

**Diversity, Equity, & Inclusion in STEM: The Science Behind Bias seminar**  
ENTOM 4040  
Corrie Moreau  
Spring 2024, 1 credit

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### **COURSE DESCRIPTION**

In this seminar course we will discuss the historical context of bias, racism, 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.

#### **Instructors:**

Dr. Corrie Moreau  
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#### **Discussion seminars:**

Wednesdays 11:15am-12:05pm  
Location Comstock Hall 2123

### **READING DISCUSSION TOPICS**

<b>Topics to be read and discussed (specific readings listed below)</b>
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 instructors know ahead of time.

Date (Wednesday)	Readings and Media Assignments
January 24 <sup>th</sup>	Topic 1- Introduction, ground rules, definitions, structure forward (presentation by instructors – no reading assignment)
January 31 <sup>st</sup>	Topic 2 - Historical racism in STEM – Origins of the concept of race 1) Online video assignment: “The Origin of Race in the USA”: <a href="https://www.youtube.com/watch?v=CVxAlmAPHec&amp;t=560s">https://www.youtube.com/watch?v=CVxAlmAPHec&amp;t=560s</a> 2) Online video assignment: “Crania Americana -the most important book in the history of scientific racism”: <a href="https://www.youtube.com/watch?v=mMVzPCOutlw&amp;t=62s">https://www.youtube.com/watch?v=mMVzPCOutlw&amp;t=62s</a> 3) Hoffman et al. (2016) Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. <i>PNAS</i> 113(16): 4296-4301. <a href="#">[link]</a>
February 7 <sup>th</sup>	Topic 3 - Historical racism in STEM – Experimentation on groups 1) Sartin (2004) J. Marion Sims, the father of gynecology: hero or villain? <i>Southern Medical Journal</i> 97(5): 500-505. <a href="#">[link]</a> 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. <i>Health Equity</i> 2(1): 249-259. <a href="#">[link]</a> 3) Santos (2008) Genetic Research in Native Communities. <i>Progress in Community Health Partnerships</i> 2(4): 321-327. <a href="#">[link]</a>
February 14 <sup>th</sup>	Topic 4 - Historical racism in STEM – Eugenics 1) Online video assignment (10 minute expert of “The Gene – an intimate history” by Ken Burns on PBS): <a href="https://tinyurl.com/y8dwjb94">https://tinyurl.com/y8dwjb94</a> 2) Friedmann (2019) Genetic therapies, human genetic enhancement, and ... eugenics? <i>Gene Therapy</i> 26: 351-353. <a href="#">[link]</a> 3) Hill et al. (2019) Genome-wide analysis identifies molecular systems and 149 genetic loci associated with income. <i>Nature Communications</i> 10: e5741. <a href="#">[link]</a>
February 21 <sup>st</sup>	Topic 5 - Data and bias against Women In STEM 1) Huang et al. (2020) Historical comparison of gender inequality in scientific careers across countries and disciplines. <i>PNAS</i> 17(9): 4609-4616. <a href="#">[link]</a> 2) McKinnon & O’Connell (2020) Perceptions of stereotypes applied to women who publicly communicate their STEM work. <i>Humanit Soc Sci Commun</i> 7: 160. <a href="#">[link]</a> 3) Leavy (2018) Gender Bias in Artificial Intelligence: The Need for Diversity and Gender Theory in Machine Learning.

	<i>ACM/IEEE 1st International Workshop on Gender Equality in Software Engineering</i> pp. 14-16. [ <a href="#">link</a> ]
February 28 <sup>th</sup>	<p>Topic 6 - Data and bias against LGBTQIA+ in STEM</p> <ol style="list-style-type: none"> <li>1) Broockman et al. (2016) Durably reducing transphobia: a field experiment on door-to-door canvassing. <i>Science</i> 352(6282): 220-224. [<a href="#">link</a>]</li> <li>2) Jabbour et al. (2020) Robust evidence for bisexual orientation among men. <i>PNAS</i> 117(31): 18369-18377. [<a href="#">link</a>]</li> </ol>
March 6 <sup>th</sup>	<p>Topic 7 - Data and bias against people of color in STEM part 1</p> <ol style="list-style-type: none"> <li>1) Hofstra et al. (2020) The diversity-innovation paradox in science. <i>PNAS</i> 117(17): 9284-9291. [<a href="#">link</a>]</li> <li>2) Hoppe et al. (2019) Topic choice contributes to the lower rate of NIH awards to African-American/Black scientists. <i>Science Advances</i> 5: eaaw7238. [<a href="#">link</a>]</li> <li>3) Birhane (2022) The unseen Black faces of AI algorithms. <i>Nature</i> 610: 451-452. [<a href="#">link</a>]</li> </ol>
March 13 <sup>th</sup>	<p>Topic 8 - Data and bias against people of color in STEM part 2</p> <ol style="list-style-type: none"> <li>1) Wu &amp; Jing (2011) Asian Women in STEM Careers: An Invisible Minority in a Double Bind. <i>Issues in Science and Technology</i> 28(1): 1-10. [<a href="#">link</a>]</li> <li>2) Shivaram (2021) Southeast Asians are underrepresented in STEM. The label 'Asian' boxes them out more. NPR [<a href="#">link</a>]</li> <li>3) Online video assignment: Why Asian Americans are not the Model Minority - Alice Li – TEDx Talks (10:35 minutes): <a href="https://youtu.be/87QkjfUEbz4">https://youtu.be/87QkjfUEbz4</a></li> </ol>
March 20 <sup>th</sup>	<p>Topic 9 - Data and bias against first generation and low-income people and people with disabilities in STEM</p> <ol style="list-style-type: none"> <li>1) Douglass &amp; Thomson (2008) The poor and the rich: a look at economic stratification and academic performance among undergraduate students in the United States. <i>CSHE Research &amp; Occasional Paper Series</i> 15(8): 1-20. [<a href="#">link</a>]</li> <li>2) Lee (2011) A comparison of postsecondary science, technology, engineering, and mathematics (STEM) enrollment for students with and without disabilities. <i>Career Development for Exceptional Individuals</i> 34(2): 72-82. [<a href="#">link</a>]</li> </ol>
March 27 <sup>th</sup>	<p>Topic 10 – Systematic racism, bias and exclusion in STEM</p> <ol style="list-style-type: none"> <li>1) Miller &amp; Roksa (2020) Balancing research and service in academia: gender, race, and laboratory tasks. <i>Gender &amp; Society</i> 34(1): 131-152. [<a href="#">link</a>]</li> <li>2) Ma et al. (2019) Women who win prizes get less money and prestige. <i>Nature</i> 565: 287-288. [<a href="#">link</a>]</li> </ol>
April 3 <sup>rd</sup>	<i>No class – Spring break</i>
April 10 <sup>th</sup>	<p>Topic 11 - Systematic racism and code switching</p> <ol style="list-style-type: none"> <li>1) McCluney et al. (2021) To be, or not to be...Black: The effects of racial codeswitching on perceived professionalism in the workplace. <i>Journal of Experimental Social Psychology</i> 97</li> </ol>

	<p>(2021) 104199. <a href="#">[link]</a></p> <p>2) Opie &amp; Phillips (2015) Hair penalties: the negative influence of Afrocentric hair on ratings of Black women’s dominance and professionalism. <i>Front. Psychol.</i> 6:1311. <a href="#">[link]</a></p>
April 17 <sup>th</sup>	<p>Topic 12 - Progress on reducing racism, bias, and exclusion in STEM</p> <p>1) Bentley et al. (2017) Diversity and inclusion in genomic research: why the uneven progress? <i>Journal of Community Genetics</i> 8: 255-266. <a href="#">[link]</a></p> <p>2) Yang et al. (2022) Gender-diverse teams produce more novel and higher-impact scientific ideas. <i>PNAS</i> 119: 1-8. <a href="#">[link]</a></p> <p>3) Jimenez et al. (2019) Underrepresented faculty play a disproportionate role in advancing diversity and inclusion. <i>Nature Ecology &amp; Evolution</i> 3: 1030-1033. <a href="#">[link]</a></p>
April 24 <sup>th</sup>	<p>Topic 13 Identify actionable steps to achieve equity and inclusion in STEM part 1</p> <p>1) Cooper et al. (2020) Fourteen recommendations to create a more inclusive environment for LGBTQ+ individuals in academic biology. <i>CBE – Life Sciences Education</i> 19(es6): 1-18. <a href="#">[link]</a></p> <p>2) Schell et al. (2020). Recreating Wakanda by promoting Black excellence in ecology and evolution. <i>Nature Ecology &amp; Evolution</i> pp. 1-3. <a href="#">[link]</a></p> <p>3) Demery &amp; Pipkin (2020) Safe fieldwork strategies for at-risk individuals, their supervisors and institutions. <i>Nature Ecology &amp; Evolution</i> 5: 5-9. <a href="#">[link]</a></p>
May 1 <sup>st</sup>	<p>Topic 14 - Identify actionable steps to achieve equity and inclusion in STEM part 2</p> <p>1) Smith et al. (2015) Seven actionable strategies for advancing women in science, engineering, and medicine. <i>Cell Stem Cell</i> 16: 221-224. <a href="#">[link]</a></p> <p>2) Mays et al. (2023) Juneteenth in STEMM and the barriers to equitable science. <i>Cell</i> 186: 2510-2517. <a href="#">[link]</a></p>

## GRADING

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 groups and 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 groups. We will have students in the course sign up for a week/topic and develop a list of discussion questions based on the assigned readings/media. Students enrolled in the course 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](#). 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](https://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 Gayogohó:nq' (the Cayuga Nation). The Gayogohó:nq' 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 Gayogohó:nq' dispossession, and honor the ongoing connection of Gayogohó:nq' people, past and present, to these lands and waters.

This land acknowledgment has been reviewed and approved by the traditional Gayogohó:nq' leadership.

In addition to the Gayogohó:nq' 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](#).

#### **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](#) (213 Willard Straight Hall, 607-255-3277), [Cornell Health's Counseling and Psychological Services](#) (CAPS, 607-255-5155), and [Let's Talk](#). The [Learning Strategies Center](#) offers a range of academic resources.-