Student life in the Combined Program in the Biological and Biomedical Sciences

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B Contest

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http://www.bbs.yale.edu/about/b/b.aspx
Dipika Guha received her M.F.A. in Playwriting ('11) from The Yale School of Drama, is a member of the Dramatist’s Guild, and has received fellowships at Harvard, Brown, and Yale. She is now beginning work on a commission for the Yale Center for Scientific Teaching to develop a theater piece about women in science that will be filmed and may be performed live. The piece will explore the glaring discrepancy between the number of women receiving their Ph.D.s in the sciences and the relatively small number who enter academia. B Magazine’s Anna Chase caught up with Guha to discuss work on her play, women in science, and the art of developing a story on stage.

**B:** Can you talk about the nature of this project?

**DG:** I am working with Jo Handelsman, Corinne Moss-Rauchsin, and Jenny Frederick at the Yale Center for Scientific Teaching. [They] wanted to create a piece that would both reflect the scientific community and reflect back some of the codes of behavior, some of the things that women in particular are facing…what are the struggles, what are the challenges, what’s the climate for women in science today? It’s probably going to be several vignettes that have some unifying feature and will be accompanied by links to the empirical data (concerning women in academia). I’m going to work to write these vignettes so that they make sense individually but also as a whole so all fifteen or twenty will add up to an evening of theater. We’re hoping it can both be filmed and used as a teaching tool on the Internet as well as [become] an evening of theater.

**B:** Why did you take on this assignment in particular?

**DG:** It felt like it would be a good match [for me] because a lot of my writing has to do with women and, in a broader sense, how to make space for a multiplicity of views and how one way of looking at something it can be damaging…how when you’re locked into your own logic sometimes you cause harm. Sometimes I think we don’t even realize that we’re a party to prejudice--it’s in our culture--and my writing looks at this a lot.

**B:** What sorts of themes have been emerging in your research?

**DG:** I’ve been researching for three weeks now, so I’m in the very early stages and can’t really make any big generalizations. I do know that the data points towards implicit biases that we hold towards women whether or not they are accomplished…and that mothers are seen as lowest on the rung of productivity. There is a lot of data to support that women aren’t staying in science, and that it’s not that women aren’t capable…The women I have talked to have mostly been graduate students.

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starting out in their careers, but I intend to speak to women who are further along in their field and also undergraduates. At the moment, a lot of graduate students say they don’t feel that their gender has slowed them down, but it does seem like later on, the problems start to arise when women want to have families...and certainly, [given] the pressures of balancing an intensely profound commitment to science, I’m getting the feeling that it’s a major struggle to balance the two. For now, it does seem to feel like science will not change for you. If you can’t do the twelve-hour days anymore, you may want to investigate another life option. It doesn’t seem like academia will absorb a schedule that’s different with fewer hours. That’s something I want to investigate—whether that’s true...and if it is true, what can be done to improve things so that women do continue to feel there is a place for them even with families.

B: One doesn’t usually think of theater as coming up with solutions to problems, usually it seems to be “just” a critique...

DG: I hope that theater can provide an alternative view or create the space for an alternative view to exist. I think all good theater does that. Sometimes when you’re immersed in a field you don’t really have time to step back...theater creates a space where you can see yourself from a distance, from a new perspective. If there’s a way to create a new perspective on these challenges, then the piece would have done its job. In order to create a critique, you have to know what the truth is. Underneath my research is a desire to see the reality of the situation for women in science.

B: Do you feel that there could there be something about women’s mindsets contributing to the scenario?

DG: Women certainly have an interesting time of it...there is documentation that women often have a difficult time pitching how they represent themselves. If you’re too confident you’re regarded as abrasive and unfriendly and if you are more submissive you’re seen as pliant and weak. This is certainly a contradiction since in science it is important to represent your ideas with a kind of confidence that almost can’t be questioned. And yet, when women do, there is documentation of a backlash effect.

B: It seems like a daunting task to now pull these themes together into a coherent whole. Can you tell me more about how you go about creating a piece of theater like this?

DG: It differs from process to process very much. I have never done investigative work that depends on primary sources [before]. This would be similar to other processes in that you do the research you need and then do your best to forget it as you’re writing. Your conscious brain is not your friend as you’re writing; you’re hoping that your subconscious is at work. I think it’s important to not think too strongly when the writing is happening.

B: What do you do to escape your conscious thoughts?

DG: I do a lot of free writing...I just write a lot until it appears to cut through my conscious mind. You almost have to look away. My teacher Paula Vogel (Chair of the Yale School of Drama and Pulitzer winner) always says that it’s like looking at the sun. If you look at your theme directly, you will just blind yourself because the theme is always there, it’s underneath everything that you write, but if you look it in the eye you will never be able to write anything. It’s such an overwhelming sense of responsibility...the desire to get it right...perfectionism is not your friend when you’re writing. Getting it right is not the point when you’re writing creatively.

B: It seems like theater could indeed be a good medium to explore these types of questions since conducting studies and collecting statistics don’t really seem to have brought us any farther...

DG: My attraction to theater is that there isn’t one view...every person literally has a different view depending on where you’re sitting [in the theater]. There’s a lot more room to own a piece of theater and engage with it, you’re always aware as a person in the audience that you are in conversation with the people on stage. There is a dialogue happening, and I think that is very powerful. Just by being present, you’re complicit in the event that’s happening...and I think when it’s presented without judgement, it’s perhaps most powerful...you can see dynamics at work. The data [of an academic paper] doesn’t necessarily penetrate as culturally. [My work] is an attempt to reach people in a form that is accessible.
As scientists, part of our job is to describe our work in a public forum. Graduate students are frequently exposed to public speaking in the context of departmental seminars or classroom lectures. But most graduate students have limited, if any, exposure to addressing the general public. The ability to describe scientific phenomena to a non-scientific audience is a crucial skill: it can be used for education, fundraising, or to promote interest in scientific development and careers. Although most individuals are familiar with the basic guidelines for presentations (speak clearly, make eye contact, etc.), there are multiple ways in which a talk for a general audience differs from a talk for a scientific audience. These differences create a unique challenge for the speaker, but by remembering a few simple concepts speakers can maximize the effectiveness of their presentations.

Put simply, the ability to successfully address the general public boils down to a single simple concept: be mindful of your audience. When speaking to a specialized group, the presenter is allowed a certain amount of leeway in assuming that the audience is already familiar with certain concepts. Yet for a non-specialized group, scientists have to take the time to properly introduce critical notions while being careful not to use unnecessary scientific jargon. At the same time, speakers should never gloss over a concept because it’s “too difficult” for the audience to understand. If a presenter truly grasps the subject matter, he or she should be able to explain it to any audience, regardless of their background.

When scientists address a group of their peers, the “real-world” application of the science is generally not discussed as much as the scientific merit of the work. But Ms. Tiffany Lohwater, the Public Engagement Manager at the American Association for the Advancement of Science (AAAS), believes that general audiences appreciate a more intensive discussion of the way scientific work can impact day-to-day life. Describing the potential benefits of scientific inquiry helps to grab the audience’s attention and promotes discussion. Such discussion is important because unlike some forms of academic didactic lectures, speaking to a general audience should always be considered a form of two-way communication. Whenever possible, prior knowledge of the audience’s background can be used to tailor a talk to the audience's interests but the speaker must remain flexible enough to address unanticipated queries. If the speaker is asked a question that they cannot answer, he or she can always offer to research the question and answer it at a later date. At the same time, Ms. Lohwater notes that “unanticipated or unanswerable questions offer the opportunity to talk about how [the scientific process] works,” which is in and of itself a worthwhile topic.

Finally, when scientists speak to a general audience they should be prepared for a certain amount of skepticism. Depending on the topic in question, some members of the audience may not be willing to support a given scientific school of thought. And although it is important to delineate the scientific basis for a given conclusion, it is also important to realize that not everyone may be willing to accept the same conclusions. When speaking to a general audience, scientists should allow for personal differences of opinion and even though it is acceptable to present the strengths and weaknesses of an argument, speakers should never try to browbeat the audience into embracing a given theory.

Interaction between scientists and non-scientists presents certain challenges, but proper planning will enable a scientific speaker to gauge the appropriate level of background information, make the talk interesting to the audience, and promote discussion. For those who would like additional tips on public speaking, the AAAS offers several useful services on their website (www.aaas.org/communicatingscience). Individuals interested in discussing scientific discoveries and controversies with the general public can hone their skills with local programs like Science Saturdays or Yale’s Science in the News. Yale-directed public outreach is coordinated by the Office of New Haven and State Affairs and graduate students can contact Maria Parente (maria.parente@yale.edu) for information about volunteering opportunities. Finally, it’s not uncommon for local chapters of national organizations to offer chances for scientists to engage the general public. By making use of these programs, members of the Yale community can develop their ability to address a general audience, and there’s no doubt that such skills will be an invaluable addition to their personal and professional development.
OUTTA HERE!!!
CONGRATULATIONS TO ALL OF THE STUDENTS (AND THEIR P.I.S.) ON THEIR SUCCESSFUL THESIS DEFENSES OVER THE PAST 12 MONTHS

Cell Biology

Justin Fendos (Warren Graham)
Mutating Spanning Aspartic Residues and Changing Membrane Composition Each Affect pHLIP’s Insertion pKa

Jessica Ma (Ira Mellman)
Oligo-ubiquitination Determines MHC II Trafficking and Regulates Antigen Presentation in Dendritic Cells and B Cells

Manavendra Pathania (Angelique Bordey)
MicroRNA-132 Regulates the Synaptic Integration of Postnatally Generated Neurons in the Mammalian Olfactory Bulb

Kelly Romano (Joseph Madri)
Multifaceted Effect of CD44 Deficiency Contributes to Enhanced Experimental Autoimmune Encephalomyelitis and Vascular Barrier Dysfunction: A Role in Immune Cells, Blood-Brain-Barrier, and Endothelial Cells of the Vasculature

Bradley Rubin (Michael Caplan)
Molecular Regulation of Insulinresponsive GLUT4 Trafficking

Elenoe Smith (Diane Krause)
Myocardin Related Transcription Factors Promote Megakaryocyte Maturation and Platelet Formation

Computational biology and Bioinformatics

Lukas Habegger (Mark Gerstein)
Computational Methodologies for Transcript Analysis in the Age of Next-Generation DNA Sequencing

Karen Lostritto (Annette Molinaro)
Piecewise Constant Estimation: Extensions of PartDSA and Applications to Cancer and Epidemiological Studies

Thaibinh Luong (Michael Krauthammer)
Improving Biomedical Information Retrieval Using Term Identification and Concurrent Image and Text Processing

Michael Sneddon (Thierry Emonet)
Overcoming Complexity in Systems Biology Modeling and Simulation

Cellular and Molecular Physiology

Whitney Harris Brown (Gerald Shulman)
The Role of NAPEs and NAEs in Energy Homeostasis and Glucose Metabolism

Hyun Chul Choi (Michael Nitabach)
Cellular Dissection of the Drosophila Circadian Control Circuit Using Membrane Tethered-PDF

Maha Elsayed (Ronald Duman)
Fibroblast Growth Factor-2 is Necessary and Sufficient for the Gliogenic and Behavioral Actions of Antidepressants

Matthew Fleming (Leonard Kaczmarek)
Phosphorylation Regulates Gating and Channel-Protein Interactions in the Slack Sodium-Activated Potassium (KNa) Channel

Shelby Montague (John Carlson)
Translation of Olfactory Input into Behavioral Output in the Drosophila Larva

Christoph Straub (Susumu Tomita)
Kainate Receptor Properties and Synaptic Localization

Experimental Pathology

Maria Baquero (David Rimm)
Predicting Response to Taxanes: Molecular Characterization of Microtubule Associated Proteins (MAPs) as Prognostic and Predictive Markers in Breast Cancer

Jennifer Bordeaux (David Rimm)
Validation and Assessment of Protein and mRNA Biomarkers in Breast Cancer: Focus on Met and ESR1

Melissa Cobleigh (Michael Robek)
Novel Vesicular Stomatitis Virus Vaccine Vectors for Prevention and Treatment of Chronic Hepatitis B

Allison Green (Gary Kupfer)
A Role for RNA and the Transcriptional Machinery in the Pathophysiology of Fanconi Anemia

Jason Hanna (David Rimm)
Quantitative in Situ Analysis of MicroRNAs and Proteins as Molecular Biomarkers in Cancer

Susan MacLauchlan (Themis Kyriakes)
Negative Regulation of the Angiogenesis Inhibitor Thrombospondin 2 (TSP2) by Nitric Oxide and Hypoxia

Continued
Genetics

Marc Chatenay-Lapointe (Gerald Shadel)
Regulation of Mitochondrial Function and Chronological Lifespan in Budding Yeast

Katherine Donigan (Joanne Sweasy)
Tumor-Associated Variants of DNA Polymerase Beta are Functionally Linked to Cancer Etiology

Emily Freed (Susan Baserga)
The Function of the t-Utp Subcomplex in Ribosome Biogenesis in Yeast and Humans

Catherine Hofler (Michael Koelle)
Modulation of C. elegans Behavior after Food Deprivation via AGS-3 and RIC-8 Activation of the Neural G Protein Galpha(o)

Susan Jun (Daniel DiMaio)
Isolation and Characterization of Small, Artificial Transmembrane Proteins that Activate the Human Erythropoietin Receptor

Jade Li (Zhaoxia Sun)
Analysis of Qilin and Its Roles in Zebrafish Embryonic Development

Thomas Magaldi (Daniel DiMaio)
Genetic Analysis of Simian Virus 40 Receptor Usage

Carlos Stahlhut (Antonio Giraldez)
The microRNAs miR-1 and miR-206 Regulate Angiogenesis by Targeting the Vascular Endothelial Growth Factor-A (vegf-a)

Pingxing Xie (Joel Gelernter)
Investigation of Gene-Environment Interaction Effect and Functional Rare Variants in the Etiology of Nicotine Dependence

Shiaulou Yuan (Zhaoxia Sun)
TOR Signaling Modulates Cilia Size and Function

Xiao-Feng Zheng (Patrick Sun)
The Role of FANCM Family of Helicases/Translocases and Their Interacting Partners in DNA Repair

Feng Zhou (Herve Agaisse)
JAK/STAT Signaling and Homeostasis of the Adult Drosophila Midgut

Immunology

Dennis Jones (Wang Min)
Novel Molecular Regulation of Inflammatory Lymphangiogenesis

Kathryn Wilkinson Juchem (Mark Shlomchik)
Why Do Effector Memory T Cells Fail to Induce Graft-versus-Host Disease? A TCR Transgenic Approach

Interdepartmental Neuroscience Program

Rachel Berman (Hal Blumenfeld)
Why are Patients with Absence Seizures Absent?: Combined EEG, fMRI, and Behavioral Testing in Childhood Absence Epilepsy

Matthew Johnson (Marcia Johnson)
Component Processes, Top-Down Modulation, and Interactions between Perceptual and Reflective Processing

Kristen Maynard (Elke Stein)
DSCAM Contributes to Pyramidal Neuron Dendrite Arborization and Spine Formation in the Developing Cerebral Cortex

Microbiology

Heather Carleton-Romer (Jorge Galan)
Engineering the Type III Secretion Machinery in a Non-Replicating Vehicle for Antigen Delivery

Christopher Case (Craig Roy)
Regulation of Caspase-1-associated Activities in Macrophages During Legionella pneumophila Infection

Bithi Chatterjee (Ira Mellman)
The Endocytic Requirements for Cross Presentation by Human Dendritic Cells

Tiffany Sun (Richard Bucala)
Suppression of T Cell Immunity by a Plasmodium-Encoded Cytokine

Molecular Biophysics and Biochemistry

Rebecca Berlow (Patrick Loria)
Dynamic and Functional Characterization of High Molecular Weight Enzymes

Kathleen Bower-Phipps (Susan Baserga)
The Box C/D sRNP Dimeric Architecture Is Conserved across Domain Archaea

Christopher Cheng (Mark Saltzman)
Ligand-enhanced Polymeric Nanoparticles for Targeted RNA-based Gene Therapy

Brian Couch (Antony Koleske)
Cytoskeletal Regulation, Neuron Structure, and Behavior in Alzheimer’s Transgenic Mice

Continued
Steve Ding (Anna Pyle)
Exploring the Functional Diversity of Superfamily 2 Helicases

Shana Elbaum (Elizabeth Rhoades)
Single Molecule Investigations into Tau Conformations and Aggregation Mechanisms: Implications for Alzheimer’s Disease

Thanh Vu Erion (Scott Strobel)
Biochemical Investigation of the Mechanism of Cooperative Ligand Binding by the Glycine Riboswitch: Defining the Role of RNA Aptamer Tertiary Interactions Important for Cooperativity

Nicholas Last (Andrew Miranker)
Membrane Poration by Islet Amyloid Polypeptide and the Common Mechanism Shared with Antimicrobial Peptide Magainin 2

Brannon McCullough (Enrique De La Cruz)
Mechanics of Actin Filament Severing by Cofilin

Lauren Saunders (Enrique De La Cruz)
Kinetic Analysis and Inhibition of Autotaxin, a Lysophospholipase D

Leslie Wolfe (Yong Xiong)
Viral Hijacking of Host E3 Ubiquitin Ligase Machinery for the Degradation of Host Antiviral Factors

Molecular, Cellular and Developmental Biology

Imran Babar (Frank Slack)
A Study of MicroRNA Oncogene-Addiction in Lymphoma and microRNA Radiosensitizers in Lung Cancer

Leah Campbell (Craig Crews)
Investigations of the Role of the Regeneration Epithelium during Axolotl Limb Regeneration

Rajini Haraksingh (Michael Snyder)
Genome-wide Mapping and Functional Analysis of Copy Number Variation in the Human Genome

Su Li (Elke Stein)
Identification and Characterization of the ligand for PUNC

Yeqin Ma (Xing-Wang Deng)
Involvement of miRNAs in Crop Development and Differential Epigenetic Modifications within Co-Expression Clusters

Richard Reznick (Gerald Shulman) Age-Associated Defects in AMPActivated Protein Kinase Activity and Mitochondrial Biogenesis

Timothy Stuhlmiller (Martin Garcia-Castro)
FGF Signaling in Early Neural Crest Development

Anna Trofka (Scott Holley)
Biochemical Analysis of the Complex Network of Her Dimers During Zebrafish Somitogenesis

Michael Turner (Frank Slack)
Transcriptional Regulation of the C. elegans microRNA lin-4 Stephanie

Dianne Vadasz (Martin Garcia-Castro)
Neural Crest Specification and Pax7 cis-regulation

Jason Wallace (Ron Breaker)
A Large, Noncoding RNA Confers Alcohol Stress Tolerance in Extremophilic Bacteria

Casey Walsh (Martin Garcia-Castro)
The Role of Pax7 in Early Neural Crest Development

Nathan Yardley (Martin Garcia-Castro)
Neural Crest Induction in the Non-neural Ectoderm and the Role of Nfat5 in Early Neural Crest Development

Neurobiology

Amanda Foust (David McCormick)
Optically Tracking Action Potential Initiation and Propagation in CNS Neuron Axonal Arbors with Voltage-Sensitive Dyes

Nao Gamo (Amy Arnsten)
Role of Hyperpolarization-activated Cyclic Nucleotide-gated Cation Channels in Stress-induced Prefrontal Cognitive Dysfunction: Relevance to Psychiatric Disorders

Pharmacology

Fatih Mercan (Anton Bennett)
The Role of the SH2 domain-Containing Protein Tyrosine Phosphatase, SHP-2 Nutrient Responsive mTOR Signaling

Wenwen Xu (Dan Wu)
Role of Front and Back Signaling in Regulation of Neutrophil Polarization, Directionality, and In Vivo Infiltration
When doctoral students graduate, knowledge leaves with them. Likewise, potential mentors and guides for new graduate students are gone as well. In order to preserve a morsel of their wisdom I sought out five Yale BBS students who have recently completed their PhD. They shared their experiences as well as advice to help navigate graduate school. Here is a bit about our post-graduates...

“HC” Heather Carleton: Graduated from University of Michigan where she majored in Microbiology. Prior to starting her PhD at Yale she earned a Masters in Public Health from UC Berkley and researched infectious disease control for 4 years at San Francisco General Hospital. For her thesis she joined Dr. Jorge Galan’s microbial pathogen laboratory, she is considering researching at the CDC and will go on to do a postdoc.

“ME” Maha Elsayed: Majored in Biology at American University of Beirut and worked as a research assistant at an academic institute for a year before she joined BBS. A member of the Department of Physiology, she joined Dr. Ronald Duman’s Molecular Psychiatry laboratory for her thesis and will do her postdoc in Switzerland.

“NG” Nao Gamo: Attended MIT, studied Brain and Cognitive Science and Music and upon graduation began her doctoral degree at Yale. Her graduate research interests coincided with the research she pursued as an undergrad; she chose to do her thesis in the Neuroscience laboratory of Dr. Amy Arnsten. She is now pursuing a postdoc at Johns Hopkins doing research related to schizophrenia.

“WH” Whitney Harris: Before attending Yale for her PhD, she studied Anthropology at Stanford University and researched at different universities across the nation. Graduating this past May from Dr. Gerald Shulman’s laboratory in the Department of Physiology, she will pursue a postdoc in Italy.

“SM” Susan Maclauchlan: Began her career in science studying Biochemistry at Smith College. Now having completed her thesis in the Pathology lab of Dr. Themis Kyriakides she will pursue a postdoc in Cambridge later this year.

One of the most important decisions doctoral students face is selecting the right thesis laboratory, so right off the bat I asked the post-grads why they chose their thesis labs. WH emphasized two reasons for her choice, “one, the lab had nice graduate students and two the students graduated in a timely manner while gaining a wide range of expertise.” SM sought to find a PI who had her best interest in mind, because she realized that although all her rotations had a great lab dynamic, “it’s the PI who will be working with you the whole time, whereas the current lab members will leave.” HC’s choice was based on it being a larger lab with several postdocs who were experts, and because her PI was easy to get along with and he also proposed projects tailored to her interests. NG, who started the program already knowing the topic of study she was most interested in, suggested, “trying to choose your rotations in a way that will compliment that area of work” and then selecting the best option. ME considered many factors including if the research interested her and how useful techniques used in the lab would be for her scientific career.

Another important aspect of graduate life is acquiring funding. I asked our graduates about specific fellowships or grants that are worthwhile to apply for. Primarily the ladies suggested applying for the NSF Graduate Research Fellowship Program; the application is expected to open in August. WH highly suggests the NRSA Pre-Doctoral Training Program for students with translational research interest, but take note that many NIH awards require US citizenship. She also spoke highly of the Ford Foundation Fellowship as well as the Merck Graduate Science Research Dissertation Fellowship for minority researchers, which opens in September. NG obtained travel grants for conferences through the NIH’s institutional allowances. SM, whose research was vascular related, applied for the American Heart Association Predoctoral grant, a two-year grant that she suggests applying for later in the PhD. She also thinks the Graduate School Association’s travel fund application is “easy to do and the odds of getting it are good” and that it is also common to win travel grants when registering for conferences based on the quality of the abstract you submit. ME also reminds us that the BBS offers internal fellowships that are open to international students and that it is best to consult with the registrar to learn what those awards are.

Regarding scientific conferences, internships and abroad research opportunities, all the post-grads had given either oral or poster presentations at conferences relative to their field. HC had a unique opportunity to attend a scientific career workshop hosted by ASM Kadner Institute in which she sat in on a mock NIH grant review panel and had a senior researcher review her CV and practice grant. She suggests Continued
Participants in a similar workshop at some point. Concerning internships, WH was very fond of the Bristol-Myers Squibb Internship opportunity, which she did the summer after her first year. Although none of the post-grads I interviewed had abroad research experiences, most had lab mates who went abroad to collect samples for experiments or for collaboration. Those interested in research abroad should look into the Fulbright Program.

By the second year of graduate school students start preparing for the qualifying exam. I wanted to know what the best way to prepare is. NG said, “Primarily, it’s important to figure out in advance the specific requirements your department has for qualifying as the process can change each year.” Consulting the department chair or DGS is a good way to do this. From there, “become knowledgeable about the papers assigned, and create practice questions for yourself. For the written portion you could be asked to choose from a list of questions based on the themes from the papers you are reading and in the oral session they may ask you to clarify what you wrote about, or they are likely to ask the other questions on the list that you chose not to answer on paper!” She warns us not to rush into the process, especially when it comes to choosing faculty to read with. She believes “you get a better idea over time on who to choose based on who compliments your thesis work and who is a likely collaborator of your lab, noting that these people could become your committee members in the future.”

WH, who qualified in the Department of Physiology, said that the August before qualifying she got her hands on as many reviews that would help with the paper she had to write. She believes “the best review papers to start preparing with are the seminal papers that are so old in the field that everyone uses them, especially because all new papers do is reiterate those same findings with fancier equipment.” From there the student should “meet with your readers once a week and in this way you will know in advance if you will pass.” At each meeting be prepared with “a naive question to ask but also teach your reader during the meeting to make it worthwhile for the faculty member as well.” She also noted that she had the opportunity to work from home for a bit while preparing for qualifying. HC said that when she qualified in Microbiology she had a reading period of one month as well as important journal meetings with three committee members. In the end her written proposal served as a sort of back up plan to her dissertation project. In order to pick good committee members she says “keep in mind that junior faculty may have more time to dedicate to the process” and also “talk to upperclassmen on whom to choose.”

SM who qualified in Pathology stated, “Without doubt, you MUST talk to other people about your ideas.” Although your mentors should not directly edit your work, you can discuss concepts or pose questions from papers you are reading. And if a faculty member specializes in a technique you are writing about it is beneficial to ask how they do a particular assay in their lab. Susan vouches, “Having discussions with friends and faculty made me realize I knew more than I thought I did.”

Next I was interested in learning what they valued most in graduate school. For NG it was opportunities to collaborate and network; she encourages us to “definitely take them if you have the chance.” WH valued teaching the most, which included time tutoring and TAing courses. HC enjoyed Carl Zimmer’s annual workshop entitled “Science Writing for the Public.” For those interested she notes, “There is also an Undergrad course on this topic.” She also appreciated resources from the Graduate Writing Center as well as writing for the Yale Journal of Biology and Medicine. SM's highlight was writing and earning the AHA Fellowship because it made her feel very validated as a researcher, stating “I hadn’t given my prospectus yet, and although my PI and I thought we have good ideas, it was important to know that reviewers thought so as well.” Similarly, writing a NIH F31 fellowship was ME's most valued experience because “it was a great practice and going through the process gives you a great insight on how grants go about and even if you don’t succeed, it is a great learning experience.” She also promises, “Publishing I would say is the most rewarding experience of all!”

The light at the end of the tunnel is defending your dissertation. NG describes this moment as “thrilling” because “it is the reward from all that you have done, at this point you have learned a lot from writing, and have filled in so many gaps in your knowledge that you wish you would have done this all along.” WH saw defending as “empowering” because one sees how much they’ve accomplished. “You already have a good introduction and methods from previous poster presentations, and now you get to enjoy writing it up.” HC felt that defending was “anticlimactic” because she “expected to feel different, but in reality still had experiments to do, still had a paper to submit”. SM and ME both felt extreme relief after the process was all over. SM declares, “I hadn’t realize how stressed I was at the time, I thought I was calm but apparently I was a mess!” But she also says defending is positive because
“it’s a moment that’s about you, which doesn’t happen a lot, so when all these people came to see me and the room was full, I felt touched by all that. I was prepared to feel anti-climactic, but didn’t feel that way.”

When I asked if obtaining a PhD is worth all the trouble, I got an array of anonymous answers. Foremost, a student said “Yes but it definitely helped that I had a nurturing PI. And now I still have left to experience what I can do with the degree.” Another answers, “Not for me, I had interest in academia but I don’t want to become a professional grant writer, that is not why I got into science and I learned this is not what I want to do in science.” She went on to say, “One can work at the bench with just a master’s degree or do the same in industry and make decent money, especially when the tenure outlook is bleak; I’m not optimistic about it.” A different student thinks obtaining the degree is worthwhile, but throughout the process “seriously questioned it”. A rather thoughtful opinion was that “it depends on what you want to do, as there are things you do and don’t need a PhD for.” Additionally, I was told that it’s worth it if you try to get a lot out of it and that the degree will change the way you think about issues and your approach to fixing them. Lastly, a student believes, “The PhD is worth the effort if you enjoy science and research and know that this is what you see yourself doing for the next few years of your life. But one has to be aware that the job market in academia is becoming a concern. A PhD is no longer a guaranteed ticket to an academic career.”

I was next interested to know if having graduated from Yale BBS, they felt prepared and confident about taking the next steps in their career. Most of the post-graduates felt ready, one mentioned “Yes, I actually met my future PI when I had the opportunity to invite a prominent scientist to speak for departmental seminar. This helped me get to know them and facilitated finding a position.” One felt she should have definitely sought out more mentorship and another regretted not realizing she disliked animal work until the latter half of the project. Another replied, “Sort of, I am concerned with the funding situation though. Also, some PI’s don’t support students going into anything besides academia, which I feel has limited my mentorship.” She recommends the Yale Career Center to help address this problem. I was also curious what they considered their biggest regret in graduate school. I was told, “I regretted not writing and thinking about my thesis sooner in the process. The third year was the hardest for motivation, and for me the five years were tough without a structured schedule or frequent pressing deadlines.” This student urged, “Do not feel awkward about emailing your PI or arranging your committee meetings because you will be in trouble with your program if you’re not keeping on top of this!” Another regretted not being her own advocate as much as she should have, stating, “The sooner you realize no one else cares about you and your graduation, the sooner you will take charge of your own destiny and graduate. Your PI will only help you as far as it is in line with their goals, so you need to think the same way.”

Finally, the ladies considered if they had the opportunity to go back and redo their education, whether or not they would choose this path again. The answers varied. “No, I would still get a bachelors of science but instead I would major in business, do my masters in biotechnology and work in science in industry.” Another student, who couldn’t imagine doing anything else, said she loved every step along the way. But she said if she had to, she would develop her other interests and become an editor, novelist or travel writer. The overall consensus seemed to be, “I have my days where I think this is crazy, this is not what I should have done, but at the same time I don’t think I could be equally as excited about other jobs- I like thinking about science.”

A few famous last words for the new graduate students:

“The best stress relief in the PhD and life in general is to get the work done and move on. Also, always promote yourself, try to network and present at meetings if possible, don’t just attend.” NG

“Lab can be isolating, so take advantage of opportunities outside of the lab and try to bond with other graduate students, you don’t want to complain in the lab with same people you see everyday!” HC

“Don’t be aggressive, but consistence in your expectations for graduation. Some students don’t want to ask, but once you’ve completed a body of work you decide when to graduate, your PI may add to the list of to-dos, but they will know where your head is. Also, have committee meetings at least every three month to nine months leading up to defense because it’s not how long you’ve been here that counts, it’s how long they feel like you’ve been here!” WH

“Grad school is hard but you have to pick your battles; if you go to a small lab there’s gonna be hardship and if you go to a big lab it’s gonna be hard in a different way, there is no easy way out of this degree, making it suit you best is critical.” SM

Thanks post-grads! B
Shorter days and cold nights getting you down? Inject a little bit of summer into your fall gatherings by sharing this citrus-sweet treat with your friends. Makes 40-60 bars, depending on how you cut them.

Materials:
For crust:
• 1 cup unsalted butter
• 1/2 cup granulated sugar
• 2 cups flour
• 1/8 teaspoon salt
For lemon layer:
• 1 cup flour
• 1 cup freshly squeezed lemon juice (3-5 lemons)*
• 6 extra-large or 5 jumbo eggs
• 2 1/2 cups granulated sugar
• 2 tablespoons grated lemon zest (3-5 lemons)*
• Powdered sugar for dusting the top

Methods:
- Preheat oven to 350° F
- Grease a 9 x 13 x 2-inch baking sheet
For crust:
• Cream butter and sugar until light and well-mixed
• In a separate bowl, combine flour and salt
• Add flour-salt mixture to butter-sugar mixture, and mix until just combined (a few flour streaks are fine)
• Dump dough onto a well-floured surface, and form into a ball.
• Transfer to greased baking sheet and press down into the bottom, forming 1/2-inch edges on the sides
• Bake for 15-20 minutes, until lightly browned
• Remove from oven and let cool, but leave the oven on
For lemon layer:
• Measure flour into a bowl, then add lemon juice and whisk until few lumps remain
• Whisk eggs, granulated sugar, and lemon zest into the flour-juice mix until homogenous
• Pour lemon mixture onto the crust
• Bake for 30-35 minutes, or 5 minutes past when the center no longer moves if the dish is wiggled
• Remove from oven, and let cool to room temperature

Once cooled, dust top with powdered sugar by pouring the sugar into a sieve and shaking the sieve over the top of the dish. Enjoy!

*If you end up with extra lemon zest, you can freeze it in a plastic bag or container for up to two months; the zest works wonderfully in any kind of sweet batter, such as pancakes. If you end up with extra juice, make yourself a cup of lemonade!
Disclaimer: The B magazine and this author are not endorsing any particular stocks or financial services. We’re just here to provide pointers so that you can make the decisions.

Some of you may be laughing at the title- a grad student, before the pinnacle of his achievements, planning for retirement? On a grad student salary? It certainly is possible and you should get on it. There’s no time like the present to plan for the future. The earlier you act on reducing interest that you have to pay and on increasing the interest that you can get on your investments, the better off you will be in the long-run. Here’s a list of 8 things you should do or think of doing (think of it as a pyramid scheme that actually does pay you).

#1- Do nothing (except #2 on this list) until you have a three month supply of cash in your checking account. We’ll call this emergency money in the long run, but it is good to have that just-in-case money. If you’re really smart about it, you’ll keep it in a savings account. To determine how much cash this is, check out my article in Vol. 12.2 of the B Magazine (because, like every scientist, I help out my impact factor by citing myself).

#2- Pay down debts. The sooner you kill debt, the better. If you get rid of debts faster, you accrue less interest and, in the process, save yourself a lot of money.

#3- Start small with some smaller money market instruments (Certificates of Deposit [CDs], commercial paper, money market accounts, etc.) CDs are a hands-off investment, so if you can afford to part with some cash for 6-18 months, go ahead. Other types of money market instruments are often available at most larger banks, but make sure you do research ahead of time. There might be economic factors in play that make things more advantageous for you in 6 months time as opposed to the here and now.

#4- Set up an IRA. Unless you or your spouse are an employee of a company that offers a separate retirement plan, this will be the way to go. Currently, there is also a tax break for IRA contributions, regardless of IRA type. Before you invest in an IRA, research it, particularly as taxes will be an issue. Everyone’s tax situation is different. There are different types of IRAs depending on what is offered in banks, so feel free to research each and invest accordingly.

#5- Diversify with larger things. You want to have an appropriate amount of blending in your portfolio so that your entire retirement fortune does not rest on one thing. Stocks, bonds, commodities, cash, property, etc. are all things that you may want to consider. The more blending you have, the more stable things will be- just make sure that, at the end of the year, you turned a profit instead of a loss. A word about stocks, if you do not have them in as a part of an IRA scheme- you want to have stocks that have a good dividend (most people state 2.5-3% or above is a good point). Rather than having the interest as cash on hand for spending, reinvest the dividends, as your rates are better. Just be prepared for the extra tax, unless this is wrapped up in an IRA (then things get complicated). As researchers, research before you invest.

#6- What should you anticipate when you get older? Let’s assume that, by the time you retire, you have a paying job, that you have a few kids with several grandkids, that you don’t have any huge health problems. You have a home that is almost or completely paid off. What then? In looking at my grandparents or other older people, you should figure that joint replacements, hearing aids, assisted living, health insurance/hospital payments, prescription medication, visiting progeny, and several other things will be a factor. That’s also assuming you don’t want to go on any nice vacations or “snow bird” during the winter months. Also, don’t assume that you’ll be receiving any Social Security or healthcare assistance from the Federal government. Based on how those programs are trending, they’ll be long gone before any of us even start thinking of retirement.

#7- What else should you do while #1-6 are going on? Investing in a good life insurance policy is something you should think about sooner or later. Everyone’s situation is different and not all life insurance policies are the same. Getting a will is also a good idea, unless you already have one. Intestacy is one of the worst things that can happen to your heirs.

#8- My last tip of advice- if it sounds stupid, it probably is. Research before you invest. B
A thesis defense can be a pretty staid affair: You get up. You talk. They clap. The end. How do you plan to make your own defense far more interesting?

1: Add some laxative to the coffee.
2: Add some vodka to the coffee.
3: Bring a wide assortment of hats. Change hats every slide.
4: Develop an epic soundtrack to accompany the defense and amplify the dramatic tension
5: Present the entire defense in Pig Latin.
6: Develop interpretive dance as a medium for data presentation
7: Distribute Vuvuzela’s to those attending. Encourage them to utilize them instead of clapping
8: Incorporate as many references to XKCD as possible (beware of velociraptor attack!)
9: Begin the presentation speaking very quietly. As the presentation progresses, grow louder very slowly, until I am screaming at the very end
10: Hire three undergrads to dress up as Blinky, Pinky, Inky and Clyde, and have them burst in chasing another graduate student in a Pac-Man costume
11: Make sure the committee knows I’m Never gonna give you up, Never gonna let you down, Never gonna run around and desert you...and laugh inside as they don’t realize they’ve been rick-rolled.
12: Declare that I am running for president with Paul Ryan as my running mate.

It’s easy. I show up (in my cat woman regalia). I talk (while I whip my tail back and forth). They clap (either with astonishment or terror written all over their faces). The end? I don’t think so. I finish with a big exit (Halle Berry style).

Deb Ayeni, Experimental Pathology

Hand out 3D glasses at the door. Do your thesis defense in 3D, complete with your favorite model organism virtually jumping at the audience at random points in the talk. Consider it a success if your audience seems fascinated. Or horrified. Tang Metheetrairut, MCDB

Although my personal interactions with Annie Le were minimal, the few times I did encounter her she was always cheerful, very patient, and incredibly knowledgeable. She was truly an incredible person in addition to being an accomplished community member and scientist. The Annie Le Fellowship seeks to honor her memory by selecting exemplary students who embody the qualities Annie possessed for an award given annually. Within the BBS, students are nominated for both their leadership and service to the Yale and New Haven communities and their exceptional scientific and academic achievements. This year, two recipients were chosen: Nikki Woodward from the interdepartmental neuroscience program and Andrea Stavoe from cell biology.

Nikki Woodward (4th year) works in John Carlson’s laboratory, studying odorant binding in Drosophila. She is also involved in Science Troopers, which brings science outreach to local farmers’ markets, Brain Education Day, which teaches basic neuroscience to local middle and high school students, and the Career Development Journal Club in the biological and biomedical sciences. Additionally, she participates in Neuroscience Outreach to local New Haven schools and New Haven Reads, which provides help and tutoring to local students.

Andrea Stavoe (5th year) is in Daniel Colon-Ramos’s laboratory, working on neurodegeneration and repair in C. elegans. She served as the chair for the Graduate Student Assembly this past year and current serves at the GSA Conference Travel Fund Director. She also helped to found and serves as the treasurer for STAY, the Students and Alumni of Yale, group. Additionally, she serves as a mentor for the Women in Science at Yale and at the Office for Diversity and Equal Opportunity.

These two recipients certainly do embody the traits that Annie Le herself displayed in her life and career, displaying a clear commitment to community service outside of and within Yale University as well as an exemplary academic and leadership record. B