

AS802 - Graduate Research and Scholarship (Section A1) - Spring 2017

Class Hours: Wednesday 12:20 pm – 1:35 pm, Room CAS 502.
Class Dates: Wednesday 25 January 2017 – Wednesday 03 May 2017
Final exam: There is no final exam. Nor any midterms.

Your instructor is Professor Paul Withers. I have a mailbox in CAS 506 (CSP office) and CAS 514 (AS office).

Person	Office	Email	Phone	Office Hours
Withers	CAS 604	withers@bu.edu	617 353 1531	By appointment

Course Description

An introduction to the methods of research and scholarship required for successful graduate study and the associated ethical issues. Topics include choosing a research advisor, the research topic, scholarly writing and publishing, intellectual property, and research funding.

More succinctly – Your grad school survival kit.

A PhD program is very different from the undergraduate degree programs that you all excelled in before arriving here. One of the aims of this course is to develop the tools and wisdom that will enable you to make the most of your PhD training.

The other aim of this course is to satisfy BU's Responsible Conduct of Research (RCR) policies. RCR is defined as "the practice of scientific investigation with integrity. It involves the awareness and application of established professional norms and ethical principles in the performance of all activities related to scientific research" (<http://www.bu.edu/researchsupport/compliance/responsible-conduct-of-research/training-programs/plan-for-instruction-in-the-responsible-conduct-of-research-and-mentoring-of-graduate-students-and-post-doctoral-researchers/>)

NSF and NIH require that BU implement mentoring and training in the responsible and ethical conduct of research for graduate students, and the Astronomy Department desires that its graduate students get such mentoring and training within the Astronomy Department. Which is why you're taking this course.

Resources

(Required) On being a scientist: A guide to responsible conduct in research; National Academy of Sciences, third edition (2009)

Download for free from http://www.nap.edu/openbook.php?record_id=12192

(Excerpts will be provided) The art of being a scientist: A guide for graduate students and their mentors; Roel Snieder and Kenneth L Lerner; Cambridge University Press, 2009.

ISBN-10: 0521743524

ISBN-13: 978-0521743525

(Excerpts will be provided) A PhD is not enough: A guide to survival in science; Peter J Feibelman, Basic Books, 2011.
ISBN-10: 0465022227
ISBN-13: 978-0465022229

Other resources will be introduced during the class, including some from
<http://www.bu.edu/orc/rcr/>
<http://oprs.usc.edu/education/rcr/>
<http://ccnmtl.columbia.edu/projects/rcr/>
<http://www.phdcomics.com/>

This course has a Blackboard site (learn.bu.edu).

Assignment		Possible Due Date
NESSF proposal (or equivalent)	15%	01 February
Time management diary	5%	15 February
CV	5%	22 February
Website	5%	01 March
Orals plan	10%	22 March
Prospectus plan	10%	29 March
LaTeX dissertation draft	15%	05 April
RCR case studies	10%	15 March, 12 April
Research proposal template	10%	26 April
Proposal budget	5%	03 May
Class participation	10%	

These dates are not yet fixed, use them only as a rough guide to plan your semester

Some BU online modules are also required for the official RCR approval.

That's a long list of assignments for a 2 credit course. We will discuss in class how to balance "doing the minimum required for the class" and "actually benefitting from doing the assignment".

NESSF proposal (or equivalent) (15%)

Money makes the world go round, including scientific research. It's very hard to make great discoveries if no-one is paying you to do so. Convincing others that they should support you in your plans to explore the universe is another important part of the modern scientific enterprise. After completion of a PhD program, it is extremely important. Even before completing a PhD, it can be highly valuable. In particular, it is useful to make the inevitable beginners' mistakes before your career depends on not doing so. There is a NASA graduate fellowship program that you are all eligible for with a proposal deadline of Wednesday 01 February. I know this deadline is close to the start of the semester, but the funding agencies are not governed by your schedules – welcome to the real world. Miss this date and you'll need another source of a year's funding. Actually submitting a proposal requires commitment from an advisor, which may not be forthcoming. In that

case, you will write up what looks like a NESSF proposal and most of the supporting material, but not actually submit anything (nor get any funding). **You will develop a plan for a research project, then submit a proposal to this fellowship opportunity.**

Time management diary (5%)

Where does time go? What do you actually do all day? Making effective use of your time is a key to success. **You will track your activities for a week and see if your actual use of time matches your perceptions.**

CV (5%)

A curriculum vitae (CV) is essential beyond the PhD program and often useful within a PhD program. Developing a basic CV long before you need it, then regularly updating it reduces the pain of writing an entire CV on a blank sheet of paper at the end of your PhD program. It also gives you a mechanism by which to keep track of all your noteworthy activities and accomplishments, rather than having forgotten most of them when you need to list them. **You will prepare a CV.**

Professional website (5%)

The first thing that you do when you want to know more about a scientist or their research is visit their website. This will be essential when you're looking for jobs after graduation and it will also be useful now to reviewers of fellowship applications, people interested in your conference presentations, and reviewers of your submitted manuscripts. **You will create a professional website.**

Orals plan (10%)

You will eventually want to pass your oral qualifying exam. Time to start thinking about what knowledge and skills you will need in the exam, how you will acquire them, and how you will verify that you have acquired them. **You will make a plan for how to prepare for orals.**

Prospectus plan (10%)

You all know about orals. I suspect very few of you know about the dissertation prospectus. You will eventually want to create a dissertation prospectus. **You will make a template for your prospectus.**

LaTeX dissertation draft (15%)

Word is lousy for scientific writing, which is why LaTeX is a commonly used word processing package in the sciences. Past students have helpfully generated a LaTeX template for your dissertation. This is your opportunity to learn to use LaTeX. **You will put some content in a LaTeX dissertation file.**

RCR case studies (10%)

Much of the training in Responsible Conduct of Research will involve existing case studies. Passively participating in discussions of case studies only provides a limited appreciation for the topics that are addressed. **You will write short case studies suitable for use in RCR training.**

Research proposal template (10%)

The NESSF deadline is too close to the start of the semester for us to meaningfully discuss how to prepare a compelling proposal. Proposal writing becomes much easier when you have a standard template that you've used multiple times. **You will develop a template for future proposals.**

Proposal budget (5%)

Knowing how much time and money are required to accomplish a task is essential for crafting a proposal that fits within the scope of your targeted funding program. **You will develop a budget for a fake proposal.**

Class participation (10%)

Finally, oral communication is a part of the process of science. Accordingly, the class will be structured to involve ample discussions, especially case studies. Grading of your participation will ensure sufficient contributions to these discussions – and reward cogent and coherent comments. Any small impromptu assignments arising during this course will be included within this “class participation” segment of your grade. **Your participation in class activities will be graded.**

Late policy

Late NESSF proposals will not be accepted (NASA policy). Other late assignments will have 15% of the maximum possible score deducted for each day they are overdue.

Planned Schedule

This is the plan, but it is subject to change.

<u>Date</u>	<u>Number</u>	<u>Description</u>
Wednesday 25 January	01	NESSF
Wednesday 01 February	02	Overview of AS 802, your PhD, and RCR
Wednesday 08 February	03	Mentor/trainee responsibilities (RCR); Use of time
Wednesday 15 February	04	Publication practices and authorship (RCR); CV
Wednesday 22 February	05	Data (RCR); Website
Wednesday 01 March	06	Peer review (RCR); TBD
Wednesday 08 March		No class – Spring Break
Wednesday 15 March	07	Oral qualifying exam
Wednesday 22 March	08	Collaborative science (RCR); Prospectus
Wednesday 29 March	09	Science and society (RCR); LaTeX
Wednesday 05 April	10	\$\$\$
Wednesday 12 April	11	Research misconduct (RCR); Proposal template
Wednesday 19 April		No class – Academic Monday
Wednesday 26 April	12	Conflicts (RCR); Budgets

Most of the “XXX (RCR); YYY” descriptions mean ~50 minutes on the first RCR-related item and ~25 minutes on the second item that is less directly connected with our RCR activities.