Biomedical Sciences
PhD and MS Orientation

Jim Millonig, PhD - Senior Associate Dean
Janet Alder, PhD - Assistant Dean
School of Graduate Studies – New Brunswick/Piscataway

August 29, 2018
Staff of the School of Graduate Studies – Biomedical and Health Sciences in New Brunswick/Piscataway

RWJMS Research Tower R-102

James Millonig, PhD, Senior Associate Dean

Janet Alder, PhD, Assistant Dean of Graduate Academic and Student Affairs

Smita Thakker-Varia, PhD, Assistant Dean of Graduate Academic and Student Affairs

Tracy Scott, PhD, Special Projects Coordinator
tracy.e.scott@rutgers.edu

Tina Cicollela – Registration, graduation
cicoletm@rutgers.edu

Johanna Sierra – Masters programs
sierrajo@rutgers.edu
Biomedical Science Programs in New Brunswick/Piscataway

Molecular Biosciences Umbrella Program
- Cell and Developmental Biology
- Biochemistry and Molecular Biology
- Cellular and Molecular Pharmacology
- Physiology and Integrative Biology
- Molecular Genetics and Microbiology

Individual Graduate Programs
- Biomedical Engineering
- Exposure Science and Assessment
- Toxicology
- Neuroscience
- Microbial Biology
- Endocrinology and Animal Biosciences
- Nutritional Sciences
Rutgers Facts

- Member of Association of American Universities and Big10 Academic Alliance
- Ranked 41st of 994 top US universities by the Center for World University Rankings (2018)
- $658 million annually in research R&D expenditures, among the top 20 public universities in the nation
- Among the top 3 public universities in the Northeast in receipt of Sloan Research Fellowships and National Science Foundation Faculty Early CAREER development awards.
- Top 10% of American universities in science and engineering research and development expenditures.
- Top 3 nationally in National Science Foundation Integrative Graduate Education and Research Traineeship funding.
Our faculty hold prestigious positions

Rutgers has more faculty in the National Academy of Sciences and the American Academy of Arts and Sciences than any other public peer school in the Northeast.

In last 2 years, 11 biomedical faculty selected just this year to AAAS and 1 to National Academy:

- Martin Yarmush
- Rick Padgett
- Arnold Rabson
- Suzie Chen
- Charles Dismukes
- Tony Kong
- Peter Lobel
- Pal Maliga
- Chris Molloy
- Monica Roth
Dr. Evelyn Witkin was selected for the Lasker Award in 2015 for her discoveries concerning the DNA-damage response. The Lasker Award given annually since 1945 to living persons who have made major contributions to medical sciences. The awards are sometimes referred to as "America's Nobels". Eighty-six Lasker laureates have gone on to receive the Nobel Prize.

Dr. Joachim Messing was selected for the Wolf Prize in Agriculture in 2013 for his research efforts and innovations in recombinant DNA cloning and for deciphering the genetic codes of crop plants. Because there is no Nobel Prize in this category, the Wolf Prize in Agriculture is also regarded on par with the Nobel Prize.
Rutgers houses world-renowned resources

- Largest DNA and cell repository in the world for the study of genetics and autism, mental health, drug abuse, alcoholism, diabetes, and digestive and kidney disease.

- Host to the Protein Data Bank, the single worldwide repository for 3D protein structures.
Your education
NIGMS new T32 mechanism and “π shaped” scientist

- Career Development iJOBS
- Communicating Science class
- Biostatistics
- Quantitative/computational tracks being developed
Competencies learned in graduate school – transferrable skills

- **Broad conceptual knowledge** - core courses
- **Deep knowledge of a specific field** - upper level courses, thesis work, and journal clubs
- **Critical thinking** - reading papers, planning experiments, reviewing grants and manuscripts
- **Experimental skills** - rotations and thesis lab, collaborations
- **Responsible conduct of research** – Ethical Scientific Conduct initial and refresher
- **Rigor and reproducibility** - biostatistics classes
- **Computational skills** – computer programming class
- **Collaboration/Teamwork** – working with other labs and within lab, student organizations
- **Management and emotional intelligence skills** - manage your own project, supervise undergraduates, interact with faculty and peers
- **Leadership and professionalism** – join student organizations, volunteer for events, iJOBS
- **Communication skills** - presentations in lab, university, and national meetings, writing manuscripts and fellowships, Communicating Science class
New Course in Communicating Science

• Response to input from industry and academia
• Grant from Burroughs Wellcome Fund (Ponzio PI)
• Only one in the country with communications as its goal
• Techniques from Alan Alda Center
• Course started in spring 2017
• 3 Minute Thesis Competition for first time in 2018
Biostatistics Classes

• As per NIH requirement to increase training for rigor and reproducibility of science
• New criteria for NIH grants: sample size power analysis, rigorous statistical analysis, blinding, randomization, inclusion and exclusion criteria, biological variables (sex), authenticate biological and chemical resources
• 1 of 3 schools to participate in pilot program of webinars funded by NIH R25 grant (DiCicco-Bloom PI) in 2016
• Three classes to satisfy requirement (1 in fall and 2 in spring)
http://rwjms.rutgers.edu/gsbs/current/RigorandReproducibilityTraining.html
New Computational Biology Class

• Data Carpentry workshop through iJOBS in January 2019
• New course in Spring 2019 to learn R programming as relates to genomic data
• Will be developing Python course tailored to PhD students for 2019-20.
Typical timeline

Year 1
Lab match
Qualifying exam A
Propositional
Qualifying exam B
Annual thesis advisory committee meetings

Year 6
Thesis defense

Statistics:

Time to defense: ~5.7 years
# of publications: ~3 papers, ~1.4 first author
Some recent manuscripts


Kamau Pierre Endocrinology, February 2018. “Modeling the Influence of Seasonal Differences in the HPA Axis on Synchronization of the Circadian Clock and Cell Cycle.”

Daniel Grisham Proteins, January 2018. “Hydrodynamic radius coincides with the slip plane position in the electrokinetic behavior of lysozyme.”


Stephanie Oh Advances in Experimental Medicine and Biology, November 2017. “Regulation of Signal Transduction by DJ-1.”


Jose Planta Genetics, October 2017. “Quality Protein Maize Based on Reducing Sulfur in Leaf Cells.”

Stephanie Oh Redox Biology, September 2017. “Cytoprotective mechanisms of DJ-1 against oxidative stress through modulating ERK1/2 and ASK1 signal transduction.”


Aaron Shatkin Scholarship 2018

Apoorva Halikere  Yuanyang Pang  Na Cai  Ilija Melentijevic

Awarded to 3 or 4 graduate students annually for distinguished research work over the applicant's tenure at Rutgers University

Each awardee receives $1500 to supplement graduate stipend and $1500 for educational purposes
Graduation Awards 2018

**Alexandra Nguyen** – first Harvey Waterman Medal of Excellence
   4 first author, 3 co-author papers, and F31 NIH fellowship, now postdoc at MIT

**Jacqueline Katz** – Outstanding Master’s Student Award
   Worked full time at Princeton High School while getting her MS

**Perry Dominguez and Larry Stromberg** – Excellence in Student Support
Individual Development Plans (IDP)

- Educational research has shown that IDPs increase productivity (e.g. [http://postdoc.sigmaxi.org/results/](http://postdoc.sigmaxi.org/results/))

- NIH is now requiring IDPs for all training grants and NIH Office of Management and Budget sent notice that grad students have dual roles and must engage in both training and career development.

- **First** and third year graduate students will do the AAAS online IDP ([http://myidp.sciencecareers.org/](http://myidp.sciencecareers.org/)) and upload to Sakai by Aug 31, 2019.

- Second and fourth year graduate students will complete Rutgers IDP modeled from the ones at Scripps and UCSF and meet with an IDP committee (outside member in potential career area)
Recent pre-doctoral fellowship awardees

**Ludwik Gorczyca** - NIH F31 fellowship in July 2018.

**Unnati Chauhan** - NJ Commission on Cancer Research Fellowship in May 2018.

**Ilija Melentijevic** - NIH F31 fellowship in September 2017.

**Yhan Zhao** – NIH F99/K00 in August 2017.

**Michele Patrizii** - NIH F31 fellowship in July 2017.

**Sam Kogan** - NJ Commission on Cancer Research Fellowship in March 2017.
SGS help for fellowship writing

• ~17% of current students have external fellowships

• Meeting every September with students and mentors who have been successful obtaining funding and faculty from study section

• Boiler plate paragraphs for various sections
  http://rwjms.rutgers.edu/gsbs/student_affairs/fellowship.html

See below for some materials and please contact Janet Alder (janet.alder@rutgers.edu) for additional help if needed.

• RCR training
• Rigor and Reproducibility training
• iJOBS career development program
• Individual Development Plans
• Description of Institutional Environment and Commitment to Training and Additional Educational Information
• Sample successful NIH F applications, NSF, EPA, AHA, NJ state fellowships as well as diversity supplements upon request.
Courses for grant writing

Grant Writing Basics spring course
Guidance and practice in writing a biological research grant proposal focusing on Specific Aims. 16:681:601

Advanced Studies in Neuroscience or Psychology to write an NRSA F31 Grant Proposal
The purpose of the course is to facilitate each student's submission of an F31 application for the December deadline. 16:830:504

Graduate Courses in Writing

355:502  Graduate Writing
Focuses on academic tone, syntax, and the drafting and revision process in order to improve skills necessary for successful graduate work.

355:506  Writing for Publication
Focuses on overall organization of published work as well as writing and editing at the level appropriate for a journal submission in the student's graduate field.

355:508  Writing the Dissertation
Focuses on writing at the level appropriate for a dissertation in the student's respective field.
GradFund

- $45 million in external fellowships and awards in the last 17 years
- Help identifying funding sources
- Virtual Office on Sakai
- Help with application logistics
- Feedback, editing, and revising
- ~17% of current students have external fellowships

http://gradfund.rutgers.edu/

Fellowship Application Workshop for Biomedical PhD Students

Monday September 17, 2018
3 - 5pm
RWJMS Research Tower
675 Hoes Lane West
Room V10
Piscataway, NJ

This workshop will include presentations by:

1) GradFund on how to use their resources at Rutgers for identifying fellowship opportunities and applying for them.
2) A faculty member who serves on NIH study section and reviews fellowship applications with pointers on what reviewers are looking for.
3) A panel of graduate students and their mentors who have successfully obtained funding in the past few years from various organizations.

No registration required. Refreshments will be served. For more information contact Dr. Janet Alder janet.alder@rutgers.edu
Cognitive Skills

http://rwjms.rutgers.edu/education/medical_education/student_support/cognitive.html

Individual Consultation
• Confidential individual consultation regarding learning, time management and job performance.
• Diagnostic evaluation of study practices and their effectiveness.
• Structured intervention to increase learning productivity and efficiency.
• Individual preparation programs for course, board, and licensure examinations.
• Learning disabilities.

Seminars
• Effective study strategies, test taking and time management.
Designed to promote excellence in undergraduate and graduate education at Rutgers through the professional development of the graduate student teaching staff:

- annual orientation
- certificate programs
- special issues seminars
- web-based publications
- discipline-specific training

http://taproject.rutgers.edu/
A teaching K-12 outreach program which allows graduate students and postdocs the opportunity to volunteer in local public schools.

BIO Links volunteers are paired with a science teacher from a local school and make a commitment to visit one class per week for nine weeks.

Contact Dr. Martha Soto; sotomc@rwjms.rutgers.edu
The Graduate Mentoring Fellows Program is a year-long program to allow participants to study the functions involved in serving as a good mentor and to work with undergraduates as a mentor for one academic year.

http://gsnb.rutgers.edu/profdev
Advanced graduate students who join can meet monthly with faculty and administrators to discuss issues related to undergraduate instruction and contemporary higher education.

rastl.rutgers.edu/
Rutgers Pre-doc Leadership Development Institute (PLDI)

Two-year program to prepare for academic and administrative leadership roles in academia.

Students will learn the challenges universities face, and will gain the interpersonal and organizational knowledge, competencies and aspirations to provide effective and ethical leadership in addressing the critical issues confronting higher education.

www.odl.rutgers.edu/pldi/
Your career
Examples of Career Tracks

- Principal investigator
- Bench Research in Government, Pharma or Biotech
- Teaching-intensive careers in academia
- Science and Health Policy
- Patent Law
- Tech Transfer and Business Development
- Clinical Research
- Regulatory Affairs
- Health and Science Data Analysis
- Business Consulting
- Scientific Writing and Medical Communications
- Medical Affairs
- Non-profit and Foundations
- Finance and Equity Research
- Publishing
- Food safety
- Journalism
- Teaching Education Outreach
- Entrepreneur
NIH Broadening Experiences in Scientific Training (BEST) Awards
$2 million for 5 years to create infrastructure

Rutgers

Boston U
UC Davis
UC Irvine
UC San Francisco
U Chicago
U Colorado Denver
Cornell
Emory/Georgia Tech
U Mass Worcester
Michigan State
New York U
U North Carolina
U Rochester
Vanderbilt
Virginia Polytech
Wayne State
Rutgers iJOBS
Interdisciplinary Job Opportunities
for Biomedical Scientists

will empower our PhD students and postdocs to take action toward career development and build the knowledge, professional network, and experience needed to reach their career objectives.

Grant awarded Sept 2014
Program launch Jan 2015
iJOBS Participation

Rutgers Graduate Students
- SGS (New Brunswick/Piscataway/Newark)
- GSN (Newark)
- GSC (Camden)

Rutgers Postdocs
- RWJMS
- NJMS
- SAS New Brunswick
- SoE
- SoP
- SEBS
- SAS Newark
- SAS Camden

Free shuttle transportation provided
Holistic Programming

Phase 1: iNQUIRE
- SciPhD Leadership and Business Training
- Site visits
- Networking sessions
- Career panels
- Case studies
- Primers
- Workshops
- Career fair
- Web portal access

Phase 2: iINITIATE
- Individual development planning & mentorship
- Career-specific courses
- Professional shadowing

Phase 3: iMPLEMENT
- Resume development
- Interview preparation
- Job placement and tracking

Phase 4: iNSTRUCT
- Continued participation
- Support and mentoring

Support and mentoring activities:
- Professional shadowing
- Resume development
- Interview preparation
- Job placement and tracking
Phase 1
iNQUIRE
SciPhD: Leadership and Business Skills for Scientists

Provided by Human Workflows, LLC
Winter 2015, 2016, 2017, 2018/35 hours

• The Business of Science
• Major Leadership Styles
• Successful Communications as a Scientist
• Developing Your People
• Networking and the Interview Process
• Team Performance Tools
• Negotiations
• Financial Literacy
• Strategic Project Management for Scientists
Representative Site Visits

- Merck (3)
- Genewiz
- Bristol-Myers Squibb (3)
- Novartis
- GlaxoSmithKline
- Regeneron
- Eli Lilly (2)
- Celgene
- Janssen
- Commercialization Center for Innovative Technology
- Enterprise Development Center
- Institute for Life Science Entrepreneurship
- Sanofi Aventis
- Covance
- Kashiv
- Ferring Pharmaceutical
- NJ Dept. of Health (3)
- Stryker
- Colgate-Palmolive
- Envigo
Representative Workshops: Job Simulation

- Patent Law – rewrite patent to demonstrate originality
- Pharma Market Research Analysis – report on whether drug is worth pursuing
- Medical Affairs – Medical Informaticist vs MSL role play
- Consulting – recommend approach to launch new clinical trial
- Regulatory Writing – prepare an Investigative Brochure
- Medical Communications – create slide deck for physician
- Entrepreneur - How to test your biotech business idea
Representative Workshops: Primers

- Project Management
- Python with DataCarpentry - programming and how to deal with large datasets
- Good Laboratory Practice (GLP)
- Pharmokinetics and Pharmodynamics (PK/PD)
- Immuno-oncology Research
- Communicating Science with Alan Alda - elevator pitch and improv to connect with audience
- Scientific Storytelling
Representative Workshops: Job Search

• Targeted resumes
• LinkedIn profiles with photo shoot
• Networking skills
• Transferrable skills
• Interviewing skills
• Informational interviews
• Job search using staffing agencies
• Finding and applying for an internship
• Goal setting and time management
• How to prepare for job fairs
• International students seeking employment in USA
• Self assessments (StrengthsFinder, Birkman)
• Emotional Intelligence and influencing others
Career Track Example
Skill Classes
One 40-Hour Class

- Programming Methodologies for Numerical Computing
- Drug Discovery through Preclinical Development
- Introduction to Public Administration; Public Policy Formation
- Clinical Trials, Adverse Event Reporting, Post-Marketing
- Practical Aspects of Clinical Trial Design
- Bioengineering in Biotech and Pharma Industries
- Fundamentals of Regulatory Affairs
- Business
- Public Health
- Engineering
- Medicine
- Public and Science
- Rutgers Programs

- Project Management; Perspectives in Drug Development
- US Healthcare System and Pharma Managed Markets
- Drug Development: From Concept to Market
- Project Management
- Pharma Product Management
- Organizational Behavior
- Innovation and Entrepreneurship
Professional Shadowing and Mentoring

- Each trainee is matched to a mentor and a shadowing opportunity relevant to their chosen track with industrial, institutional or governmental partners. 72 hours over a whole semester or over 2 weeks.

- Each trainee is assigned a professional mentor and uses the Individual Development Plan (IDP) as a framework for growth.
Program Leadership

- **Martin Yarmush**
  - Distinguished Professor of Biomedical Engineering
  - School of Engineering
- **James Millonig**
  - Senior Associate Dean
  - School of Graduate Studies
- **Janet Alder**
  - Assistant Dean for Academic & Student Affairs
  - School of Graduate Studies
- **Susan Engelhardt**
  - Executive Director
  - Center for Innovative Ventures of Emerging Technologies
- **Doreen Badheka**
  - Program Director
  - School of Graduate Studies

**Co-PI**
**Co-PI**
**Co-PD**
**Co-PD**
**Co-PD**
Communication Platforms

Email listserve: 1500 members

Trainee run blog:
ijobs.rutgers.edu/blog.php

Website: ijobs.rutgers.edu

iJOBS Past Events and Resources

7 September 2016
iJOBS Workshop: Job Search Using Staffing Agencies
Hear from representatives from companies such as Aerotek, Hayes and Probstff to learn how staffing agencies work and how to best utilize them in your job search at different phases in your career. There will be an opportunity to meet with the representatives after their presentations to get general feedback.
Click here to view the speaker list for this event.

22 June 2016
iJOBS Career Panel: Identifying and Protecting Emerging Technology/New Business for Pharma
Hear from two Rutgers alumni who now work as a Senior Manager of Global Business Insights and Competitive Intelligence at Celgene and an Associate in Life Sciences for IP Group, Inc. To view the agenda and speaker bio, please click here.

14 June 2016
iJOBS Site Visit: Celgene
Visit the manufacturing site for the cellular therapeutic branch of Celgene. Hear from Greg Russell, PhD Vice President of Tech Ops and hear from other Celgene employees. To view the agenda and speaker bio, please click here.
Program Registration

Phase 1

• iJOBS programming open to all pre and post-doctorates as well as recent alumni.
• Some events have limited capacity; participants register on a first come, first served basis.
• PI notified about participation in first Rutgers iJOBS event. We will contact PI.

Phase 2

• Graduate students must be in 3rd year or above and have completed propositional qualifying exam. Postdocs are eligible at any time.
• Trainee application approval based upon Phase 1 participation (12 hours), letter of intent, letter of recommendation. PI approval for participation is required with application.
Program Registration Details

• Registration links for all events will be listed on the iJOBS web site, posted on the iJOBS web calendar and open to registration 4 weeks prior to the event date at 12:00 PM.
• For example, an event will take place on Tuesday February 10, 2019. Registration opens Tuesday January 13, 2019 at 12:00 PM.
• If registration is limited, confirmation will be sent to those that are successfully enrolled in the event.
• Applications for Phase 2 are every April.
<table>
<thead>
<tr>
<th>iJOBS Workshop</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Careers in Publishing Job Simulation</td>
<td>9/6/2018</td>
<td>4:30-6pm</td>
<td>Wiley Publishing</td>
</tr>
<tr>
<td>Site Visit: Nanion Technologies</td>
<td>9/13/2018</td>
<td>11am-1pm</td>
<td>Nanion Technologies</td>
</tr>
<tr>
<td>Site Visit: PTC Therapeutics</td>
<td>9/18/2018</td>
<td>9am-1pm</td>
<td>PTC Therapeutics</td>
</tr>
<tr>
<td>Primer in Good Laboratory Practice</td>
<td>9/24/2018</td>
<td>4-6pm</td>
<td>Envigo</td>
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<td>How to use Emotional Intelligence for Self Awareness and to Influence Others</td>
<td>10/4/2018</td>
<td>4:30-6:30pm</td>
<td>Hart and Chin Associates</td>
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<tr>
<td>Choose Your Adventure Exploring Non-Traditional Careers in the Pharma Agency Communications Space</td>
<td>10/10/2018</td>
<td>3-5pm</td>
<td>PRN Experts</td>
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<tr>
<td>Internship Applications and Resume Preparation</td>
<td>10/17/2018</td>
<td>12-1pm</td>
<td>AAPS - Dina Kuo and Anika Alam</td>
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<tr>
<td>Site Visit: Adello Biologics</td>
<td>10/22/2018</td>
<td>3-5:30pm</td>
<td>Adello Biologics</td>
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<tr>
<td>Careers in Pharma R&amp;D Job Simulation</td>
<td>10/29/2018</td>
<td>4:30-6pm</td>
<td></td>
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<tr>
<td>and Eagleton Workshop: Scientists in Politics</td>
<td>11/2/2018</td>
<td>9am-1:30pm</td>
<td>Eagleton Institute of Politics</td>
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<td>Site Visit: GeneWiz</td>
<td>11/5/2018</td>
<td>2-4:30pm</td>
<td>GeneWiz</td>
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<tr>
<td>Site Visit: Bayer Pharmaceuticals</td>
<td>11/13/2018</td>
<td>9:30am-12pm</td>
<td>Bayer Pharmaceuticals</td>
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<tr>
<td>Medical Affairs Job Simulation</td>
<td>11/19/2018</td>
<td>4:30-6:30pm</td>
<td>Rutgers</td>
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<tr>
<td>Site Visit: Merck</td>
<td>11/29/2018</td>
<td>9:30am-12pm</td>
<td>Merck</td>
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<td>Workshop: Careers in Business Development Job Simulation</td>
<td>12/3/2018</td>
<td>4-6pm</td>
<td>Rutgers Business School</td>
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<tr>
<td>Workshop: Careers in Science Policy Job Simulation</td>
<td>12/14/2018</td>
<td>3-5pm</td>
<td>NSPAR</td>
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</tbody>
</table>
Laboratory Research is #1 Priority

More information: ijobs.rutgers.edu

Email: Millionig@cabm.rutgers.edu
janet.alder@rutgers.edu
FIRST POSITION OF SCIPHD PARTICIPANTS (N = 96)

- Academia: 33%
- For Profit: 48%
- Nonprofit: 8%
- Government: 5%
- Unknown: 10%
Rob Connacher scientist at Merck. Fei Wang data scientist at Gartner Inc. Sarah Misenko GSK leadership program position. Dharm Patel position at Leo Pharma.


Website: your resource for everything
http://rwjms.rutgers.edu/education/gsbs/

Join our groups and also email us your news to post!

Google calendar
- Seminars
- Career development events
- Thesis defenses
- Workshops
- Can link to your calendar

LinkedIn has alumni contacts – important for career development
Have fun!
Where are we?

New Brunswick/Piscataway
Rutgers is less than an hour to NYC and Philadelphia by train
Reach Out if You Need Help

Counseling and Psychiatric Services (CAPS)
Monday-Friday 9am-4pm: 848-932-7884
Evenings and weekends: 1-855-654-6735
We Are Here for You

Jim Millonig: millonig@cabm.rutgers.edu
Janet Alder: janet.alder@rutgers.edu
Graduate Student Organizations

- Molecular Biosciences GSO
- NeuroConnections
- Rutgers Association of Toxicology Students
- Biomedical Engineering Student Society
- Rutgers Exposure Science Student Association
- NJ Seeding Labs
- Society for Advancing Chicanos/Hispanics and Native Americans in Science
- Nutritional Sciences GSO
- Endocrinology and Animal Biosciences GSO
- Microbial Biology
- Quantitative Biology
- iJOBS blog
- Rutgers GSA – events for everyone