Becoming Science (HouseCS- 15)

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Semester: Fall 2019
Time: Wednesday/6:30-8:00pm
Location: Social Sciences 107

Course Description:
This is a course designed for first and second year students who come from diverse backgrounds and may not have had previous exposure to the world of science. We will provide a foundational overview of biomedical research while also creating a safe space to discuss scientific endeavors at Duke and beyond. Students will be encouraged to think critically about Duke campus culture and respectfully engage with their peers on diversity and inclusion in science, technology, engineering, and math (STEM) initiatives. Classes will include training on networking, mentoring, seeking out research opportunities, as well as discussions with Duke graduate students and faculty regarding career paths in science. Readings will vary from books focused inequities in science-based professions to detailed scientific papers.

Objectives:
Students in this course will:

- Learn to read a peer reviewed scientific article
- Analyze texts relating to their chosen profession
- Develop communication and professional skills relating to science
- Cultivate strategies to feel empowered and excel in homogenous environments in science and beyond
- Meet Damon Tweedy, New York Times best-selling author and physician, and have the opportunity to ask challenging questions

Required Texts:
Black Man in a White Coat, Damon Tweedy
Lean In, Sheryl Sandberg
Scientific paper links will be provided
Notebook

Course Requirements:

1) A grade of satisfactory in this course requires satisfactory completion of all assignments of this course including written and oral assignments, attendance, and participation.

2) Students are required to attend at least 11 classes to receive a passing grade.

3) To ensure a safe and inclusive learning environment, any deliberately disrespectful statements of another student's race, background, socioeconomic status, gender, sexual identity, or any of their defining characteristics will result in failing the course.

4) Students will be expected to participate in class discussions and come prepared to share their ideas.

5) Students are required to engage with guest speaker Damon Tweedy respectfully and ask engaging questions during our graduate student panel discussion.

6) Students must complete their chalk talk and final project in order to pass the course. There will be no make-up opportunity for either presentation.

Course Schedule:

*Note: * next to class date denotes date of faculty sponsor attendance.*

Part One: The Basics of Science

Part one of this course seeks to provide a framework of understanding of the scientific community that students from diverse backgrounds may not have previously had. Students will get an entry-level understanding of the mechanics of how scientific research is conducted.

Week 1 ***Introductions/ What is Science?***

08/28* Activity/Discussion: We will spend the majority of the first class on introductions and discussing the motivation of this course. The instructor will give a presentation on her journey into Duke and into science. Students will be asked to commit to creating a safe space to discuss diversity and inclusion issues and commit to keeping any personal information shared by their peers private. The goal of this first meeting is to establish a basis of trust that can be built upon throughout the course. We will then have a brief overview of various niches within science and explain broader ideas surrounding scientific research.

Students will be given an overview of various opportunities to pursue science at Duke and beyond.
Reflection Prompt: **To turn in**- What is something in science that particularly interests you? What is one major thing you would like to learn from this course? Why did you choose to take this course?

Week 2 ***Reading a Scientific Paper***

09/04 Activity/Discussion: We will have a mini-lecture on the basics of reading a scientific paper. Students will identify the different sections in a peer reviewed scientific paper are and how to think critically through experimental design and data analysis and interpretation. The framework will highlight an introduction to why papers are important, how they are used by the scientific community, different types of journals, and how the paper submission process works. Students will discuss the paper they read for homework in small groups. They will apply the main ideas learned in lecture to the paper and try to summarize the paper's findings in 6 sentences.
A brief introduction to the next-week's paper will be given. The paper is from the instructor's lab and is quite dense for introductory students. It is meant to challenge students and teach them how to read a complex paper.
Reflection Prompt: What did you learn during this class that you did not know before?
Readings: **Paper**, submit a list of 3 main scientific interests

Week 3 ***Joining a Lab***

09/11 Activity/Discussion: The instructor will present a mini lecture on the parts of a standard research lab by using her lab as an example. Explanations of the roles of a PI, post-doctoral fellow, research scientist, clinical researcher, lab manager, graduate student, and laboratory technician will be given. Aspects of the paper the students read for homework will be used to describe aspects of the instructor's lab. Based on the previous week's submitted scientific interests, the instructor will pull lists of potential labs at Duke that could be within a student's particular field of interest. Time will be given for students to do independent research about various research opportunities relating to their interests based on what was presented during the lecture. Students will learn best practices for joining a lab and be given time to draft personalized emails to send to different PI's if they are choosing to join a lab. The students will have the opportunity to discuss their

fears with joining their first lab. These fears can include personal anxieties, diversity issues, or just general worries.
A brief example of a professional resume will be presented to students to aid them with their homework for the coming week.
Reflection Prompt: Why do you want to join a lab? Write a list of 5 major goals for your first semester of research.
Readings: Hultman R et. al. Brain-wide Electrical Spatiotemporal Dynamics Encode Depression Vulnerability. Cell. 2018.

Week 4 ***Networking***

09/18 Activity/Discussion: The instructor will present a mini lecture on the basis of networking specifically in regard to science. Emphasis will be placed on providing tools for students to develop to flourish within their scientific careers. Students will be advised on how to engage with Duke faculty in a respectful and productive manner and learn to create their "network" within science. Students will be taught how to keep a field notes notebook with summaries of important meetings or talks that they have attended. Students will learn the basics of how to present themselves professionally in a networking space, send follow-up emails, and how to maintain a relationship after first introductions have been made.
After the mini-lecture, students will discuss the paper they read for homework. They will be split into teams and each team will present an assigned aspect of the paper.
Readings: **Paper,** Resume Draft 1

Week 5 ***Mentoring***

09/25* Activity/Discussion: The instructor will present a mini-lecture on the importance of mentoring in science. Students will learn what a mentor means specifically in science and how a good mentor/mentee relationship is maintained. Based on the mini-lecture students will be asked to think critically about their goals and interests in science and will need to develop an 'ideal' mentor that fits their learning styles, personality, and interests. Students will discuss ways in which under represented minority students struggle to find a mentor that meets their needs and discuss ways to combat these difficulties.
Students will then have the opportunity to edit each other's CVs in pairs. Best CV practices will be developed as a group and students will learn how to improve their resume based on instructor feedback from their first draft and feedback from their peers.

Reflection Prompt: Think of a mentor in your life. What did that person do for you? What did you do for that person? How have they helped you get to where you are today? As a mentor, what would you take from them and what would you not?
Readings: **Paper,** CV Draft 2 (print out one copy for instructor with your name and one copy with a fake name)

Week 6 ***Communicating Science***

10/02 Activity/Discussion: First assignment: Students will give a chalk talk on a paper of their choosing. Students should choose a paper that reflects research interesting to them. Students will read the paper before class and prepare a 10-minute presentation that walks other students through the main components of the paper. Slides may not be used. The presentation should be done completely through white-board drawings in a typical "chalk-talk" fashion. Students will be assessed based on their knowledge of their chosen paper and their ability to effectively communicate their ideas.
Reflection Prompt: In what ways have scientists failed to communicate their research? What is an example of a public misconception surrounding a scientific concept? What can we do as scientists to mitigate these discrepancies?
Readings (40 pgs): *Lean In*, Sheryl Sandberg (Introduction-Chapter 3)

Week 7
October 7th-11th FALL BREAK NO CLASS

Part Two: Diving into Diversity and Inclusion

Part two of this course gives students the opportunity to discuss diversity and inclusion issues that they have experienced or will experience throughout their scientific career. Students will learn how to equip themselves to handle issues of diversity and inclusion at Duke and beyond as well as how to start a conversation about issues when one arises. Students will have the opportunity to meet the author of one of their primary texts and network with current grad students at Duke.

Week 8 ***Diversity at Duke***

10/16 Activity/Discussion: Students will be expected to have read the first seven chapters of *Lean In.* We will apply trends in women's mobility seen in *Lean In* to different trends seen in science. Particular attention will be paid to white privilege within the feminist movement and students will be encouraged to think critically about the role of white

women as allies in STEM and beyond. Research on outcome disparities for minorities in stem will be presented and students will have the opportunity to discuss. Particular focus will be made on diversity within Duke. Exact statistics on minority populations at Duke will be used and students will be asked to think crucially about the presence, or lack of presence, of minority students in their stem classes.
Reflection Prompt: Is Duke diverse and inclusive ? Do you feel supported by the Duke community? Where can Duke improve?
Readings (52 pgs): *Lean In*, Sheryl Sandberg (Chapters 4-7)

Week 9 ***"Leaning-in"***

10/23 Activity/Discussion: This class will focus on the topics presented in *Lean In.* Students will discuss in particular the chapter titled "Sit at the Table." Students will be asked to think about examples of where they can "sit at the table" in their lives at Duke. Have they been "leaning in" to their courses? Do they find themselves sitting at the back of a lecture or not answering questions out of fear that they will not be listened to? Emphasis will be placed on the importance of leaning-in whenever possible in science. Students will be asked to wrap up the discussion with where the concept of leaning-in falls short. Can all groups lean in equally? How does male privilege or white privilege play a role in the notion of leaning in?
Reflection Prompt: Describe an example of where you should have leaned-in but didn't and how reading this book has made you view the scenario differently? Write one major criticism you have with Sheryl Sandberg's book.
Readings (55pgs): *Lean In*, Sheryl Sandberg (Chapters 8-11)

Week 10 ***Imposter Syndrome***

10/30 Activity/Discussion: The instructor will define impostor syndrome. Examples of the impostor syndrome from the first three chapters of *Black Man in a White Coat* will be highlighted. Students will lead the discussion on times that they have felt the impostor syndrome at Duke or have seen it in action. Students will identify times on campus where this feeling is the strongest and times where they feel especially empowered. Students will be encouraged to develop strategies to come with the impostor syndrome and resources at Duke will be provided when necessary. Special consideration will be made for the impostor syndrome in science in particular.

At the end of class, a brief overview of a personal statement will be given to prepare students for their homework.
Reflection Prompt: What aspect of *Black Man in a White Coat* has struck you so far? Can you relate to Dr. Tweedy's experiences?
Readings (67pgs):
Black Man in a White Coat, Damon Tweedy, M.D. (Chapters 1-3)

Week 11 ***Summer Applications Workshop***

11/06 Activity/Discussion: The entire class period will be devoted to preparing summer applications for research opportunities. Many students miss deadlines for these opportunities because they are so early in the academic year. Students will learn various options available to them at Duke for performing summer research as well as other REI programs that they may apply for. Students will get together in pairs and edit each other's personal statements. Students will discuss best practices for personal statements and will have time to workshop theirs. Students will have the opportunity to ask questions about asking for recommendation letters, how funding works, and where/how to apply to different programs.
Readings (75pgs): *Black Man in a White Coat* (Chapters 4-6), Personal Statement Draft 1

Week 12 ***Damon Tweedy***

11/13* Activity/Discussion: Damon Tweedy, M.D. will come give a talk to students about his book that they have read. Students are required to attend and are expected to ask thoughtful, engaging questions. Questions should be relevant to course topics as well as to specifics of Dr. Tweedy's memoir. Two questions should be submitted before the start of class on 11/13. Each person should ask at least one question.
Reflection Prompt: What were your main take-aways from this talk? What did Dr. Tweedy say that stuck you most? What are some ways that you could incorporate him into your network?
Readings (71pgs): *Black Man in a White Coat* (Chapters 7-10), Two questions

Week 13 ***Panel Discussion***

11/20 Activity/Discussion: Graduate students will be asked to come to speak about their research and scientific journey to students. Each student is

expected to ask at least one question. After students leave, we will have a discussion about how to follow up with different students and ways to craft follow-up emails. Students are expected to come prepared to listen and take notes on important points that panelists make. Questions should be centered around course topics or their personal ambitions.
Reflection Prompt: Which panelist did you relate to the most? Why? What questions could you ask to follow up with the person or people that you most related to? How could you incorporate them into your network?
Readings: Personal Statement Draft 2, Work on Final Presentation

Week 14
November 25th-29th THANKSGIVING NO CLASS

Week 15 ***Final Presentations***

12/04 Assignment: Final projects will be due on the last day of classes. Each student will be expected to prepare a presentation for their peers on the major points in their presentation. This presentation and class attendance are mandatory and a part of the final grade.
Prompt: (1500 words) Why science? What about science makes you passionate, makes you excited, or makes you happy? Why are you spending your Duke career learning what you are learning? What aspects about your story, life, journey, or personality attract you to science? How can you hold onto this passion going forward? Incorporate one aspect of this class that has helped you answer one of these questions.

* assignments require extra time spent outside class, readings have been shortened.
Paper denotes scientific papers are being read.
-papers will be primary scientific literature from reputable journals.