

# **Deconstructing Systemic Bias: Where Biology Ends and Bias Begins**

GMS GE 706

Spring 2023

Tuesdays 1:00 pm to 2:50 pm

## **Course description:**

This course will help students explore the relationship between race, ethnicity, ancestry, sex, gender, ability status, and identity. Students will also gain understanding of the fundamentals of human population variation at the genetic level and will demonstrate how this information has been misused in the form of “scientific racism.” These principles will be used to examine the impact of underrepresentation in scientific studies and cases in which scientific racism and bias have caused harm to marginalized groups. To integrate this knowledge, students will debunk misapplication of these concepts in examples of racism and other forms of bias where biological principles are misrepresented.

## **Course Learning Objectives**

By the end of this course, students should be able to:

1. Contrast the biological descriptions of ancestry, sex, disability, and other traits with conflated concepts of race, gender, and traits influenced by systemic inequalities.
2. Apply an understanding of human population genetic variation to inclusion in scientific studies and healthcare practices.
3. Connect the historical context of eugenics to modern practice.
4. Understand the intersectionality of science and policy.
5. Debunk common errors in science communication about these topics.

## **Course Instructor:**

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## **Grading:**

This course will be graded on a pass/fail basis. The intention behind grades in this course is to encourage you to attend each session. Students are asked to attend at least 10 of the 12 core sessions, and completion of the final presentation is also required. This grading allows flexibility for you as a student in cases of emergency, but we ask that students plan to attend all classes as we will build upon prior content.

All reading materials will be posted to Blackboard, and completion of readings prior to classes is essential to participation in class discussions. We expect professionalism and respect for peers during in class discussions.

### *Illness, Attendance, and Deadlines*

We are all delighted to hold classes in person this year for all of our students. However, we also recognize that we are not able to completely eliminate risk to zero, and students/faculty may be exposed in classroom or other environments. To protect the health of our learning community, we ask you to be prudent and isolate yourself if you exhibit any symptoms of illness. We assure you that there will be no penalties for staying home when feeling ill, deadlines can be extended for classroom assignments, and arrangements can be made with respect to discussions. Please keep faculty apprised of your wellness so that we can help you all. We are all in this together!

### *Student Support*

As we continue to live through this pandemic, please know that students are encouraged to keep Dr. Dasgupta informed when situations (related to the pandemic or otherwise) arise that impact your ability to keep up with class. We have many resources to help, some of which are listed on the GMS Student Life and Wellness pages here:

<https://www.bumc.bu.edu/gms/student-life/>

<https://www.bumc.bu.edu/gms/student-life/wellness/>

### *Final project*

The final project is designed to give students an opportunity to apply what we have learned to examples of bias in the media or to examples of emerging technologies with the capacity to amplify inequities. Each student team will be able to choose their own topic and will either debunking myths that are propagated by the media or will consider the potential harms of emerging technologies in their presentation. Each presentation will be 10 minutes long.

### *Boston University and GMS academic conduct codes*

<https://www.bu.edu/academics/policies/academic-conduct-code/>

[https://www.bumc.bu.edu/gms/files/2010/05/GMS-Academic-Conduct-Code-and-Disciplinary-Procedures-08\\_10\\_15-amended-5-21-18.pdf](https://www.bumc.bu.edu/gms/files/2010/05/GMS-Academic-Conduct-Code-and-Disciplinary-Procedures-08_10_15-amended-5-21-18.pdf)

<b>Session</b>	<b>Class</b>
Session 1	<p><b>1. Introduction to Origins of Bias and Humane Genetics, Part I</b> Neuroscience of bias, measuring bias, Biology of human populations (race vs. ancestry)</p> <p>Project Implicit <a href="http://implicit.harvard.edu">http://implicit.harvard.edu</a></p>
Session 2	<p><b>2. Humane Genetics, Part II and Racism</b> Biology of human populations, the social construction of race</p> <p>Hoffman KM, Trawalter S, Axt JR, Oliver MN. Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. <i>Proc Natl Acad Sci U S A</i>. 2016 Apr 19;113(16):4296-301. doi: 10.1073/pnas.1516047113.</p> <p>Harmon A. James Watson Had a Chance to Salvage His Reputation on Race. He Made Things Worse. <i>NY Times</i>. 2019 Jan 1. <a href="https://www.nytimes.com/2019/01/01/science/watson-dna-genetics-race.html">https://www.nytimes.com/2019/01/01/science/watson-dna-genetics-race.html</a></p>
Session 3	<p><b>3. Sex and Gender</b> Biology of sex determination, women and gender expansive folks in STEM and athletics</p> <p>Hemel DJ. Summers' Comments on Women and Science Draw Ire. <i>Harvard Crimson</i>. 2005 January 14. <a href="https://www.thecrimson.com/article/2005/1/14/summers-comments-on-women-and-science/">https://www.thecrimson.com/article/2005/1/14/summers-comments-on-women-and-science/</a></p> <p>Barres, BA. Does Gender Matter? <i>Nature</i>. 2006 July. 442: 133-136. <a href="https://www.nature.com/scitable/content/does-gender-matter-by-ben-a-barres-10602856/">https://www.nature.com/scitable/content/does-gender-matter-by-ben-a-barres-10602856/</a></p> <p>Personal Genetics Education Project. Sex, Gender, and Genetics. <a href="http://pged.org/wp-content/uploads/2019/05/InfoBrief-SexGenderGenetics.pdf">http://pged.org/wp-content/uploads/2019/05/InfoBrief-SexGenderGenetics.pdf</a></p>
Session 4	<p><b>4. Pregnancy, Bodily Autonomy, and Reproductive Justice</b> Timing of genetic testing relative to reproductive healthcare and emerging restrictions</p> <p>McGowan M, Randaney A, and Mutcherson K. Impact of SCOTUS's Dobbs Decision on Prenatal Genomics Research and Practice. <i>ELSI Hub</i>. 2022 June 17. <a href="https://elsihub.org/video/impact-scotuss-dobbs-decision-prenatal-genomics-research-and-practice">https://elsihub.org/video/impact-scotuss-dobbs-decision-prenatal-genomics-research-and-practice</a></p> <p>Badger E, Sanger-Katz M, Miller, CC. States With Abortion Bans Are Among Least Supportive for Mothers and Children. <i>NY Times</i>. 2022 July 28. <a href="https://www.nytimes.com/2022/07/28/upshot/abortion-bans-states-social-services.html">https://www.nytimes.com/2022/07/28/upshot/abortion-bans-states-social-services.html</a></p>
Session 5	<p><b>5. Disability</b> Who defines normal, Project Inclusive Genetics, Disability Culture: Achondroplasia, Deafness</p> <p>E Vaimberg, L Demers, E Ford, M Sabatello, B Stevens, and S Dasgupta (2021) <i>Project Inclusive Genetics: Exploring the Impact of Patient-Centered Counseling</i></p>

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Training on Physical Disability Bias in the Prenatal Setting. PLOS ONE. <https://doi.org/10.1371/journal.pone.0255722>.

Sanghavi DM. Wanting Babies Like Themselves, Some Parents Choose Genetic Defects. NY Times. 2006 Dec 5. <https://www.nytimes.com/2006/12/05/health/05essa.html>

Ciesemier K. Leave My Disability Out of Your Anti-Abortion Propaganda. NY Times. 2022 July 31. <https://www.nytimes.com/2022/07/31/opinion/disability-rights-anti-abortion.html>

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Session 6

### **6. What Genetics Doesn't Fully Explain**

Sociogenomics, Educational Attainment, Same Sex Behavior

Coop G, Przeworski M. Lottery, luck, or legacy. A review of "The Genetic Lottery: Why DNA matters for social equality". *Evolution*. 2022 Feb 28;76(4):846–53. doi: 10.1111/evo.14449.

Kaiser J. Genetics may explain up to 25% of same-sex behavior, giant analysis reveals. 2019 Aug 29. *Science*. <https://www.science.org/content/article/genetics-may-explain-25-same-sex-behavior-giant-analysis-reveals>

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### **BU Spring Break**

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Session 7

### **7. Contemporary Eugenics and Its Historical Roots**

Eugenic philosophy, Genetic Superiority and Protection of the Gene Pool Through Forcible Sterilization, Noninvasive Prenatal Screening

Cold Spring Harbor Dolan DNA Learning Center. Eugenics Archive. <http://www.eugenicsarchive.org/eugenics/list3.pl>

Zhang S. The Last Children of Down Syndrome. *The Atlantic*. 2020 December. <https://www.theatlantic.com/magazine/archive/2020/12/the-last-children-of-down-syndrome/616928/>

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Session 8

### **8. Genetics, Privacy, and the Justice System**

Genetic Information Nondiscrimination Act, Privacy, Genetic Genealogy and Detective Work, Genetics and Police Brutality

The Genetic Information Nondiscrimination Act (GINA). <https://www.ashg.org/advocacy/gina/>

Faife C. NJ Police Used Baby DNA to Investigate Crimes, Lawsuit Claims. *The Verge*. 2022 July 29. <https://www.theverge.com/2022/7/29/23283837/nj-police-baby-dna-crimes-lawsuit-public-defender>

La Forgia M and Valentino-DeVries J. How a Genetic Trait in Black People Can Give the Police Cover. *NY Times*. 2021 May 15. <https://www.nytimes.com/2021/05/15/us/african-americans-sickle-cell-police.html>

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Session 9

### **9. Who Gets Left Behind**

Representation in Studies and in the Workforce, Building Trust

Sirugo G, Williams SM, Tishkoff SA. The Missing Diversity in Human Genetic Studies. *Cell*. 2019 Mar 21;177(1):26-31. doi: 10.1016/j.cell.2019.02.048. Erratum in: *Cell*. 2019 May 2;177(4):1080.

Brothers KB, Bennett RL, Cho MK. Taking an antiracist posture in scientific publications in human genetics and genomics. *Genet Med*. 2021 Jun;23(6):1004-

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1007. doi: 10.1038/s41436-021-01109-w

Harmon A. Indian Tribe Wins Fight to Limit Research of Its DNA. NY Times. 2010 April 21. <https://www.nytimes.com/2010/04/22/us/22dna.html>

Thomas SP, Amini K, Jameson Floyd K, Wilard R, Wossenseged F, Keller M, Scott JB, Abdallah KE, Buscetta A, Bonham VL. Cultivating diversity as an ethos with an anti-racism approach in the scientific enterprise. HGG Advances. 2021 Oct 14. 2(4): 100052. <https://www.sciencedirect.com/science/article/pii/S2666247721000336>

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Session 10

**10. Race-Based Medicine**

Ancestry and identity, Race Correction in Medicine

Roberts D. The Problem With Race-Based Medicine. TedMed 2015. [https://www.ted.com/talks/dorothy\\_roberts\\_the\\_problem\\_with\\_race\\_based\\_medicine](https://www.ted.com/talks/dorothy_roberts_the_problem_with_race_based_medicine)

Vyas DA, Eisenstein LG, Jones DS. Hidden in Plain Sight - Reconsidering the Use of Race Correction in Clinical Algorithms. N Engl J Med. 2020 Aug 27;383(9):874-882. doi: 10.1056/NEJMms2004740.

Hobson W. How 'race-norming' was built into the NFL concussion settlement. The Washington Post. 2021 Aug 2. <https://www.washingtonpost.com/sports/2021/08/02/race-norming-nfl-concussion-settlement/>

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Session 11

**11. The Future of Genomic Medicine**

Preimplantation Genetic Diagnosis and Embryo Selection, CRISPR Babies, Gene Therapy, Economic Ramifications and Access

Regalado A. The World's First GATTACA Baby Tests Are Finally Here. MIT Technology Review. 2019 Nov 8. <https://www.technologyreview.com/2019/11/08/132018/polygenic-score-ivf-embryo-dna-tests-genomic-prediction-gattaca/>

Cohen J. Did CRISPR Help – or Harm – the First-Ever Gene-Edited Babies? Science. <https://www.science.org/content/article/did-crispr-help-or-harm-first-ever-gene-edited-babies>

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Session 12

**12. Our Shared Responsibilities and Introducing Final Projects**

Highlighting the need for scientists to communicate plainly the potential impact of their science and introducing students to the concept of applying their knowledge to debunking information

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Session 13

**Final Project Team Brainstorming Session**

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Session 14

**Final Project Reading Period**

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Session 15

**Final Presentations**

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