"A Conversation on Power, Structural Racism, and Perceptions of Normality in STEM Through a Lens of Critical Race Theory"

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Slide 1. Dr. Morton's Current Research Projects
- a. Re-Envisioning Culture: Addressing Black Student Retention in Undergraduate Biology Education
  - i. Twitter: https://twitter.com/REC_Network1
  - ii. Website: https://qubeshub.org/community/groups/recnetwork
    1. Please consider joining the network!
- b. Louis Stokes Regional Center of Excellence for the Study of STEM Interventions
  - i. Project Description: https://www.nsf.gov/awardsearch/showAward?AWD_ID=2020709&HistoricalAwards=false
- c. Transforming the Natural Sciences at Mizzou: Retain, Belong, Lead, THRIVE
  - i. Twitter: https://twitter.com/MuThrive
  - ii. Website: https://education.missouri.edu/learning-teaching-curriculum/thrive/
- d. Critical Race Theory – Dialogic Learning Communities
- e. Black and Brown in STEM

Slide 2. Dr. Morton's Publications
- a. https://linktr.ee/Mortontr

Slide 3. Existing Research Examining STEM Degree Completion – National Statistics
- a. According to the National Science Foundation:
  - i. Approximately 23% of Black students and 28% students entering into college express interests in studying STEM.
  - ii. From 2000 – 2015, 9% of STEM degrees go to Black students and approximately 18% of the degrees go to Latinx student.
  - iii. When looking at the difference between intention to major in STEM vs graduating with a STEM degree, we find that "something" is taking place within their college experience that leads to significant attrition.
- b. Supporting Text:
  - i. National Science Board (2018). Science and engineering indicators 2018. Arlington, VA: National Science Foundation. (NSB-2018-1)
    1. https://www.nsf.gov/statistics/2018/nsb20181/report
  - ii. NSF Science and Engineering Indicators 2020: https://files.eric.ed.gov/fulltext/ED599398.pdf

Slide 4. "Fairy Godmother Approach"

a. When examining existing research as well as current university approaches to addressing the problem with retaining Black and Latinx students in STEM, we find that the majority of the solutions seem "fairy godmother" like where they attempt to "dress up" the individual so that they can meet the needs and expectations of society rather than address structural issues in need of change.

b. This perspective is often rooted in "deficit-mindsets" about Black and Brown students and their capabilities as most of the programs and opportunities are designed in ways to attempt to "give" these students "something they lack" because they are "minorities" or "lesser than" than the standard or norm.

Slide 5.   What is the Connection?

Slide 6.   The Iceberg Model for Systemic Thinking
   a. The need to think deeply about what we are "seeing" when looking at the data and our responses to the circumstances.
       i. Going from addressing the observable "symptoms" to thinking about the "root causes" of the problems in efforts to generate "real" solutions.
   b. Supporting Text:
       i. Iceberg Model: https://ecochallenge.org/iceberg-model

Slide 7.   What Do You See?
   a. In using the "Maleficent story" to discuss differences in how the character can be perceived as either villain (animated version) or activist (live-action version) based on the backstory provided, we have to ask ourselves, "what do we see" when looking at the students entering into our learning spaces and whether or not our perceptions of them (their abilities, capabilities, interests, desires, etc.) account for their full lived experience or solely our individual biases.

Slide 8.   Perception, Perspective, Positioning
   a. Given the way that perception works, connecting back to our philosophies and world views and lived experiences, how we **Perceive** individuals and the extent to which they are "less than" dictates the solutions we develop, how we implement those solutions, how we interact with other people, and how other people respond to us.
   b. How we enter into our work (i.e., research, teaching, service, programming) is based on our perceptions and understandings of life and the overarching philosophical paradigms that ground our perspective of what is and what is not truth, reality, knowledge, etc.

Slide 9.   Who Am I?
   a. Educational Pedigree
       i. North Carolina A&T State University (B.S. Chemistry, 2011)
       ii. University of Miami (M.S. Neuroscience, 2013)
       iii. University of North Carolina at Chapel-Hill (Ph.D. Education, 2017)
   b. Identities
       i. Scientists, Advocate - Activist, Speaker, Civil Servant, Family

Slide 10. Positionality
   a. Shaped by my identities, privileges exposures, commitments, and actions.
      i. Identities: Social identities (e.g., race, gender, religion) and socialization processes.
      ii. Privileges: Educational pedigree
      iii. Exposure: Experiences as a Black man, exposure to others, readings and conversations through graduate school and beyond.
      iv. Commitment: Goals related to racial justice, desire to enact transformative change,
      v. Action: Decision to research Black women in STEM, decision to conduct research that honors, empowers, and promulgates participants from strengths-based perspectives.
   b. Supporting Texts:
      i. Milner IV, H.R. (2007). Race, culture, and research positionality: Working through dangers seen, unseen, and unforeseen. *Educational Researcher, 36*(7), 388-400.
      ii. Patel, S. (2015). The research paradigm – methodology, epistemology and ontology – explained in simple.
      iii. Ridgeway, M.L., & Yerrick, R.K. (2018). Whose banner are we waving? Exploring STEM partnerships for marginalized urban youth. *Cultural Studies of Science Education, 13*, 59-84.

Slide 11. Critical Race Theory and PVEST
   a. Two overarching frameworks that guide my position and perspective, particularly when looking to examine Black and Brown students' STEM experiences.
   b. Critical Race Theory affords the opportunity to critique and examine the structure and the extent to which racism is present and operating within the different STEM environments.
   c. PVEST helps examine the relationship between the external environment and the individual perceptions of and experiences with reality to note how external environments attempt to regulate student experiences and how students have the power (and where they have the power) to determine how to respond to those external cues.
   d. Reference Texts:
      i. Corneille, M., Lee, A., Harris, K.N., Jackson. K.T., & Covington, M. (2020). Developing culturally and structurally responsive approaches to STEM education to advance education equity. *The Journal of Negro Education, 89*(1), 48-57.
      ii. Delgado, R. & Stefancic, J. (2017). *Critical race theory: An introduction* (3rd ed.). New York, NY: New York University Press.
      iii. McGee, E.O. (2020). *Black, Brown, bruised: How racialized STEM education stifles innovation.* Cambridge, MA: Harvard Education Press
      iv. Morton, T.R. (2020). A Phenomenological and ecological perspective on the influence of undergraduate research experiences on Black women's

persistence in STEM at an HBCU. *Journal of Diversity in Higher Education.* DOI: 10.1037/dhe0000183

    v. Morton, T.R., <u>Gee, D.S.,</u> & Woodson, A.N. (2019). Being vs. becoming: Transcending STEM identity development through afropessimism, moving towards a Black X consciousness in STEM. *The Journal of Negro Education, 88*(3), 327-342. DOI: 10.7709/jnegroeducation.88.3.0327

Slide 12. Deep Dive into CRT
- a. Tenets (Key Scholars)
  - i. Interest Convergence – Derrick Bell, 1990
  - ii. Racial Realism (Permanence of Racism) – Derrick Bell, 1992
  - iii. Whiteness as Property – Cheryl Harris, 1993
  - iv. Critique of Liberalism – Neil Gotanda, 1991
  - v. Intersectionality – Kimberlé Crenshaw, 1991
  - vi. Counter-Narrative/Counter-storytelling - Richard Delgado, 1989
- b. Contemporaries/Splinters (Key Scholars)
  - i. AsianCrit (Robert Change; Mari Matsuda)
  - ii. BlackCrit (Michel Dumas)
  - iii. Critical Race Feminism (Adrienne Wing)
  - iv. DisCrit (Subini Ancy Annamma)
  - v. LatCrit (Fransisco Valdes)
  - vi. QueerCrit (Fransisco Valdes)
  - vii. TribalCrit (Bryan Brayboy)
- c. Reference Text:
  - i. Bell, D. (1980). Brown v. board of education and the interest-convergence dilemma. *Harvard Law Review, 93*(3), 518-533.
  - ii. Bell, D. (1992). Racial realism. *Connecticut Law Review, 24*(2), 363–379.
  - iii. Collins, P.H., & Blige, S. (2016). *Intersectionality.* Cambridge, UK: Polity Press.
  - iv. Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Legal Review, 43*(6), 1241–1299.
  - v. Crenshaw, K., Gotanda, N., Peller, G., & Thomas, K. (Eds.). (1995). *Critical race theory: The key writings that formed the movement.* New York, NY: The New Press.
  - vi. Delgado, R. (1989). Storytelling for oppositionists and others: A plea for a narrative. *Michigan Law Review, 87*(8), 2411-2441.
  - vii. Delgado, R. & Stefancic, J. (2017). *Critical race theory: An introduction* (3rd ed.). New York, NY: New York University Press.
  - viii. Harris, C.L. (1993). Whiteness as property. *Harvard Law Review, 106*(8), 1707-1791.
  - ix. Gotanda, N. (1991). A critique of "our constitution is color-blind". *Stanford Law Review, 44*(1), 1-68

Slide 13. Whiteness as a Cultural Phenomenon
- a. Whiteness as Property (Cheryl Harris)

      i.   Right to Disposition
      ii. Right to Use and Enjoy
      iii. Reputation and Status
      iv. Absolute Right to Exclude

b. Phenomenology of Whiteness (Sara Ahmed, 2007)
    i. How whiteness shapes our perceptions, standpoints/positions, and conceptions of normality and reality.

c. Emotionality of Whiteness (Cheryl Matias, 2016)
    i. Constant (re)centering of whiteness through emotions that lead to stalling or quashing of race-related work and progress.

d. Hegemonic Whiteness (Nolan Cabrera, 2018)
    i. Maintenance and reinforcement of white racial dominance through de factor social stratification.

Slide 14. Whiteness and Western Colonialism
a. Connection cultural imperialism and epistemic injustice through the rejection of Indigenous and Afrocentric ways of knowing, doing, and being.

Slide 15. Evidence in Education
a. Meritocracy – Standardize assessments for access, demarcations of learning/success.
b. Continued attacks against "progress" juris prudence (i.e., cases against Affirmative Action and college admissions).
c. Essentializing of experience through the creation and reinforcement of umbrella categories and tokenized experiences.

Slide 16. Whiteness in STEM
a. Ideology: Western, Eurocentric, and "Objective"
b. Methodology: "Merit-Based," "Colorblind," "Experimental Design" to "prove"
c. Praxis: "Mirror-tocracy," Anti-Blackness, "Model Minority," "Crazy-Making"
d. Reference Text:
    i. [PBS Timeline on Race](#)
    ii. Aikenhead, G. S. (1996). Science education: Border crossing into the subculture of science. Studies in Science Education, 27(1), 1–52. https://doi.org/10.1080/03057269608560077
    iii. Brown. B.A., & Mutegi, J.W. (2010). A paradigm of contradictions: Racism and science education. In P. Peterson, E. Barker, & B. McGraw (Eds.), *International Encyclopedia of Education* (Vol. 1, pp. 554-564). Oxford: Elsevier.
    iv. Bullock, E.C. (2017). Only STEM can save us? Examining race, place, and STEM education as property. *Educational Studies, 53*(6), 628-641.
    v. Cobern, W., & Aikenhead, G. (1998). Cultural aspects of learning science. In Fraser, B. J., & Tobin, K. G. (Eds.), The international handbook of science education (pp. 39–52). Great Britain: Kluwer Academic Publishers.

vi.   Green, A. M. (2014). The systematic misuse of science. In Atwater, M. M., Russell, M., & Butler, M. B. (Eds.), Multicultural science education: Preparing teachers for equity and social justice (pp. 11–28). Netherlands: Springer.

vii.   *King, N.S., & Pringle, R.M. (2019). Black girls speak STEM: Counterstories of informal and formal learning experiences. *Journal of Research in Science Teaching, 56*(5), 539-569.

viii.   Mensah, F.M., & Jackson, I. (2018). Whiteness as property in science teacher education. *Teachers College Record, 120*(1), 1-38.

ix.   Mutegi, J. W. (2013). "Life's first need is for us to be realistic" and other reasons for examining the sociocultural construction of race in the science performance of African American students. *Journal of Research in Science Teaching*, *50*(1), 82-103.

x.   Parsons, E. C. & Thompson Dorsey, D. (2015). The race problem: Its perpetuation in the next generation of science standards. In Drakeford, L. D. (Ed.), *The race controversy in American education* (Vol 2, pp. 215-237). Santa Barbara, CA: Praeger.

xi.   *Sheth, M.J. (2019). Grappling with racism as foundational practice of science teaching. *Science Education, 103*(1), 37-60.

xii.   Walls, L. (2016). Awakening a dialogue: A critical race theory analysis of U.S. nature of science research from 1967 to 2013. *Journal of Research in Science Teaching, 53*(10), 1546-1570.

Slide 17.   Whiteness in/Through Social Justice
    a.   Conflating of DEI
    b.   Continued centering and re-centering of white interests

Slide 18.   Now What?

Slide 19.   Engaging in Dialogic Action
    a.   Embrace Racial Realism (realize that racism exists and is structural…naming the underlying power structures of oppression).
    b.   Explore your positionality (reflect on who you are, what you believe, why you believe it, and how it impacts the way you engage this work)
    c.   Raise your Critical Consciousness (expose yourself to materials, lived experiences, and information that help you "see" the world critically, structurally, and from the standpoint of those minoritized).
    d.   Engage in Dialogic action (work together in community with those you are looking to serve to make structural change).
    e.   Reference Text:
        i.   Powell, C., Demetriou, C, Morton, T.R., & Ellis, J.M. (2020). A model for a CRT-informed model to enhance experiences and outcomes of racially minoritized students. *Journal of Student Affairs Research and Practice.*

Slide 20.   Critically Examine Yourself
    a.   Think about your power and privileges as it aligns with your social identities

Slide 21. Critically Examine Your Roles
    a. Think about the power and privileges you maintain given your institutional/community role
        i. Administrations
        ii. Faculty
        iii. Professional Staff
        iv. Students

Slide 22. Think about your Sphere of Influence
    a. What Can You Control?
    b. What Can You Directly Influence?
    c. What Can You Indirectly Influence?

Slide 23. Suggestions for ways to Optimize STEM Education
    a. Distrupt and remove all practices and policies that render Black and Brown as illegitimate, deficient, and unhuman.
    b. Establish classroom (lab) culture and norms that validate, appreciate, and integrate Black and Brown students' identities, realities, and knowledge and experiences.
    c. Center the voices of Black and Brown people in the construction of policies and procedures related to access, engagement, and standards for success.

Slide 24. Reminder
    a. "The Masters Tools Will Never Dismantle the Master's House…" ~ Audre Lorde

Other Resources

- Baber, L.D. (2015). Considering the interest-convergence dilemma in STEM education. *The Review of Higher Education, 38*(2), 251-270
- Bonilla-Silva, E. (2014). *Racism without racists: Color-blind racism and the persistence of racial inequality in America* (4th ed.). Plymouth, UK: Rowman & Littlefield Publishers, Inc.
- Brown, B.A. (2019). *Science in the city: Culturally relevant STEM education*. Cambridge, MA: Harvard Education Press.
- Burt, B.A., & Johnson, J.T. (2018). Origins of early STEM interest for Black male graduate students in engineering: A community cultural wealth perspective. *School Science and Mathematics, 118*(8), 257-270.
- Corwin, L. & Morton, T.R., Demetriou, C, & Panter, A.T. (2020). A qualitative investigation of STEM students' switch to non-STEM majors post-transfer. *Journal of Women and Minorities in Science and Engineering, 26*(3), 263-301. DOI: 10.1615/JWomenMinorScienEng.2020027736
- DeCuir-Gunby, J.T., Long-Mitchell, L.A., & Grant, C. (2009). The emotionality of women professors of color in engineering: A critical race theory and critical race

feminism perspective. In P. Schutz & M. Zembylas (Eds.). *Advances in teacher emotions research* (pp. 323-342). Boston, MA: Springer.

- Grant, C.A., Woodson, A.N., & Dumas, M.J. (Eds.). (2020). *The future is Black: Afropessimism, fugitivity, and radical hope in education.* New York, NY: Routledge.
- Hartman, S. (2007). *Lose your mother: A journey along the Atlantic slave route.* New York: Farrar, Straus, & Giroux.
- Ireland, D.T.; Freeman, K.E., Winston-Proctor, C.E., DeLaine, K.D., Lowe, S.M., & Woodson, K.M. (2018). (Un)hidden figures: A synthesis of research examining the intersectional experiences of Black women and girls in STEM education. *Review of Research in Education,* 42(1), 226-254.
- Joseph, N.M., Haynes, C., & Cobb, F. (Eds.). (2016). *Interrogating whiteness and relinquishing power: White faculty's commitment to racial consciousness in STEM classrooms*. New York, NY: Peter Lang Publishing, Inc.
- McGee, E.O., & Robinson, W.H. (Eds.). (2020). *Diversifying STEM: Multidisciplinary perspectives on race and gender*. New Brunswick, NJ: Rutgers University Press.
- Morton, T.R, & Nkrumah, T. (2021). A day of reckoning for the white academy: Reframing success for African American women in STEM. *Cultural Studies of Science Education*. DOI: https://doi.org/10.1007/s11422-020-10004-w
- Ware, F. (2006). Warm demander pedagogy: Culturally responsive teaching that supports a culture of achievement for African American students. *Urban Education, 41*, 427-456.
- Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race, Ethnicity, and Education,* 8(1)*,* 69-91.