BSRI Black Studies Research Institute
IN STEMM
at DALHOUSIE UNIVERSITY

BLACK STUDIES RESEARCH INSTITUTE (BSRI) IN SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS AND MEDICINE

The *BlackPaper*

Dalhousie University

OVERALL GOAL

This *BlackPaper* offers a guide to the official working guidelines of the Black Studies Research Institute (BSRI) at Dalhousie University. This document outlines key concepts and principles to conducting critical Black scholarship within Science, Technology, Engineering, Mathematics, and Medicine (STEMM). Serving as a critical intervention into traditional academic discourse in STEMM, this paper aims to reframe these fields through a lens of Black Studies, emphasizing the importance of integrating Black-focused, anti-racist perspectives and methodologies to challenge existing paradigms that often overlook or further marginalize Black contributions, health, and experiences.

HISTORY OF THE BLACK STUDIES RESEARCH INSTITUTE AT DALHOUSIE UNIVERSITY

Black Studies research and scholarship has been present at Dalhousie University in several venues and iterations. In 1990, Dalhousie University became the first university to establish an endowed chair in Black Studies through the James R. Johnston Endowed Research Chair in Black Canadian Studies. The BSRI plays a pivotal role in establishing interdisciplinary and transdisciplinary research, emphasizing the integration of Black Studies across faculties. The BSRI (financially supported by 9 faculties: Science, Medicine, Management, Law, Health, Engineering, Dentistry, Computer Science, and Arts and Social Sciences) is a leader in promoting Black diasporic research, in diverse Black communities locally, and nationally, tackling anti-Black racism in academia and beyond.

CRITICAL BLACK RESEARCH PHILOSOPHIES

The philosophical concepts that underpin Black Studies serve to provide a framework for challenging dominant Eurocentric, western, and white (herein white) paradigms in research and knowledge production that have historically marginalized and underserved Black communities and health (Funk & Parker, 2018; Rainey et al., 2018). Critical Black paradigms inform the development of culturally responsive and affirming, and relevant research methodologies, guide researchers to choose research approaches and analyses, and centre Black experiences, knowledge systems, and ways of being.

The ontological basis (the nature of reality and what can be known about it) of Black paradigms challenges the notion of single, objective reality by recognizing the multiple realities shaped by historical, social, and cultural contexts of Black experiences (Anderson-Carpenter, 2021). The epistemological orientation (the nature of knowledge and how it can be acquired) validates diverse ways of knowing beyond white paradigms, including valuing Black lived experiences (Hunn, 2004). The axiological assumptions (the values and ethics of study) prioritize key principles, such as communalism, spirituality, and social justice (Anderson-Carpenter, 2021). Together, these philosophical concepts provide a methodology (the theoretical application of methods) bridging the gap between epistemology (what can be known) and methods (how we can know it).

WHAT IS BLACK STUDIES?

Black Studies emerged in the 1960s as both an academic field and a critical ideology, driven by a student-led movement for Black-led departments (Asante & Mazama, 2005; Rojas, 2010). This discipline arose in response to the white misrepresentation of Black experiences, which distorted Blackness within the sciences, invalidated Black contributions to STEMM, and perpetuated harm against Black populations (Cole, 2004). Since its inception, Black Studies has created intellectual spaces for Black students at predominantly white universities and led to the establishment of doctoral programs in the field (Adams, 2005; Rojas, 2010).

Black Studies is inherently cross disciplinary, and the BSRI prioritizes the interdisciplinary and transdisciplinary approaches to research and scholarship Black Studies research in STEMM.

Interdisciplinarity refers to the reconfiguration of academic disciplines, involving the integration of knowledge, methods, and perspectives from multiple fields (Stehr & Weingart, 2000; Miller, 2010). Interdisciplinarity allows for the study of complex systems that require a multi-dimensional approach (Newell et al., 2001), such as combining biology, chemistry, and psychology in medicine (Max-Neef, 2005). According to Klein (1990), interdisciplinarity helps achieve various objectives, including answering complex questions, solving multi-disciplinary problems, and fostering a unity of knowledge. ***Transdisciplinarity*** involves not only crossing disciplinary boundaries but also the explicit participation of non-academic stakeholders in knowledge production, addressing "wicked problems" through collaborative and innovative approaches (Scholz & Steiner, 2015; Bernstein, 2015). Such approaches necessitate meaningful research collaboration with Black communities, policymakers, and industry professionals to develop more inclusive, equitable, and relevant STEMM practices.

BLACK METHODOLOGIES

Black Studies, as both a methodology and analytic, are grounded in frameworks that emphasize Black perspectives and historical realities. Several Black methodologies are described below, however this is not an exhaustive list.

Africentric methods empower researchers to describe reality from their viewpoint, fostering non-oppressive, liberating inquiry by deepening the cultural significance of research concepts (Pellerin, 2013; Reviere, 2001). For example, Africentric approaches to health can be utilized to offer culturally meaningful healthcare grounded in the values, histories, and lived experiences of people of African descent to disrupt systemic anti-Black racism and related health inequities (Gebremikael et al., 2022). Africentric approaches, particularly in medicine, challenge anti-Black racism in STEMM by fostering culturally meaningful healthcare (as an example), as demonstrated by the TAIBU Community Health Centre in Ontario, which applies Africentrism and the seven principle of Kwanzaa (*imani, umoja, kujichagulia, ujima, ujamaa, nia*, and *kuumba* – i.e. spirituality, unity, self-determination, collective work and responsibility, cooperative economics, purpose and creativity) along with Ubuntu (the ethic of justice and collective or shared humanity) to deliver holistic care to Black communities (Gebremikael et al., 2022). ***Critical race theory*** also plays a role by analyzing race as a social construct and racism within various systems, addressing issues such as racial wealth gaps, policing, and adverse Black health outcomes (Delgado, 2023).

Afrofuturism combines science fiction, art, and media to explore Black futures grounded in Afrodiasporic experiences (Yaszek, 2006). It, alongside other Black methods like ***Black queer diasporic analytics***, enriches research by blending Black diaspora studies, queer studies, and anthropology (Gill, 2012). Afrofuturism further enriches the exploration of Blackness in STEMM by projecting Black futures in a technology-driven world. Originating from the work of Mark Dery (1994), it explores Black people's negotiations with technology and offers a reimagination of lost pasts (Gipson et al., 2016; Yaszek, 2006). Scholars like Anderson and Jones (2016) expand on Afrofuturism with the concept of Astro-Blackness, a framework for Black identity free from colonial structures. This work highlights how technology augments Black bodies and experiences and the role of Afrofuturism in transforming STEMM education, medical discourse, and agricultural practices across the African diaspora (McGee & White, 2021; Samatar, 2017).

BLACK LEADERS IN STEMM

Efforts to promote diversity in STEMM have elevated Black professionals, with leaders like Ashley Walker and Dr. Devin Swiner (who lead #BlackinAstro and #BlackinChem) in chemistry (Chemical Institute of Canada, 2021), Dr. Kafui Dzirasa in neurobiology (Duke University, n.d.), and Dr. Ayana

Elizabeth Johnson who advocates for diversity in marine science (Urban Ocean Lab, 2023). Dr. Chanda Prescod-Weinstein (2023) pioneers dark matter research in physics, while Dr. Joy Buolamwini (2023) advocates for fairness in AI. technology, challenging algorithmic bias. Material culture studies, led by Dr. Jonathan Square (2022), explore Black identity through objects.

Researchers such as Dr. Chanda Prescod-Weinstein (2023), Dr. Alondra Nelson (2012, 2018), Dr. Ruha Benjamin (2020), Dr. Katherine McKittrick (2020), and Dr. Simone Browne challenge racial biases in STEMM, calling for decolonized approaches and addressing systemic inequities – using Black-centered methods to reshape fields like computer science, engineering, and mathematics. McKittrick and (2020) and Benjamin (2020) illustrate the interplay between race and technology through their work, while Browne critiques surveillance systems. In mathematics, McKittrick (2015) and Denise Ferreira da Silva (2017) reveal how the field perpetuates anti-Black violence, advocating for decolonizing approaches. Initiatives like Black Girls Code and Black Boys Code address underrepresentation (Bryant, 2022; Hosang, 2019), while scholars critique systems like facial recognition and hiring practices (Buolamwini, 2018).

Anti-Black racism in STEMM has limited opportunities for Black professionals and perpetuated biased research. In response – and necessary opposition to harmful STEMM methods and inquiries – Black-led initiatives and scholars like Cedillo (2018), McGee and Stovall (2015) foster anti-racist, liberatory spaces in STEMM, empowering Black students and professionals.

And significantly they explore the normative methods used in STEMM and seek to disrupt the embedded structural white supremacy and discrimination within, thus offering anti-racist methods in STEMM research.

Other Black Studies research institutes and centres include:

- **Black Scholars' Institute** (University of Windsor, Ontario) focuses on Black literature, history, health, education, business, and culture.
- **Centre for Black Studies in Education** (Ontario Institute for Studies in Education, University of Toronto, Ontario) primarily advances research and pedagogical practices in education.
- **African Studies Center** (Pardee School of Global Studies, Boston, MA) covers arts, humanities, social sciences, and natural sciences.
- **African Studies Institute** (University of Oklahoma, Norman, OK) emphasizes interdisciplinary research.
- **Centre for African Studies** (University of Cape Town, South Africa) concentrates on land use, rural livelihoods in Africa, land reform, democracy, and the Mendi Centenary Project.

PROPOSED RESEARCH QUESTIONS

Our review identified key gaps in integrating Black Studies into STEMM fields, leading to the development of research questions to promote critical Black scholarship in STEMM:

- How does recognizing subjectivity in "objective" STEMM disciplines affect the scientific method?
- How can STEMM research adopt Africentric methodologies to challenge Eurocentric models as the status quo and promote inclusivity and holistic approaches?
- How can Afrofuturism drive STEMM innovation in areas that disproportionately affect Black communities?

- How does integrating Black Studies into STEMM research (and education) benefit the scientific discovery, innovation, community, and society?
- What role do Black researchers play in STEMM, and how can their experiences shape more equitable research practices?
- What policies and initiatives can effectively address barriers to Black representation in STEMM?

POLICY CONTEXT, IMPLICATIONS, AND OPTIONS

The underrepresentation of Black researchers in STEMM perpetuates systemic inequalities and limits the innovative potentials of STEMM. Promoting Black Studies in STEMM requires not only addressing these historical exclusions but also encouraging the further development of Black-focused, anti-racist STEMM methods and methodologies. It is important to prioritize policies that promote Black Studies in STEMM and foster inclusive, liberatory spaces. These are all necessary pathways to advance innovation in STEMM equitably:

- **Increase funding for Black Studies in STEMM:** Prioritize funding for Black-centered STEMM research through federal, institutional, and private grants. This promotes and demonstrates a commitment to provide spaces for Black researchers to explore and contribute to the field.
- **Promote Black-led research teams:** Support Black researchers, highlighting those who engage in transdisciplinary/interdisciplinary STEMM research, and ensuring that this expertise is represented at all organizational levels.
- **Address systemic anti-Black barriers:** Identify where interdisciplinary/transdisciplinary training is discouraged and undermined, also tackle barriers such as limited interdisciplinary STEMM education, that limit opportunities for Black researchers to develop and expand their knowledge and expertise in interdisciplinary and transdisciplinary STEMM.
- **Increase Black representation in research publications:** Incentivize research that includes Black interdisciplinary and transdisciplinary subject matter expertise, insights, and perspectives; fund equitable and diverse authorship, and increase representation on Black methods in STEMM education at all levels.
- **Promote collaboration between academia and industry:** Strengthen ties between academic institutions and industry to provide Black researchers with resources and opportunities for entrepreneurship and innovation, and to highlight new innovative Black methods in STEMM research. Create cooperative agreements that provide Black scholars and researchers access to state-of-the-art resources and entrepreneurship opportunities in direct support of interdisciplinary and transdisciplinary STEMM research and education.
- **Support community engagements:** Bridge STEMM initiatives across sectors and environments. Amplify STEMM organizations engaging Black communities through workshops, partnerships, and interdisciplinary/transdisciplinary STEMM communication that continues to build trust and strengthen relationships between diverse Black researchers and diverse Black communities.

CONCLUSION

Integrating Black Studies into STEMM is essential for to 1) disrupt STEMM methods that are inherently anti-Black limit innovation 2) identify methodological innovations in STEMM that promote social justice, equity, anti-oppression, anti-racism, and reimagined Black futurities. Centering Black-focused and theorized methods will facilitate greater interventions to address systemic biases in STEMM and challenge limiting and harmful dominant practices, and ultimately develop more

innovative, anti-racist technologies. Striving for anti-racist ubiquity in STEMM fields will help create more just, equitable, and original discoveries that will benefit all of us.

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