Diversity, Equity, & Inclusion in STEM: The Science Behind Bias seminar

ENTOM 4040

Corrie Moreau

Fall 2020, 1 credit

**COURSE DESCRIPTION**

In this seminar course we will discuss the historical context of bias and exclusion in science, read from and discuss the primary literature to understand the science of bias and why it is present and how it has continued to persist across the Science, Technology, Engineering, and Mathematics (STEM) fields, and identify actionable items to address and overcome these issues.

**Instructor:**

Dr. Corrie Moreau

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**Course collaborators:**

Andrea (Drea) Darby (Entomology graduate student): amd439@cornell.edu

Amelia-Juliette Demery (Ecology & Evolutionary Biology graduate student): acd254@cornell.edu

**Discussion seminars:**

Wednesdays 10:20-11:10am

Remote/Online via Zoom

**READING DISCUSSION TOPICS:**

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| **Topics to be read and discussed (specific readings listed below)** |
| Historical racism in STEM – Origins of the concept of race |
| Historical racism in STEM – Experimentation on groups |
| Historical racism in STEM – Eugenics |
| Data and bias against Women In STEM |
| Data and bias against LGBTQIA+ in STEM |
| Data and bias against people of color in STEM |
| Data and bias against people with disabilities in STEM |
| Data and bias against first generation and low-income people in STEM |
| Systemic racism, bias and exclusion in STEM |
| Progress on reducing racism, bias, and exclusion in STEM |
| Identify actionable steps to achieve equity and inclusion in STEM |

**COURSE READING SCHEDULE:**

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| **Date (Wednesday)** | **Readings and Media Assignments** |
| September 2nd | Topic 1- Introduction, ground rules, definitions, structure forward (presentation by instructors – no reading assignment) |
| September 9th | Topic 2 - Historical racism in STEM – Origins of the concept of race1. Hudson (1996) From “Nation” to “Race”: The origin of racial classification in eighteenth-century thought. *Eighteenth-Century Studies* 29(3): 247-264. [[link](https://www-jstor-org.proxy.library.cornell.edu/stable/30053821?seq=1#metadata_info_tab_contents)]
2. Govier (1999) The Royal Society, Slavery and the island of Jamaica: 1660-1700. *Notes Rec. R. Soc. Lond*. 53(2): 203-217. [[link](https://royalsocietypublishing.org/doi/10.1098/rsnr.1999.0075)]
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| September 16th | Topic 3 - Historical racism in STEM – Experimentation on groups1. Sartin (2004) J. Marion Sims, the father of gynecology: hero or villain? *Southern Medical Journal* 97(5): 500-505. [[link](https://insights-ovid-com.proxy.library.cornell.edu/article/00007611-200405000-00017)]
2. Prather et al. (2018) Racism, African American, and their sexual and reproductive health: a review of historical and contemporary evidence and implications of health equity. *Health Equity* 2(1): 249-259. [[link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6167003/)]
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| September 23rd | Topic 4 - Historical racism in STEM – Eugenics1. Online video assignment (10 minute expert of “The Gene – an intimate history” by Ken Burns on PBS): <https://tinyurl.com/y8dwjb94>
2. Friedmann (2019) Genetic therapies, human genetic enhancement, and … eugenics? *Gene Therapy* 26: 351-353. [[link](https://www.nature.com/articles/s41434-019-0088-1)]
3. Hill et al. (2019) Genome-wide analysis identifies molecular systems and 149 genetic loci associated with income. *Nature Communications* 10: e5741. [[link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6915786/)]
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| September 30th | Topic 5 - Data and bias against Women In STEM1. Holman et al. (2018) The gender gap in science: how long until women are equally represented? *PLOS Biol*. 16(4) e2004956. [[link](https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.2004956)]
2. Leavy (2018) Gender bias in artificial intelligence: the need for diversity and gender theory in machine learning. *2018 ACM/IEEE 1st International Workshop on Gender Equality in Software Engineering* pp. 14-16. [[link](https://ieeexplore.ieee.org/document/8452744)]
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| October 7th | Topic 6 - Data and bias against LGBTQIA+ in STEM1. Broockman et al. (2016) Durably reducing transphobia: a field experiment on door-to-door canvassing. *Science* 352(6282): 220-224. [[link](https://science-sciencemag-org.proxy.library.cornell.edu/content/352/6282/220.full)]
2. Jabbour et al. (2020) Robust evidence for bisexual orientation among men. *PNAS* 117(31): 18369-18377. [[link](https://www.pnas.org/content/117/31/18369)]
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| October 14th | *No class – University break* |
| October 21st | Topic 7 - Data and bias against people of color in STEM1. Hofstra et al. (2020) The diversity-innovation paradox in science. *PNAS* 117(17): 9284-9291. [[link](https://www.pnas.org/content/117/17/9284.short?rss=1)]
2. Hoppe et al. (2019) Topic choice contributes to the lower rate of NIH awards to African-American/Black scientists. *Science Advances* 5: eaaw7238. [[link](https://advances.sciencemag.org/content/5/10/eaaw7238)]
3. Why Asian Americans are not the Model Minority - Alice Li – TEDx Talks (10:35 minutes): <https://youtu.be/87QkjfUEbz4>
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| October 28th | Topic 8 - Data and bias against first generation and low-income people and people with disabilities in STEM1. Douglass & Thomson (2008) The poor and the rich: a look at economic stratification and academic performance among undergraduate students in the United States. *CSHE Research & Occasional Paper Series* 15(8): 1-20. [[link](https://cshe.berkeley.edu/sites/default/files/publications/rops-jd-gt-poorrich-10-8-08.pdf)]
2. Lee (2011) A comparison of postsecondary science, technology, engineering, and mathematics (STEM) enrollment for students with and without disabilities. *Career Development for Exceptional Individuals* 34(2): 72-82. [[link](https://journals-sagepub-com.proxy.library.cornell.edu/doi/abs/10.1177/0885728810386591)]
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| November 4th | Topic 9 - Systematic racism, bias and exclusion in STEM1. Miller & Roksa (2020) Balancing research and service in academia: gender, race, and laboratory tasks. *Gender & Society* 34(1): 131-152. [[link](https://journals-sagepub-com.proxy.library.cornell.edu/doi/full/10.1177/0891243219867917)]
2. Ma et al. (2019) Women who win prizes get less money and prestige. *Nature* 565: 287-288. [[link](https://www.nature.com/articles/d41586-019-00091-3)]
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| November 11th | *No class – Entomology conference* |
| November 18th | *No class – Semi-finals week* |
| November 25th | *No class – Thanksgiving break* |
| December 2nd | Topic 10 - Progress on reducing racism, bias, and exclusion in STEM1. Bentley et al. (2017) Diversity and inclusion in genomic research: why the uneven progress? *Journal of Community Genetics* 8: 255-266. [[link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5614884/)]
2. Jimenez et al. (2019) Underrepresented faculty play a disproportionate role in advancing diversity and inclusion. *Nature Ecology & Evolution* 3: 1030-1033. [[link](https://www.nature.com/articles/s41559-019-0911-5?proof=t)]
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| December 9th | Topic 11 - Identify actionable steps to achieve equity and inclusion in STEM part 11. Cooper et al. (2020) Fourteen recommendations to create a more inclusive environment for LGBTQ+ individuals in academic biology. *CBE – Life Sciences Education* 19(es6): 1-18. [[link](https://www.lifescied.org/doi/pdf/10.1187/cbe.20-04-0062)]
2. Schell et al. (2020). Recreating Wakanda by promoting Black excellence in ecology and evolution. *Nature Ecology & Evolution* pp. 1-3. [[link](https://www.nature.com/articles/s41559-020-1266-7)]
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| December 16th | Topic 12 - Identify actionable steps to achieve equity and inclusion in STEM part 21. Chapman (2019) “Rendering the invisible visible: student success in exclusive excellence in STEM environments” Ch. 2 in *Diversifying STEM: Multidisciplinary Perspectives on Race and Gender* pp. 36-52. [[link](https://drive.google.com/file/d/16OBC-mDHiFni6RHmcP0Vyyq59mhinNGY/view?usp=sharing)]
2. Smith et al. (2015) Seven actionable strategies for advancing women in science, engineering, and medicine. *Cell Stem Cell* 16: 221-224. [[link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4476252/)]
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**GRADING:**

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| **Activity** | **Percent of final grade** |
| Discussion participation | 70 |
| Leading discussion reading | 30 |

**COURSE AIMS AND OUTCOMES**

In this course participants will learn about the history of racism, exclusion, and bias in Science, Technology, Engineering, and Mathematics (STEM) and how it continues to persist today. Students will learn how to assess primary scientific literature and present these findings to the class. We will identify actions we can each implement as individuals, as well as steps institutions can take, to decrease bias and promote equity and inclusion.

**COURSE STRUCTURE**

Each week we will assign a 2-3 papers or other form of media around a topic. We will come together to discuss the readings or assignment. We will discuss as a group and in smaller breakout rooms. We will have those students formally enrolled in the course sign up for a week/topic and as a group come up with a list of discussion questions based on the assigned readings/media.

**ACADEMIC INTEGRITY**

Each student in this course is expected to abide by the [Cornell University Code of Academic Integrity](https://www.library.cornell.edu/research/citation/code). Any work submitted by a student in this course for academic credit will be the student's own work.

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. One great way to assess what you know is to teach the idea to a peer! You may also work together on problem sets and give "consulting" help to or receive "consulting" help from your peers. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in any form (e.g. email, Word doc, Box file, Google sheet, or a hard copy). Assignments that have been previously submitted in another course may not be submitted for this course.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam and may lead to failure of the course and University disciplinary action.

**ACCOMMODATION FOR STUDENTS WITH DISABILITIES**

Cornell University is committed to ensuring access to learning opportunities for all students. Student Disability Services (SDS) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you are registered with SDS and have a faculty notification letter for this semester, please contact me [Head TA, Course Coordinator] early in the semester to review how the accommodations will be applied in the course. If you have an immediate access need, please see me after class.

If you have, or think you may have, a disability, please contact the SDS office to arrange a confidential discussion regarding equitable access and reasonable accommodations.

Students with short-term disabilities, such as a broken arm, can often work with instructors to minimize classroom barriers. In situations where additional assistance is needed, students should contact the SDS as noted above.

If you are registered with SDS and have questions or concerns about your accommodations, please contact your SDS Counselor. Student Disability Services is located at Cornell Health Level 5, 110 Ho Plaza, 607-254-4545, [sds.cornell.edu](http://sds.cornell.edu/).

**INCLUSIVITY STATEMENT**

We understand that our members represent a rich variety of backgrounds and perspectives. The [program/department name] program/department is committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

* Share their unique experiences, values, and beliefs.
* Be open to the views of others.
* Honor the uniqueness of their colleagues.
* Appreciate the opportunity that we have to learn from each other in this community.
* Value each other’s opinions and communicate in a respectful manner.
* Keep confidential discussions that the community has of a personal (or professional) nature.
* Stories stay, lessons leave
* Use “I” statements
* Take Space, Make Space
* Accept that things may remain unresolved
* Embrace discomfort, but take a moment if you need it
* If you feel yourself getting angry or defensive, ask yourself why.
* You will make mistakes and apologize if you do (it is not about your intent it is about your impact)
* Take ownership of your words and actions. This is a good way to act with more intention and consideration of others in the classroom.
* Use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the Cornell community.