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

ENTOM 4040

Corrie Moreau

Spring 2022, 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 10:10-11:00am

Remote classes on Zoom for first two weeks

Location Comstock Hall B108

**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**

We have tried to be mindful of religious holidays of all faiths, but if you need to miss a class due to a religious holiday please let the course instructor know ahead of time.

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| **Date (Wednesday)** | **Readings and Media Assignments** |
| January 26th – Remote class | Topic 1- Introduction, ground rules, definitions, structure forward (presentation by instructors – no reading assignment) |
| February 2nd – Remote class | 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. Hoffman et al. (2016) Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. PNAS 113(16): 4296-4301. [[link](http://www.pnas.org/cgi/doi/10.1073/pnas.1516047113)]
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| February 9th  | 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/)]
3. Santos (2008) Genetic Research in Native Communities. *Progress in Community Health Partnerships* 2(4): 321-327. [[link](https://muse.jhu.edu/article/260199)]
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| February 16th  | 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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| February 23rd | Topic 5 - Data and bias against Women In STEM1. Huang et al. (2020) Historical comparison of gender inequality in scientific careers across countries and disciplines. *PNAS* 17(9): 4609-4616. [[link](https://www.pnas.org/content/117/9/4609)]
2. McKinnon & O’Connell (2020) Perceptions of stereotypes applied to women who publicly communicate their STEM work. *Humanit Soc Sci Commun* 7: 160. [[link](https://www.nature.com/articles/s41599-020-00654-0#citeas)]
3. 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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| March 2nd  | 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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| March 9th  | Topic 7 - Data and bias against people of color in STEM part 11. 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. Fani et al. (2021) Association of Racial Discrimination With Neural Response to Threat in Black Women in the US Exposed to Trauma. *JAMA Psychiatry*. 2021;78(9):1005-1012. [[link](https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2782454?utm_campaign=articlePDF&utm_medium=articlePDFlink&utm_source=articlePDF&utm_content=jamapsychiatry.2021.1480)]
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| March 16th  | Topic 8 - Data and bias against people of color in STEM part 21. Wu & Jing (2011) Asian Women in STEM Careers: An Invisible Minority in a Double Bind. *Issues in Science and Technology* 28(1): 1-10. [[link](https://issues.org/realnumbers-asian-women-stem-careers/)]
2. Shivaram (2021) Southeast Asians are underrepresented in STEM. The label 'Asian' boxes them out more. NPR [[link](https://www.npr.org/2021/12/12/1054933519/southeast-asian-representation-science)]
3. Online video assignment: Why Asian Americans are not the Model Minority - Alice Li – TEDx Talks (10:35 minutes): <https://youtu.be/87QkjfUEbz4>
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| March 23rd  | Topic 9 - 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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| March 30th  | Topic 10 – 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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| April 6th | *No class – Spring break* |
| April 13th  | Topic 11 - Systematic racism and code switching [short presentation by Drea Darby]1. McCluney et al. (2021) To be, or not to be...Black: The effects of racial codeswitching on perceived professionalism in the workplace. *Journal of Experimental Social Psychology* 97 (2021) 104199. [[link](https://www.sciencedirect.com/science/article/abs/pii/S0022103121001025?via%3Dihub)]
2. Opie & Phillips (2015) Hair penalties: the negative influence of Afrocentric hair on ratings of Black women’s dominance and professionalism. *Front. Psychol.* 6:1311. [[link](https://www.frontiersin.org/articles/10.3389/fpsyg.2015.01311/full)]
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| April 20th  | Topic 12 - 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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| April 27th  | Topic 13 Identify actionable steps to achieve equity and inclusion in STEM part 1[short presentation by Amelia Demery]1. 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)]
3. Demery & Pipkin (2020) Safe fieldwork strategies for at-risk individuals, their supervisors and institutions. Nature Ecology & Evolution 5: 5-9. [[link](https://www.nature.com/articles/s41559-020-01328-5)]
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| May 4th  | Topic 14 - 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 | 50 |
| Leading discussion reading | 25 |
| Final project (due the last day of class) | 25 |

**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. Students will also complete a final project\* (one page maximum with additional pages for references if needed) due the last day of class where they either 1) write a short reflection essay about a topic they choose related to the course content or 2) outline their personal commitments to continue to create equitable and inclusive spaces in STEM. \*If you are auditing the course this is optional.

**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.

**LAND ACKNOWLEDGEMENT**

Cornell University is located on the traditional homelands of the Gayogo̱hó꞉nǫ' (the Cayuga Nation). The Gayogo̱hó꞉nǫ' are members of the Haudenosaunee Confederacy, an alliance of six sovereign Nations with a historic and contemporary presence on this land. The Confederacy precedes the establishment of Cornell University, New York state, and the United States of America. We acknowledge the painful history of Gayogo̱hó꞉nǫ' dispossession, and honor the ongoing connection of Gayogo̱hó꞉nǫ' people, past and present, to these lands and waters.

This land acknowledgment has been reviewed and approved by the traditional Gayogo̱hó꞉nǫ' leadership.

In addition to the Gayogo̱hó꞉nǫ' land acknowledgment but separate from it, the AIISP faculty would like to emphasize: Cornell's founding was enabled in the course of a national genocide by the sale of almost one million acres of stolen Indian land under the Morrill Act of 1862. To date the university has neither officially acknowledged its complicity in this theft nor has it offered any form of restitution to the hundreds of Native communities impacted. For additional information, see the [Cornell University and Indigenous Dispossession website here](https://blogs.cornell.edu/cornelluniversityindigenousdispossession/).

### MENTAL HEALTH AND STRESS MANAGEMENT RESOURCES

If you are feeling overwhelmed, or are worried about a friend, please reach out to one of your instructors or your academic advisor. We can try to help or we can put you in touch with someone who can help. Cornell has trained counselors available to listen and help: [Empathy, Assistance, and Referral Service](http://orgsync.rso.cornell.edu/org/ears) (213 Willard Straight Hall, 607-255-3277), [Cornell Health's Counseling and Psychological Services](https://health.cornell.edu/services/counseling-psychiatry) (CAPS, 607-255-5155), and [Let’s Talk](https://health.cornell.edu/services/counseling-psychiatry/lets-talk). The [Learning Strategies Center](http://lsc.cornell.edu/) offers a range of academic resources.