual in America. Only a handful of other U.S. institutions – such as Stanford University and Oak Ridge National Laboratory – have developed similar capabilities. The new visualization lab, combined with Blue Gene/Q and BlueHive 2 systems, places the University of Rochester at the forefront of the national trend to unlock the potential of big data. The lab is part of a $30 million investment made by the University, New York State, and IBM in the Health Sciences Center for Computational Innovation (HSCCI) and more than $50 million that has been invested in recent years to expand the University's high performance computational resources.
POC: David Topham, 585-273-1403, david_topham@urmc.rochester.edu

Goergen Institute for Data Science (GIDS): https://www.rochester.edu/data-science/
In late 2013, the UR announced a new, $50 million commitment to greatly expand its work in the burgeoning field of data science. The commitment includes the creation of a new Institute for Data Science, construction of a state-of-the-art building to house it, and as many as 20 new faculty members with expertise in the field. This is the top UR priority for the University's 2013 - 2018 strategic plans. The initiative builds on current strengths in data science including the Health Sciences Center for Computational Innovation and the active research that is carried out in fields such as machine learning, artificial intelligence, and biostatistics. It also leverages collaborations with companies such as IBM, Wegmans, 1010data, Google, MC10 and Xerox in data science. GIDS serves as the integrating hub for research, education, corporate engagement and broad dissemination of UR research, with an initial focus on the following areas:

- Health analytics: Using data to predict individual health outcomes on the basis of treatments, genomics, and lifestyle and behavioral factors may lead to some of the biggest healthcare breakthroughs in the future. UR is already a leader in tracking and developing methods to control the spread of infectious diseases and is home to a world center for the collection and analysis of cardiac data.
- Cognitive systems and artificial intelligence: This area focuses on increasing our understanding of how the brain makes sense of the world. UR is uniquely positioned as it is home to internationally recognized research in cognitive science and artificial intelligence.
- Methods, Tools, and Infrastructure: Analyzing large-scale data requires the appropriate tools and approaches—an interdisciplinary challenge that some of the Institute's faculty will address. This initiative will develop the computational methods, tools, and infrastructure that will drive discovery in science, business, medicine, the humanities, and virtually every other field. This computational framework will allow researchers to efficiently collect large amounts of data, manipulate it, and then surround it with the right computing resources and statistical expertise to make sense of it. UR is uniquely positioned for success due to having faculty members who can build the systems and others who can apply it to their fields of research.
- Center of Excellence in Data Science: One of NYS most innovative and ambitious collaborative initiatives is the establishment of "Centers of Excellence" at leading universities. These centers encourage the rapid development of scientific breakthroughs, leveraging basic research, training and technology development to drive regional economic development. The center builds upon UR infrastructure and expertise in data science data analytics, and high performance computing, while collaborating with other academic partners, industry, and government agencies, to support the following objectives and strategies:
- Research: Generate innovative technologies and methods, while increasing competitive research grants and public-private partnerships
- Commercialization and Incubation: Drive growth of large and small commercial partners by supporting the commercialization of new products and services, and providing access to business acceleration programs
- Consultations and Resources: Facilitate access to advanced computing and data visualization facilities, resources, and expertise
- Education and Training: Increase the pool of well-trained, highly skilled data scientists to meet national demands by supporting formal graduate and undergraduate programs and experiential learning opportunities

Photonics Good Stuff
Optics and Photonics: Essential Technologies for our Nation, National Research Council, http://www.nap.edu/catalog.php?record_id=13491 , 2013.

Integrated Photonics Institute for Manufacturing Innovation (IP-IMI) a competition under the National Network for Manufacturing Innovation (NNMI).
http://www.manufacturing.gov/ip-imi.html
https://www.dodmantech.com/Institutes/IPIMI

AIM Photonics http://www.aimphotonics.com/
AIM Funding Opportunities
The American Institute for Manufacturing Integrated Photonics (AIM Photonics), a designated Institute under the National Network for Manufacturing Innovation (NNMI) program, provides a technology, business and education framework for industry, government and academia to accelerate the transition of integrated photonic solutions from innovation to manufacturing-ready deployment in systems spanning commercial and defense applications. AIM Photonics seeks to advance integrated photonic circuit manufacturing technology development while simultaneously providing access to state-of-the-art fabrication, packaging, and testing capabilities for small-to-medium enterprises, academia and the government; create an adaptive integrated photonic circuit workforce capable of meeting industry needs and thus further increasing domestic competitiveness; and meet participating commercial, defense and civilian agency needs in this burgeoning technology area.

AIM Photonics was in response to the 2015 Air Force Research Laboratory Integrated Photonics Institute for Manufacturing Innovation (IP-IMI) national competition. Headquartered in Rochester, NY, AIM Photonics will support Small and Medium Enterprises (SMEs), providing practical access and technology on-ramps for U.S. industry, government, and academic communities. The proposed funding model included $110 million from the U.S. Air Force Research Laboratory, and that award will be supplemented by another $250 million from the State of New York, with additional funding commitments from public and private partners expected to exceed $245 million over the next five years for a 5:1 matching of federal funds. The proposal was put together by a coast-to-coast academic and industry consortium led by SUNY Polytechnic Institute and included the University of Rochester, RIT, MIT, University of Arizona, the University of California–Santa Barbara, and Columbia University among its major academic partners. Corporate partners include Boeing, IBM, Intel, Hewlett-Packard, Lockheed Martin, Infinera, Corning and Synopsys. In addition to support from New York state, AIM Photonics is supported by the states of California and Massachusetts, along with leading national and regional industry consortia and economic development agencies.

In a matrix approach, AIM Photonics addresses four critical manufacturing and design areas, Manufacturing Innovation Centers of Excellence (MCEs): (1) Electronic and Photonic Design Automation (EPDA), (2) Multi-Project Wafer and Assembly (MPWA) services, including both Foundry Broker Services and Foundry Operations, (3) Inline Controls and Test (ICT), and (4) Test, Assembly, and Optical Packaging (TAP). MCEs are at the core of our innovation engine, where they examine technology roadmaps, analyze future requirements and propose potential solutions to ensure AIM Photonics innovations (including education and training) adequately enable those future requirements. Key Technology Manufacturing Areas (KTMAs) include Very High Speed Digital Data Communication and Links (VHS Data Comm and Links), Radio Frequency (RF) Analog, Integrated Photonic or PIC Sensors, and Phased Array Technologies). These represent market-driven industry segments illustrating the manufacturing challenges that the MCEs specifically investigate. KTMA drivers are realized through Applied R&D Project Initiatives and receive support on manufacturing-based advances through the MCEs, providing cross-cutting synergism and application of collective results. The AIM Academy supports the comprehensive education and workforce development program.

University of Rochester – Technology Commercialization, Startup Support

Services and Innovations Centers

Key Statistics:
UR is a leading economic engine in the region. At the University of Rochester, sponsored program expenditures were $382,566 million in FY 2018 In FY 2018, the University of Rochester was **granted** 45 U.S. patents **and** 32 foreign patents. These 77 patents cover 50 different technologies.

Key Publications:
Office of Research and Projects Administration (ORPA) Annual Report
http://www.rochester.edu/orpa/orpa/annual-report/
UR Ventures Annual Report
http://www.rochester.edu/ventures/about/annual-reports/

University of Rochester: The Center for Entrepreneurship ("CfE")

The UR and the local region provide numerous resources to support technology development and commercialization. The CfE, launched by the Ewing Marion Kauffman Foundation grant awarded to the University in 2003, is led by the Center Director and university Vice Provost for Entrepreneurship, Dr. Duncan Moore, who will serve as Principal Investigator for UR. The CfE takes advantage of faculty from all schools' colleges on the River Campus as well as the Medical Center.
http://www.rochester.edu/entrepreneurship/

Resources to Leverage in Proposals

Office of Research and Projects Administration:
ORPA oversees the UR's pre -and post- award administration for proposals submitted, awards made, and expenditure statistics. Contract and agreement negotiations with industry and other partner universities are handled by ORPA as well as reporting and compliance oversight. http://www.rochester.edu/ORPA/

UR Ventures: UR Ventures provides the University's technology transfer functions. Their mission is to develop UR innovations into valuable products and services to make the world ever better.
http://www.rochester.edu/ventures/about/

Center for Entrepreneurship: This serves to identify and create new partnerships with alumni, local businesses, and non-profit organizations; publicizes school-based
experiences; and encourages collaboration among the schools engaged in entrepreneurship education at the University of Rochester. http://www.rochester.edu/entrepreneurship/

Nextcorps: NextCorps (formerly known as High Tech Rochester) is a nonprofit whose mission is to be a catalyst for entrepreneurship and innovation-based economic development. We do this by applying business expertise and network connections to aid in the formation and profitable growth of companies in the Rochester area and the Finger Lakes Region of Upstate New York.
NextCorps provides a suite of services, including technology commercialization for very-early-stage opportunities, business incubation for high-growth-potential startups, and growth services for existing manufacturing companies seeking to improve their top- and bottom-line performance.
https://nextcorps.org/

NEXUS-NY Accelerator: New Energy Xcelerator of Upstate New York.

HTR leads a 5-year, $6M NYSERDA-sponsored initiative that aims to accelerate the commercialization of clean energy innovations across New York State. University partners include UR, Alfred University and RIT. NEXUS-NY provides funding support to selected technology teams to evaluate the commercial potential of existing research, immersive learning, mentoring and coaching. http://htr.org/nexus-ny

Finger Lakes Business Accelerator Cooperative: HTR is coordinating the Finger Lakes Business Accelerator Cooperative – a hub and node system to support entrepreneurship and innovation through formation, incubation and accelerated growth plans. This leverages $2.5M of NYS funding and resources from Rochester Institute of Technology (RIT), Small Business Development Centers (SBDC's) and Industrial Development Agencies (IDA's) serving the region.

Technology Development Fund
In an effort to bring University of Rochester's world-class research to life, UR Ventures has created the Technology Development Fund (TDF). Oftentimes, our research efforts yield scientific breakthroughs that are not ready to be translated to real world situations. The TDF exists to support UR researchers as they develop their innovations to get them ready for the marketplace. http://www.rochester.edu/tdf/

Simon School Venture Capital Fund: With funding commitments of over $1M student entrepreneurs and venture capitalists at the Simon School of Business now manage the Venture Capital Fund in a real world setting.

TEAM – Master of Science in Technical Entrepreneurship and Management: Offers students the opportunity to immerse themselves in a technical cluster of their choice, while receiving a strong foundation in entrepreneurial management. Through a fast-paced curriculum at the University's Hajim School of Engineering and Applied Sciences and the William E. Simon Graduate School of Business, students can complete the program in as little as one academic year. TEAM students have the unique option to choose an existing patented technology from the University's Offices of Technology Transfer (OTT) and create a business plan for its commercialization.

New York Business Plan Competition Finger Lakes Region: The New York Business Plan Competition is an intercollegiate venture creation and innovation competition that was established in 2009 to encourage innovation and entrepreneurship throughout New York's colleges and universities. The UR runs the Finger Lakes region semi-final competition. The top teams from each of the 10 economic development regional zones advance to the final statewide competition in Albany where the teams will go head-to-head for more than $500,000 in cash and in-kind prizes.

Mark Ain Business Model Workshops and Competition:
The Mark Ain Business Model Workshop Series and Competition provides aspiring student entrepreneurs at the University of Rochester an opportunity to attend a series of three workshops that cover the following topics: articulation of their concept, sizing up market dynamics, development of business and operational models, and exposure to startup implementation issues. At the conclusion of the workshops, student finalists present their concept, analysis, and recommended business model to a panel of distinguished alumni entrepreneurs and entrepreneurship professionals in a competition with a first-place cash prize of $10,000.

UR Entrepreneurship Club: UR Entrepreneurs works to promote and facilitate entrepreneurship in the UR community by providing education, inspiration, and networking opportunities. We inspire and facilitate members of varied backgrounds to form foundations and collaborations for development and launching of ideas. The UR Entrepreneurs also develop professional relationships with businesses and other entities that can offer advice and support.

UR Consulting Group: The UR Consulting Group is an undergraduate student-run, pro bono consulting service for the Rochester business community. We focus on support services for entrepreneurs, local and regional companies, and non-profit organizations, including business plan development, advertising, market research, and communication services that integrate the newest digital media and student innovation.

Simon Entrepreneurs Association: The Simon Entrepreneurs Association (SEA) is a graduate student-run, faculty, industry, and community advised organization, centered at the Simon Business School at the University of Rochester. It is the goal of SEA to create an environment that embraces a broad definition of entrepreneurship—a way of managing one's life and resources to undertake new ventures—in all disciplines by creating a portfolio of academic, professional, and social activities that integrate entrepreneurial interests and resources from throughout the Rochester community.

Women Entrepreneurs Blog @ Simon: The Women Entrepreneurs Blog @ Simon provides a fact-filled online forum for women interested in starting their own businesses or furthering an existing entrepreneurial venture. The blog contains helpful information on starting a business, creating a business plan, finding financing, legal direction and much more. It also features insights from leading Western New York female entrepreneurs and business leaders.

Kauffman Entrepreneurial Year (KEY): Program offers selected students a fifth, tuition-free, year of college to pursue entrepreneurial endeavors. Qualified UR students may propose to devote as much as an entire academic year to internships, special projects, business plan development, research into various facets of entrepreneurship, or analysis of how culture and public policy influence entrepreneurial activity.

Other Key Centers of Excellence Driving Innovation on Campus

Center for Nursing and Entrepreneurship (CNE): actively promotes services that make the Rochester area a healthier place to live from flu clinics to community wellness programs to services for employers.

University of Rochester Clinical and Translational Science Institute (CTSI):
CTSI is a national leader in the expanding field of clinical and translational research. With funding from the National Institutes of Health Clinical and Translational Science Award, the CTSI has assembled the people and resources that will help scientists and physicians at the University of Rochester and across upstate New York collaborate to produce innovative science and technology that improves health. The Institute has one primary goal: That new preventive interventions, diagnostic procedures and treatments get to patients and communities faster than ever before. http://www.urmc.rochester.edu/ctsi/

The Center for Emerging & Innovative Sciences:
Established in 1993, is a NYSTAR-sponsored Center for Advanced Technology - one of 15 throughout New York State. CEIS promotes economic development in New York and the greater Rochester region through technological innovation with a focus on successful technology transfer. When the right match is established, academic researchers can advance their projects while companies access the skilled resources needed to improve product development and create new technologies. http://www.ceis.rochester.edu/

Center for Human Experimental Therapeutics (CHET): The mission of CHET is to conduct hypothesis-driven, rigorously designed, initial investigations of novel therapeutic interventions for human diseases. The Center utilizes a team of dedicated clinical researchers and research cores to efficiently conduct initial clinical trials in diseases targeted by the URMC Strategic Plan.
http://www.urmc.rochester.edu/chet/

Center for Medical Technology Innovation: This new Center will focus on translational research and the development of collaborative projects between physicians, students, faculty and business. It also runs a Medical Technology Innovation master's program.

Center for Music Innovation and Engagement (CMIE): The focus of the CMIE, or "entrepreneurship in music," is helping students learn how to turn promising ideas into enterprises that create value. The CMIE is part of the Institute for Music Leadership (IML), an integral part of the Eastman School of Music. Its role is to ensure that Eastman students, alumni and professional musicians obtain the broad education, specialized skills and diversified experiences they will need—along with their exceptional musicianship – to become the new generation of musical and cultural leaders.

Upstate Stem Cell cGMP Facility (USCGF): The new cGMP facility will enable scientists to produce human stem cells suitable for testing new therapies. The USCGF is a key component of the University of Rochester's Stem Cell and Regenerative Medicine Institute and is a regional resource and available to scientists in institutions throughout Upstate New York. http://www.urmc.rochester.edu/stem-cell/

UR Virtual Drug Discovery Center: The goal of the University of Rochester Virtual Drug Discovery Center (UR VDDC) is to accelerate research by investigators at the University of Rochester who are working on new drug discovery.
http://www.urmc.rochester.edu/virtual-drug-discovery/index.cfm

Other Off Campus Resources

Rochester Angel Network: The Rochester Angel Network (and its associated Angel Fund) is a private group of accredited investors in the Greater Rochester, NY Region with an interest in investing in early stage startup companies. The network administered by HTR provides an accessible and efficient forum by which entrepreneurs can find potential investors, and investors can find deals of interest.
http://www.rochesterangels.com/

The Entrepreneurs Network - TEN: The Entrepreneurs Network -TEN - is one of Upstate New York's fastest growing initiatives designed to bolster new ventures (early stage technology; life sciences) and established firms (scalable, high-revenue potential; family-owned; and/or ownership transitioning.) TEN members do better: winning government grants and contracts, increasing revenues by retooling sales & marketing strategy, and securing equity financing or traditional sources. http://ten-ny.org/

Excell Partners: Excell Partners, is a NYS-supported seed fund that manages a state-supported fund which provides pre-seed and seed stage financing to high-tech start-up companies in the Upstate New York region. Although it is a not-for-profit organization, established in cooperation with the University of Rochester and NYS, Excell maintains a for-profit discipline by structuring each investment with convertible debt and equity returns so that, over time, the fund becomes self-sustaining.
http://www.excellny.com/

Facilities and Other Resources

In addition to PIs' own laboratory, equipment, office and departmental resources, for some proposals this section can identify and elaborate upon the general institutional resources and environment. This section sets the context for assurance that the PI is working within an environment conducive to discovery. UR has an excellent reputation as a Research I institution and this information can be leveraged for grant writing. See Appendix III for good institutional context information.

Some of the institutional resources that it may be worth mentioning are:

- Core Research Facilities
- Shared Instrumentation
- Computational facilities
- The River Campus and Medical Center Libraries
- Administrative, clerical and technical human resources (departmental as well as central)
- Space-particularly research space
- Ease of collaboration with other UR Schools and units
- Regional resources, including other local colleges

Human Resources:
The XXXX Department employs a staff of technical, clerical and administrative staff to support faculty and their research. The Office of Research & Project Administration, the Office for Research Accounting and Costing Standards, and the Dean's Office employ a full staff of sponsored research and finance administrators, who provide oversight, assistance, and guidance to faculty and staff with respect to the preparation of proposals and administration of sponsored program awards.

Libraries:
The University of Rochester enjoys a world-class academic library system. The UR science and engineering library (Carlson), medical library (Miner), and humanities and social sciences (Rush Rhees) serve as important resources for students, faculty and staff. Each discipline taught at the University of Rochester has a dedicated professional librarian and a rich variety of resources available free of charge to the university community, including access to vast scientific databases, hundreds of online scientific journals, books and reference materials, and research tools.

University of Rochester Medical School:
The University of Rochester is home to a nationally prominent medical school and teaching hospital. Unlike many university medical schools, it is located contiguous with the College campus (less than a five minute walk from the XXXX Hall, the XXXX building) facilitating collaboration with medical school faculty and use of medical center facilities.

Appendix I Postdoctoral Mentoring Plan

Structure for Every Mentoring Plan, Regardless of Funding Agency
http://nationalpostdoc.org/publications-5/mentoring-plans/mentoring-plan

Toolkit National Postdoctoral Association
https://www.nationalpostdoc.org/page/MentoringPlans

The two primary features of any mentoring plan should be (1) **professional development**, including research development, and (2) **career development**. The former involves helping the postdoc become a productive and independent researcher, and the latter involves providing guidance and resources for

identifying and achieving the next career milestone. Within professional development, core competencies should be considered.

1. PROFESSIONAL DEVELOPMENT

- Don't try to do it all; identify strengths and challenges and focus on the challenges.
- Describe how you will provide initial orientation to the lab or research group, including topics such as group meeting schedule, working hours, notebooks, standard operating procedures for techniques, ordering supplies. Consider including general expectations as part of this orientation as well.
- Meet regularly with your postdocs to discuss progress on their research including: review of original data; data collection issues; additional experiments to be performed or data to be collected; data analysis and interpretation; and dissemination of results. Describe the frequency and format, whether these meetings are individual, in small groups, with the whole research group, or some combination thereof.
- Provide regular feedback, whether through informal interactions, like manuscript review and presentation style critique, or through more formal venues, like written performance evaluations.
- Facilitate conference and meeting attendance where postdocs can present their work and expand their networks. Where possible, describe these opportunities by name. Consider including travel funds within the grant to support such activities.
- Encourage attendance at departmental seminars, journal clubs, and other opportunities where postdocs can expand their breadth of knowledge.

2. CAREER DEVELOPMENT

- Discuss career goals with your postdocs and describe how you can help them to reach these goals. A postdoc self-assessment will help to identify potential career options.
- Become knowledgeable about the current job market for your postdocs so that you can provide meaningful input. For career paths outside your experience, identify other resources such as: books on career paths and outcomes; a career center or counselor; colleagues; or your professional society. Articulate your intention to provide this input as well as any other sources you think might be helpful.
- Encourage your postdocs to attend professional and career development programming at their institution or professional society meetings. Describe these activities within the plan. **Providing explicit encouragement and approval of such activities can significantly influence whether or not a postdoc will feel that it is appropriate to participate.**

Example Postdoctoral Researcher Mentoring Plan for an NSF Proposal

[Note: The following mentoring plan is provided as an example; however, the specific mentoring plan a PI develops should fit the project, the department's goals, and the needs of the postdoctoral researcher(s) to be mentored.]

One postdoctoral researcher will be funded on this project. The postdoctoral researcher's development will be enhanced through a program of structured mentoring activities. The **goal** of the mentoring program will be to provide the skills, knowledge and experience to prepare the postdoctoral researcher to excel in his/her career path. To accomplish this goal, the mentoring plan will follow the guidance of the National Academies of Science and Engineering on how to enhance the postdoctoral experience, by providing a structured mentoring plan, career planning assistance, and opportunities to learn a number of career skills such as writing grant proposals, teaching students, writing articles for publication and communication skills [1]. Specific elements of the mentoring plan will include:

- Working with the postdoctoral researcher to establish and implement an **Individual Development Plan** based on the process developed by the FASEB [2]

- Seminars, workshops and individual consultations on **how to identify research funding opportunities and write competitive proposals**, offered by Texas A&M University's Division of Research and Graduate Studies Office of Proposal Development [3]
- Participation in seminars and workshops on **teaching and learning**, as well as access to a teaching mentoring program, conducted by the Graduate Teaching Academy under the auspices of the NSF-funded Center for Integration of Research Teaching and Learning (CIRTL) and Texas A&M University's Center for Teaching Excellence [4]
- Opportunities to **network with visiting scholars who are leaders in our field** by having lunch or dinner with them when they participate in the department's visiting speaker series
- Participation in a **journal club** for graduate students and postdocs, in which participants meet weekly, along with a faculty facilitator, to discuss and critique recent journal articles in the field and to discuss how to write and submit journal articles
- Travel to at least **two conferences each year** [name conferences here] (travel funds are included in the budget), with the goal that the postdoctoral fellow will present a poster or paper at the conference.
- Participation in a monthly brown bag lunch series for postdoctoral fellows and graduate students in our department, in which speakers will be invited to discuss subjects related to **career development** such as how to apply for a faculty position, career paths outside of academia, tips for negotiating salary and start-up funds, how to plan and independent research agenda, etc.
- Participation in the PI's weekly research group meetings, in which members will be expected to present their research regularly, and feedback and coaching will be given to help all members to **develop their communication and presentation skills**.

Success of this mentoring plan will be assessed by tracking the progress of the postdoctoral fellow through her/his Individual Development Plan, interviews of the postdoctoral fellow to assess satisfaction with the mentoring program, and tracking of the postdoctoral fellow's progress toward his/her career goals after finishing the postdoc.

[1] National Academy of Science, National Academy of Engineering, Institute of Medicine, "Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisers, Institutions, Funding Organizations, and Disciplinary Societies," National Academies Press, 2000.

[2] The Federation of American Societies for Experimental Biology, "Individual Development Plan for Postdoctoral Fellows," http://www.faseb.org/

[3] http://vpr.tamu.edu/researchdevelopment/proposal-development-resources/postdoc

Sample NIH F31 Additional Educational Information

Recognizing that postdoctoral fellows must be comprehensively trained for the demands of an ever evolving technological and scientific workplace, The University of Rochester (UR) provides significant resources to the professional development of postdocs. In addition to the specific mentoring efforts described in this proposal by his/her close advisors, Dr. XXXX will also be able to take advantage of a growing number of institutionally established and supported professional development programs across campus.

Required courses in the Responsible and Ethical Conduct of Research are offered several times per year. In addition a number of workshops and seminar series are provided at least annually and/or every semester at the University of Rochester. These include supplementary training for future independent researchers that fall into three primary categories: 1) Effective verbal and written communication, 2) Effective teaching and mentoring, and 3) Navigating the STEM career.

1) Effective and Verbal Written Communication: The University offers several workshops throughout the year focusing on academic writing skills, including writing research proposals for grants and fellowships, as well as writing scientific articles/papers for publication. The Fellowships Workshop focuses on what young investigators need to know to be successful in proposal writing, as well as the online resources and the human resources available at the University to aid in this activity. The Communications Workshop focuses on how to verbally communicate one's research to a number of diverse audiences with different sensibilities, ranging from a highly technical, expert audience of peers to a general, interested lay public audience. Postdocs also have opportunities to participate in mock interviews for high-stakes funding opportunities and public talks and receive feedback on the clarity of their presentations.

2) Effective Teaching and Mentoring: Postdoctoral fellows may utilize all of the services available to faculty to learn how to become better teachers. UR is a member of the national CIRTL Network, a group of 22 institutions across the country committed to training the next generation of STEM faculty. CIRTL has as its mission enhancing undergraduate education through the development of a national faculty committed to advancing effective teaching practices as part of successful and varied professional careers, particularly in the STEM disciplines. Our local learning community, CIRTL@UR, strives to engage our graduate students and postdocs in teaching and learning activities, both on-line through the CIRTL Network and locally, through on-campus events and through local learning communities.

3) Career Workshops: The University of Rochester has established a future faculty Initiative: a series of five workshops to prepare trainees for academic careers. Topics have included: The Faculty Role, Innovative Teaching Practices; Assessing Learning; Creating Inclusive Learning Environments; How to Mentor and Be Mentored; and Achieving Balance between Work and Life. Another program directed toward young investigators is UR Year One, series of workshops designed for new faculty, but to which postdocs are welcome to attend. Through learning and networking activities UR Year One aims to increase knowledge and foster alliances that fuel career progress. Topics have included: Finding research funding and grant writing, finding successful mentors, understanding the promotion and tenure process and collaborating with library professionals, in addition to social functions. A unique session offers advice on the value of alumni and professional networking and how to maintain relationships that can benefit a scientist's career.

The UR Postdoctoral Association was established in 2006 to provide career development and networking opportunities, as well as professional recognition specifically for postdoctoral appointees. The association publishes an annual newsletter and maintains a Facebook site. It organizes and participates in postdoctoral appreciation (week every third week in September) which is a week-long celebration of postdoctoral

research with special colloquia and a poster competition with raffles and prizes. The association serves as a network for postdocs in addition to being a venue for increasing postdocs' management, leadership, and communication skills.

Signatures

Dean for Research and Dean Graduate Education and Postdoctoral Affairs

Appendix II Instructions for Data Management Sharing Plan

Data Sharing Plan NIH (to follow immediately after the Research Plan)

Data Products to be shared (suggested paragraph content)

- Indicate the data products that will be shared. (Optionally indicate the amount of data shared, especially for particularly large datasets).
- Include in the list any analytic tools being provided, such as algorithms, code, or software.
- What is the format of the final dataset? (e.g., Excel spreadsheets, text records, jpg images, an SQL database. Specify if there are particular tools or software required to read the data.)
- Optional: What additional documentation will be included to allow others to use the data? (Specify if the data applies a standard metadata format used by your community, and indicate if explanatory text files, codebooks, or other documentation will be included.)

Data access and policies

- How will the data be disseminated and accessed? Modes of sharing include:
- Researcher shares data upon request (shared by disk, email?) or makes data accessible through a personal website.
- Data will be deposited at a data archive. (Name the archive or data center, mention if it is NIH-funded or has data access policies and procedures consistent with NIH data sharing policies.)
- Data will be accessed through a data enclave (a restricted data center with controlled access).
- Identify conditions for accessing data (e.g., requests for access from identified investigators working at institutions with Federal Wide Assurance) and specify policies for data re-use (e.g., signing a data sharing agreement requesting citation and secure use of data with human subject identifiers.)
- Identify when the data will be shared. NIH policy requires "'the timely release and sharing' to be no later than the acceptance for publication of the main findings from the final data set."
- Explain any reasons for delay of sharing beyond the expectations of your community, such as patent restrictions, collaborator requirements, proprietary data from private companies.
- Provide justification for not sharing data, such as the inability at reasonable cost to remove personal identifiers. NIH expects data sharing to follow the norms of your research community, but encourages efforts to broaden the range of data shared and of potential users beyond your field. Consider whether portions of your data may be shared, such as de-identified case examples or curricular materials.

NSF Data Management Plan Instructions

Proposals must include a supplementary document of no more than two pages labeled "Data Management Plan." This supplement should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results and may include:

1. The types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project;
2. The standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies);
3. Policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
4. Policies and provisions for re-use, re-distribution, and the production of derivatives; and
5. Plans for archiving data, samples, and other research products, and for preservation of access to them.

Data management requirements and plans specific to the Directorate, Office, Division, Program, or other NSF unit, relevant to a proposal are available at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp. If guidance specific to the program is not available, then the requirements established in this section apply.

Simultaneously submitted collaborative proposals and proposals that include subawards are a single unified project and should include only one supplemental combined Data Management Plan, regardless of the number of non-lead collaborative proposals or subawards included. **Fastlane will not permit submission of a proposal that is missing a Data Management Plan.** Proposals for supplementary support to an existing award are not required to include a Data Management Plan.

A valid Data Management Plan may include only the statement that no detailed plan is needed, as long as the statement is accompanied by a clear justification. Proposers who feel that the plan cannot fit within the supplement limit of two pages may use part of the 15-page Project Description for additional data management information. Proposers are advised that the Data Management Plan may not be used to circumvent the 15-page Project Description limitation. The Data Management Plan will be reviewed as an integral part of the proposal, coming under Intellectual Merit or Broader Impacts or both, as appropriate for the scientific community of relevance.

Appendix III - NIH Guidelines for Rigor and Transparency
POC: Carrie Dykes: carrie_dykes@urmc.rochester.edu

The University of Rochester's Clinical & Translational Science Institute (CTSI) has excellent information on the relatively new NIH guidelines and requirements for rigor, transparency and reproducibility.
Guidance for new grant requirements for Rigor and Reproducibility

NIH: http://grants.nih.gov/reproducibility/index.htm

- SABV Decision Tree: Reviewer Guidance to Evaluate Sex as a Biological Variable (SABV) (posted 07/20/2016)
- Staff Training Module: General Policy Overview (compiled by NIH OER, 10/30/2015)
- Reviewer Guidance on Rigor and Transparency (compiled by NIH OER, 03/21/2016)
- Activity Codes for Rigor and Transparency (updated 12/06/2015)
- Frequently Asked Questions

Appendix IV - Program Evaluation and Assessment
https://www.warner.rochester.edu/warnercenter/contact
POC: Cathy Cerosaletti; ccerosaletti@warner.rochester.edu

The UR Warner School of Education: The Center for Professional Development & Education Reform partners with organizations and institutions to improve educational practices and policies through professional learning, leadership development, and program evaluation.
In the Center for Professional Development & Education Reform Chelsea BaileyShea, PhD serves as co-director of evaluation. She has managed evaluation projects for the U.S. Department of Education, National Science Foundation, local foundations, higher education institutions, and local community organizations. BaileyShea has both quantitative and qualitative experience, and currently works on numerous evaluation projects, both local and statewide.

UR Assessment: https://www.rochester.edu/provost/assessment/index.html
POC: Josephine Seddon josephine.seddon@rochester.edu
Josephine Seddon, Director of Educational Effectiveness for The College, has over 10 years of experience in higher education working with faculty and staff preparing grant applications and serving as the internal evaluator for grant-funded projects across the disciplines. Her degree majors include mathematics, sociology, and education with focus on program evaluation. Josephine is available to assist in identifying measurable program objectives and learning outcomes, preparing an evaluation plan, data collection and analysis plans, and developing timelines for implementation of formative and summative assessment strategies to support achievement of project goals.

The **American Evaluation Association** has a listing of professional evaluations who can serve as consultants on your program and proposal.
http://www.eval.org/

The **Association for the Assessment of Learning in Higher Education (AALHE)** is an organization of practitioners interested in using effective assessment practice to document and improve student learning.
http://www.aalhe.org/

Appendix V – General Institutional Resources - Points of Pride

ALL UR -*Note: Check Sources to Update Information

The University of Rochester (UR) is one of 62 members of the prestigious Association of American Universities[1] and one of 35 members of the Consortium on Financing Higher Education[2].

It is comprised of five professional schools and the College of Arts, Sciences, and Engineering (AS&E). Classified by the Carnegie Foundation as an R1 university (Highest Research Activity)[3], UR is dedicated to education through the doctoral degree, with highest priority on the development and dissemination of effective research.

The University consistently finds itself in the top forty colleges and universities receiving funding for research and other sponsored activities[4]. UR's continued high ranking is a significant indicator of the quality of the research conducted, of the faculty who perform such research at the University, and of the staff who support their efforts in laboratories and offices throughout the University.[5] The University currently ranks 46th in federally financed research and development expenditures to academic institutions, and 5th in federal obligations for science and engineering in New York State[6].

Additionally, UR was noted as 33rd among national universities, 41st for schools in engineering and applied science (US News & World Report, 2015), and 29th among graduate schools for medical research (same, 2015)[7]. In 2010, it was one of twenty-five schools designated by Kaplan/Newsweek as a "New Ivy[8]."

UR is a leading economic engine in the region. Research expenditures in the last five fiscal years (FY 2011 – 15) totaled $1.85B.[9] At the University of Rochester, sponsored program expenditures slightly exceeded $342 million (a slight decrease of approximately .5% from FY '14). In FY 2015, the University of Rochester was granted **53 U.S. patents** and **21 foreign patents**. These 74 patents cover 61 different technologies.[10] Rochester placed 41st on the National Academy of Inventors' global list of top patenting universities, reports the *UR Ventures Technology Review*[11].

In FY 2015, the University of Rochester received **$22,021,654** in licensing income. Research expenditures in that same year exceeded $342 million.

UR One of Nation's Leading Medical Research Universities

http://www.urmc.rochester.edu/news/story/index.cfm?id=4207

Using data from 2013, the journal ranked universities based on their research funding and technology commercialization activities. The data included the number of licenses, licensing/royalty revenue, the number of start-ups, and the number of awards and total funding from the National Institutes of Health. According to the report, the University of Rochester ranked eighth in the nation.

In 2013, the University of Rochester completed eight licensing agreements with pharmaceutical and medical device start-ups and research supply companies for a range of technologies, including diagnostic technologies for infectious and eye diseases, medical optics fabrication, and new cell lines.

During the same year, the University of Rochester received 392 awards from NIH for a total of $159 million in funding and received $27 million in royalty revenue for licenses involving University intellectual property.

Sources:
62 members of the Association of American Universities – https://www.aau.edu/about/default.aspx?id=16710 (Member Universities)

35 members of the Consortium on Financing Higher Education – http://web.mit.edu/cofhe/ (Right-hand side; Member Institutions)

Carnegie Foundation as a Research University/VH (Very High Activity) – http://carnegieclassifications.iu.edu/lookup_listings/institution.php (Institution Lookup)

From: http://www.rochester.edu/orpa/orpa/annual-report/

- Ranks 46th in federally-financed research and development expenditures to academic Institutions – (46th – found in FY 2015 ORPA Annual Report, but from NSF National Center for Science and Engineering Statistics (NCSES) survey: Academic Research and Development Expenditures: Fiscal Year 2014, Table 20
- Ranks 5th in federal obligations for science and engineering in New York State – found in FY 2015 ORPA Annual Report, but from NSF National Center for Science and Engineering Statistics (NCSES) survey: Academic Research and Development Expenditures: Fiscal Year 2014, Table 20

From: http://www.nsf.gov/statistics/nsf13303/pdf/nsf13303.pdf –

- The University consistently finds itself in the top thirty-five colleges and universities receiving funding for research and other sponsored activities

From: http://colleges.usnews.rankingsandreviews.com/best-colleges/university-of-rochester-195030/overall-rankings –

- 33rd among national universities – US News & World Report Best National Universities, ranked in 2015
- 41st schools for engineering and applied science – US News & World Report Best Engineering Graduate Schools, ranked in 2015
- 29th among graduate schools for medical research – US News & World Report Best Medical Schools: Research, ranked in 2015

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[1] http://www.aau.edu/about/default.aspx?id=4020
[2] http://web.mit.edu/cofhe/ - COFHE
[3] http://carnegieclassifications.iu.edu/lookup_listings/institution.php - Research Universities (Very High Research Activity)
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[10] http://www.rochester.edu/ventures/about/annual-reports/

[11] http://www.rochester.edu/ventures/2016/07/13/national-academy-of-inventors-names-top-patent-recipients-for-2015/