RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

NIH NIGMS

Biotechnology Training Program: Introduction and Expectations

Maish Yarmush

16:125:603: Topics in Advanced Biotechnology I

September 13, 2019

Outline

- The Course
- The Program
- Expectations and Advice

Topics in Advanced Biotechnology I

Fall 2019, Fridays, 9:00-11:00, (BME Room 116)

DATE	TOPIC	FACULTY MEMBER	FELLOW PRESENTER	FELLOW PRESENTER
Sept 13	Introduction	Maish Yarmush Rutgers BME	Andrew Boreland	Nisha Singh
Sept 27	Presentation Principles	Martin Blaser Rutgers CABM	Rahul Upadhya	Alexandra Burr
Oct 11	Industrial Perspective	Renea Faulknor Alum Celgene	Caroline Wood	Brandon Newton
Oct 25	Careers in Academia	Maish Yarmush Rutgers BME	Matthew Tamasi	Skylar Chuang
Nov 8	Clinical Bioethics	Nir Eyal Rutgers SPH	Erika Davidoff	Christen Crosta
Nov 22	Networking Principles	Susan Engelhardt CIVET, iJOBS	Jan Seiss	Shawn Rumrill
Dec 6	Industrial Perspective	Alvin Chen Philips Healthcare	Denise Robles	Juan Pena

Course Expectations

- ❑ Breakfast at 8:45am; early risers can come as early as 8:15am to socialize
- ❑ Class is Friday from 9-11am; **be on time!** Attendance of all sessions (7) is required.

Attendance Policy

- ❑ Absence for a student presentation at one (1) conference is excused with no written assignment
- ❑ All other absences require a written assignment
  - ➢ *One (1) page summary of each presentation (slides will be available); due by the date of the next Topics class following the absence*
- ❑ Greater than two absences will impact grade

Course Expectations

- ❑ Breakfast at 8:45am; early risers can come at 8:30am
- ❑ Class is Friday from 9-11am; please be on time! Attendance of all sessions (6) is required.
- ❑ Email Mary Ellen prior to the class if you have a conflict

Course Deliverables

- Professional know-how from faculty and alums
- Research projects/progress from students
- Opportunity to practice and refine presentation skills
- Opportunity for questioning and critical analysis
- Group bonding & professional maturation
- Program-related announcements
  - Progress Reports
  - PMCID #s
  - Summer Internship

Fall Progress Report Schedule

- **October 11:** prepare and submit **progress report research paragraph** to advisor and lab members for editing and comments
- **October 25:** submit edited research paragraph along with the **annual progress report form** to Mary Ellen for review by Maish and Ann
- **November 8:** Edited progress reports returned to students
- **November 15:** Final full progress reports due to Mary Ellen
- **December 1:** IDPs due to Mary Ellen
- **January, February:** Annual review meetings with Maish and Ann

PMCID #s

- PMCID #s on papers are required to track grant outcomes (http://www.ncbi.nlm.nih.gov/pmc/)

Rong Gao R, Stock AM. Evolutionary tuning of protein expression levels of a positively autoregulated two-component system. **PLoS Genet**. 2013; 9: e1003927. PMCID: PMC3812086

- Create an ERA Commons linked My NCBI account. A video overview is available.
- Collaborate with your colleagues to associate publications with NIH awards, and track public access compliance or declare the paper is not applicable. A video overview is available.

Summer Industrial Internship

- NIH mandates that all fellows must complete an 8-10-week summer internship during the first summer semester that they are in the program.
- All "new" students must submit an application and CV to the Biotech program office by **November 15** of their first year in the program.
- Exemptions are provided to students who have done a relevant internship, or who have worked for 1 year in the Biotech industry (upon receipt of documentation).

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Student Presentations

- Student presentations: 10 slides + title & acknowledgements slides (no more than 15 minutes)
- To succeed you must pay attention to slide content and style, focus on effective communication & teaching, and……
- **Practice, practice, practice** (see Ann's presentation on the resources page from Fall 2015 on resources page in the program website)

Acknowledgments

- Acknowledge NIH/NIGMS' full or partial support of your research in journal articles, oral or poster presentations, news releases, interviews with reporters and other communications.

  "Research reported in this ……. was supported by the National Institute of General Medical Sciences of the National Institutes of Health under award number T32 GM008339"

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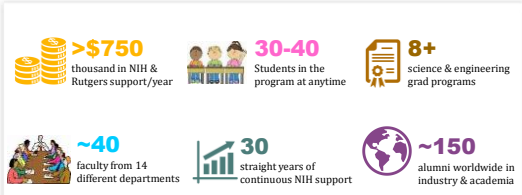
Biotech at-a-glance



Program Character

- A community and family of scholars and students striving for **excellence** in interdisciplinary research in biomedical biotechnology.
- Outstanding intellectual and physical resources in two overarching research thrusts.
  - Genomics, Proteomics, Systems & Structural Biology
  - Biomaterials & Tissue Engineering, Regenerative Medicine, Drug Delivery, and Medical Devices
- Special emphasis is placed on achieving research competence in one key area but training students broadly so that they may follow different career paths (academics, industry, and entrepreneurship).

Biotech Core Curriculum

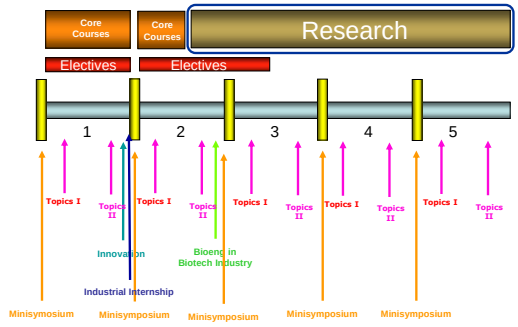
Subject	Credit Hours
Molecular and Cellular Biology (one graduate course)	3
Biophysical or Biointerfacial Chemistry (one graduate course)	3
Bioengineering or Quantitative Science (one graduate course)	3
Biostatistics Research Training for Molecular & Cellular Sciences	*3*
Ethical Scientific Conduct: Course No. 16:115:556 (Spring)	1
Required Courses in Graduate Discipline	6-12
Bioengineering in the Biotech & Pharmaceutical Industries (Every Other Spring)	3
Innovation and Entrepreneurship for Science & Technology (Spring)	3
Topics in Advanced Biotechnology I and II (Every Semester)	10
(Professional Preparedness in Biotechnology) (Summer)	3
(Applications In Medical Device Development) (Every Other Spring)	3
Laboratory Rotations	0-3
Summer Industrial Internship	
Annual Symposium	
Graduate Research	39-48

https://molbiosci.rutgers.edu/2-uncategorised/429-phd-graduate-credit-scheme-for-all-biomedical-sciences-programs

RUTGERS Current Rutgers Biotech Fellows

	Name	Advisor		Name	Advisor
1	Jeremy Anderson	Cai	19	Brandon Newton	Freeman
2	Andrew Boreland	Pang/Jiang	20	Evelyn Okeke	Madera
3	Alexandra Burr	Parekkadan	21	Anton Omelchenko	Firestein
4	Larry Cheng	Tian	22	**Juan Pena**	**Vasquez**
5	Skylar Chuang	Lee	**23**	Xiomara Perez	Freeman
6	**Christen Crosta**	**Firestein**	24	William Pfaff	Dunn
7	Erika Davidoff	Sy	25	Chris Rathnam	Lee
8	Mollie Davis	Yarmush	26	**Denise Robles**	**Zahn**
9	Emily DiMartini	Shreiber	27	**Robert Rosen**	**Yarmush**
10	Zachary Fritz	Williams	**28**	**Shawn Rumrill**	**Arnold**
11	Madison Godesky	Shreiber	**29**	**Jan Seiss**	**Nanda**
12	Ryan Guasp	Driscoll	**30**	Nisha Singh	Firestein
13	Josh Leipheimer	Yarmush	**31**	**Matt Tamasi**	**Gormley**
14	**Joseph Lubin**	**Khare**	32	Victor Tan	Jin
15	Jeffrey Luo	Lee	**33**	Rahul Upadhya	Gormley
16	Ilija Melentijevic	Driscoll	34	Caroline Wood	Sy
17	Ileana Marrero-Berrios	Yarmush			
18	Yoliem S. Miranda Alarcon	Shreiber			

RUTGERS Program Lifecycle



RUTGERS Added Value

- Additional skills training

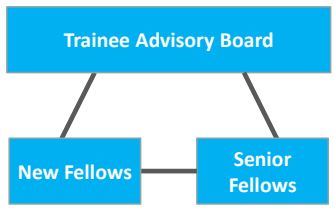
RUTGERS Skills Training

COURSES AND ACTIVITIES	Technical			Operational			Professional				Guiding Principles	
	Method	Technol	Comp /Quant	Knowledge Acquisition	Exp Design	Data Analysis	Mgmt	Leadership	Comm	Teamwork	Ethical Conduct	Rigor/ Reprod.
Ethical Scientific Conduct				x			x	x	x	x	x	x
Bioeng in Biotech & Pharma	x	x	x	x	x	x	x	x	x	x		x
Innovation & Entrepreneurship				x		x	x	x	x	x	x	
Advanced Biotechnology I	x	x			x	x			x		x	
Advanced Biotechnology II	x	x	x	x	x	x	x	x	x	x	x	x
Biostats for Molec & Cellular Sci			x	x	x	x						x
Prof Prep for Biotech				x			x	x	x	x	x	x
Lab Rotations	x	x	x	x	x	x	x	x	x	x	x	x
Thesis Proposal Preparation	x	x	x	x	x	x	x	x	x	x	x	x
Thesis Research	x	x	x	x	x	x	x	x	x	x	x	x
Annual Symposium	x	x	x	x	x	x	x	x	x	x	x	x
Industrial Internship	x	x	x	x	x	x	x	x	x	x	x	x

RUTGERS Added Value

- Additional skills training
- Preferred access to program specific courses
- Fellowship funds (stipend, tuition, fees) and travel funds ($300/yr)
- Summer industrial internship
- Association with a powerful, diverse peer group
- Added mentorship and guidance from Ann and Maish
- Extensive alumni network, many who are local
- Broad set of biomedical topics and professional areas of interest; how to understand, explain and defend complex issues; exposure to an authentic scientific/engineering culture; & prestige
- Leadership opportunities (trainee advisory board: symposium, orientation, social events, alumni networking, annual report, etc.)

RUTGERS Trainee Advisory Board (TAB)



RUTGERS Trainee Advisory Board (TAB)

Andrew Boreland
Trainee Advisory Board Chair
Cell Biology and Neuroscience

Emily DiMartini
Biomedical Engineering

Xiomara Izabel Perez
Biomedical Engineering

Nisha Singh
Cell Biology and Neuroscience

Skylar Chuang
Chemistry and Chemical Biology

Zachary Fritz
Biomedical Engineering

Ryan Guasp
Cell and Developmental Biology

Biotech Barbecue

RUTGERS Outline

- The Course
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RUTGERS Overall Expectations

- Do well in your courses (maintain 3.5 GPA)
- Find a good thesis project that really interests you
- Defend thesis proposal by end of year 2/beginning of year 3
- Work hard (not 40, not 80, **50-60 hours/week**)
- Apply for fellowships/grants
- Participate in leadership/community activities
- Finish in 4-6 years
- Publish 2 first au papers (Biotech mean: first au: ~3; co-au: ~3)
- Continuously read the literature; attend local seminars
- Participate in iJOBS activities
- Attend meetings/join scientific societies
  - Present your work (poster/oral presentation)
  - Network; check out potential postdoc/industrial opportunities

CEM The Center for Engineering in Medicine

- ❑ Develop a dynamite project(s)
- ❑ Collaborate with and help others
- ❑ Postdoc training philosophy
- ❑ Strive for excellence
- ❑ Drive to publish and disclose
- ❑ Help with CEM activities (seminars, grants, web page, retreat, journals, Communique, etc.)
- ❑ Be a mensch!
  - *Mensch* is a Yiddish word that means "a person of integrity." A *mensch* is someone who: 1) is responsible, 2) has a sense of right and wrong, 3) performs with principle, goodness, and accountability, and 4) is a role model for others

RUTGERS General Advice

- Follow rules and regulations meticulously
  - Animal care, Human subjects
  - Chemical, lab safety, and waste disposal
  - Electronic lab notebooks
  - Communicate!!!!
- Volunteer and pitch in to make the workplace enjoyable and efficient
- Speak directly with colleagues; minimize any digital sniping
- Seek help and advice from colleagues, faculty, & other higher ups on any and all subjects

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So, in summary…..

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Work Hard, Work Together

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Be Enthusiastic About Your Work

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Seek Help When Needed

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Chill Out Periodically

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Never, Ever Give Up

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Two Final Comments

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Responsibility For Your Project

- The most important transition from your undergrad years.
- To be successful in research, one needs to develop skills in independent and effective thinking, critical analysis, problem-solving, time management, and timely execution. The *only* way to perfect these skills is to take total responsibility for your project.
- Remember, your doctoral years represent the only time in your life that you can spend nearly 100% of your "working time" learning and developing scientifically and professionally without any major administrative or other responsibilities.

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Good Character

Skills

- Logical and critical thinking, creativity, communication (clear writing and speaking understanding the professional culture and how to interact within it, rigor, etc.

Character Traits

- Sharing, sacrifice, **perseverance,** doing, participating, generosity, tolerance, appreciation, **gratitude,** enthusiasm, reliability, empathy, understanding, etc.

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Questions/Discussion