

The equitable future of

SCiENCE
AcadEMIA

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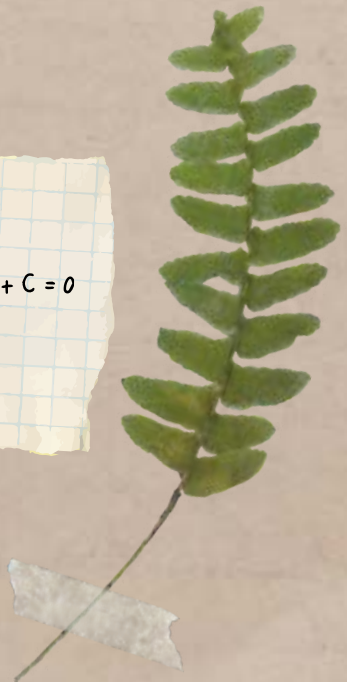
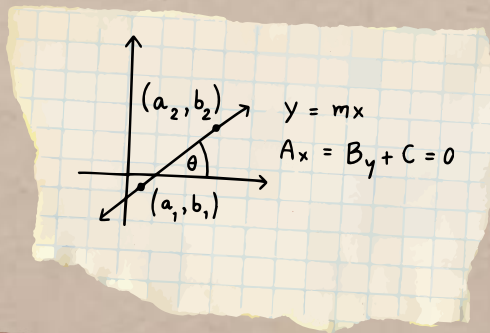


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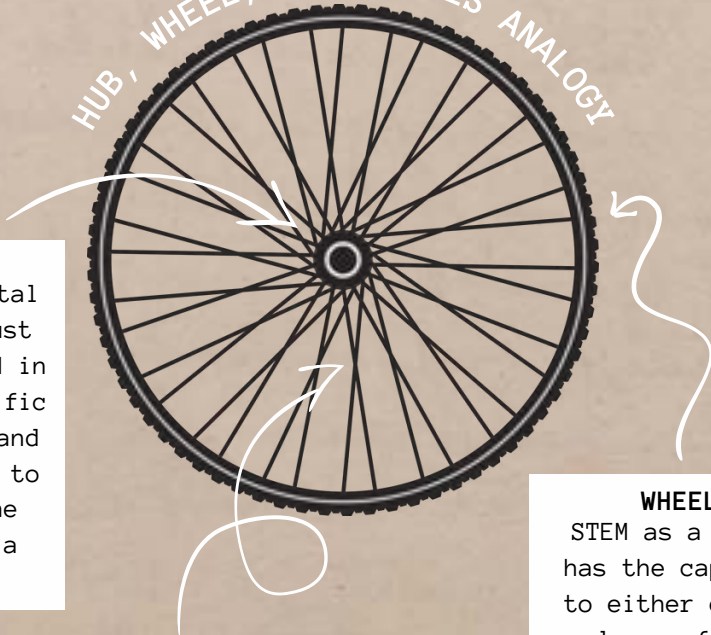
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introduction

In order to meet the challenges of a changing world, STEM (Science, Technology, Engineering, Math) must transform from being a binary and exclusionary space to one that centers environmental justice and equity in all scientific endeavors.

Universities and college actors, as educators of the next generation of scientists, engineers, and mathematicians, must be the leaders of this change by placing equity at the forefront of STEM.

HUB, WHEEL, AND SPOKES ANALOGY



HUB

environmental justice must be centered in all scientific endeavors and ripple out to impact the field as a whole

SPOKES

principles of equitable science (i.e. exclusion→inclusion, theory→praxis, binary→complex)

WHEEL

STEM as a field has the capacity to either change and move forward or remain stuck in a circular path

KEY DEFINITIONS

environment

the place "where we live, where we work, where we play, and where we learn" (Cox & Pezzullo, 2016, p. 40)

environmental justice

a movement that recognizes the interconnection of environmental activism and social justice via the disproportionate environmental burdens imposed on poor and people of color communities (Cox & Pezzullo, 2016; Wald et al., 2019)

interdisciplinary scholarship

a gathering of different knowledges that engages multiple approaches to address complex problems

STEM

an acronym denoting fields of science, technology, engineering, and math; careers in STEM provide essential services ranging from healthcare to infrastructure

academia

the environment or community focused on research, education, and scholarship; often used in the context of universities and colleges

praxis

the blending of theory and practice; knowledge that is applied to and embodied by our environment

terminology

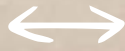
This zine will foreground the experiences of Black and Latinx students within science academia and recognize disproportionate barriers to attaining higher science education for these communities.

BLACK **I**NDIGENOUS **P**EOPLE **O**F **C**COLOR

The term BIPOC will be used to elucidate the specific challenges that Black and Latinx students face in the field. Although this still fails to represent the breadth of experiences of students from many diverse backgrounds, the term BIPOC helps diminish universalizing logic and create more space for self-determination.

reDEFINING environment

MAINSTREAM U.S.
CONCEPTIONS



ALTERNATIVE
CONCEPTIONS

Humans are
separate from
environment

Environment is
wherever people
are

Reflection of
colonial concept
of "unexplored
frontiers"

Generate
sustainable
relationships
between people and
the environment

Emphasizes
divisions between
social justice and
environmental
activism

Incorporates
principles of
environmental
justice

reDEFINING environment

continued...

This alternative definition of environment is significant because it acknowledges the ways in which BIPOC communities and other marginalized groups are disproportionately impacted by anthropogenic change via climate disasters, local pollution, and more.

Naming these phenomena for what they are—environmental disasters—opens up opportunities for relevant research and action in STEM via praxis and encourages the creation of more interdisciplinary spaces in the field.

CeNtRAL tENsions

HARMS AND HOPE

- When it comes to defining who is allowed to be a scientist, "rarely do we think of Black and Latinx youth as potentially having the solutions to address their conditions" (McGee & Stovall, 2020)
 - Alternative definitions of what encompasses the "environment" and shifting towards praxis in academic settings offers BIPOC youth more agency in their own futures

ISOLATION AND INTERCONNECTION

- Underrepresented minorities at White-dominated STEM universities experience isolation, imposter syndrome, imposed stereotypes, and racial biases
 - Centering environmental justice in all STEM endeavors creates equitable spaces, not at the fringes of progress, but rather at the forefront

STAGNATION AND STRUGGLE

- Retaining students and faculty at institutions of higher education requires increased representation, not through quotas, but via more inclusive "cultural climates" (Kafka, 2022)

SUPPLEMENTAL RESOURCES

THE FUTURE OF STEM EDUCATION
BY DR. RONI ELLINGTON



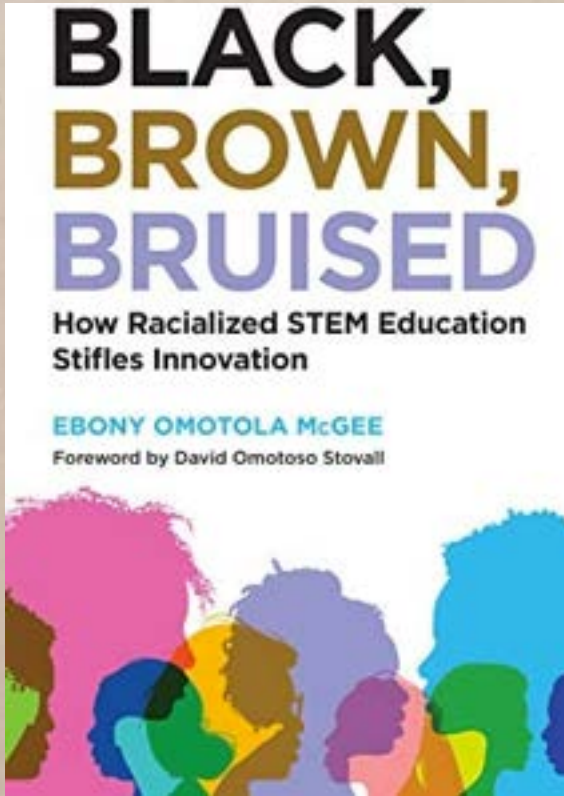
(Ellington, 2013)

In a 2013 TED Conference, Dr. Ellington provides an inclusive framework for STEM education made up of four components:

- 1 Student identity and agency
- 2 Teacher professional development and empowerment
- 3 Innovative school practices and curriculum
- 4 Utilizing community social and cultural capital

SUPPLEMENTAL RESOURCES

continued...



Dr. McGee examines STEM education through a racial equity lens, drawing on her own experiences and the experiences of her colleagues. She describes structural changes that must occur within the field to create more inclusive and equitable spaces.

Activist Spotlight

Dr. Pierre is an ecologist, biogeochemist, and writer based in San Francisco, CA. She is a National Geographic Explorer and the founder of the Critical Ecology Lab, an organization that investigates the "relationships between social, economic, and political systems, the ideologies that prop them up, and the natural systems they directly impact in the era of climate crisis"

(<https://www.criticalecologylab.org/>).



(Ward, 2022)

Dr. Pierre discusses her work in critical ecology and her own experience as a woman of color in her field in more depth on the podcast *Ologies*, hosted by Alie Ward, in an episode dedicated to exploring critical ecology.



Listen here!

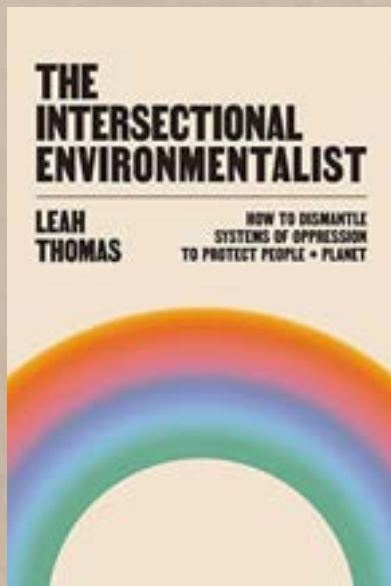
Activist Spotlight



Leah Thomas is an activist, a public speaker, the founder of the nonprofit **Intersectional Environmentalist**, and the author of the book *The Intersectional Environmentalist: How to Dismantle Systems to Protect People + Planet*.

As a self-described "eco-communicator," Thomas works to educate on environmental justice and to amplify BIPOC voices in the environmental sphere.

"While this book is an argument for the need for intersectional environmentalism, it's truly my biggest hope that one day in the future we won't need to preface 'environmentalism' with the word 'intersectional'; we won't need to create separate safe spaces and curriculums that seek to be inclusive"
(Thomas, 2022)



LOCAL Engagement

PEER MENTOR PROGRAM (CORVALLIS, OR)



Summer 2019

In a partnership with the Institute of Ecology and the Marys River Watershed Council and as part of the Willamette–Laja River Twinning Project, local high school students learned how to lead lessons on restoration planting, bird migration, aquatic macroinvertebrates, and more.

The lessons were delivered in English and Spanish to third-grade students from local dual-immersion elementary schools.

The program allowed mentors and students alike to engage with local ecosystems, conduct field surveys, and correspond with students in a sister community in the Laja River Valley of Guanajuato, MX.

THE NEXT GENERATION OF SCIENTISTS

“...mainstream White society still maintains its hold on who is allowed to be a scientist. By the time a Black or Latinx youth reaches second grade and expresses an interest in science, we cut their dreams short and write it off as impossible given their conditions (structural racism, poverty, low test scores, disinvested schools, etc.)” (McGee & Stovall 2020)

How do we empower the next generation of scientists?

Although this zine revolves around increasing equity in secondary education, the learning career of aspiring scientists begins far before then and the messaging they receive at every stage should reflect the same values of equity, intersectionality, and inclusion.



(de Onís et al., 2021)

The bilingual children's book *La justicia ambiental es para ti y para mí* instills in youth that they have agency in their own lives and reinforces a positive climate narrative. Messaging such as this helps youth develop confidence in their own abilities as they progress throughout their academic career, wherever it may lead them.

representation in Leadership

Lack of representation in STEM faculties can lead to decreased matriculation and retention rates for BIPOC students interested in careers in STEM.

Students that are not represented in their leadership often report feeling disillusioned, isolated, and tokenized (Funk & Lopez, 2022; McGee & Stovall, 2020).

What can college and university actors do to improve conditions of equity in STEM and beyond?



The Chronicle of Higher Education advocates for a triage approach, that goes beyond simply hiring to meet quotas. Instead, colleges and universities should focus their energies on creating more inclusive cultural climates where faculty and students can thrive. Suggested mechanisms for this transformation are equity audits and anti-bias trainings (Kafka, 2022).

LOOKING FORWARD

How can we increase equity and opportunities for interdisciplinary scholarship in science academia?

1

Prioritize praxis in learning environments

2

Increase representation and retention of BIPOC individuals within faculty and leadership

3

Center environmental justice in all scientific endeavors

4

Frame science as an interdisciplinary field at all levels of education

conclusion

Scientific academia has a reputation for being a highly competitive and overwhelmingly White space, with little to no resources for BIPOC students or recognition of disproportionate climate burdens.

STEM as a field requires a transformation in order to become a more inclusive and equitable space. The hub, wheel, and spokes model is helpful to visualize this transformation. In this context, environmental justice is the hub, the principles of environmental justice act as the spokes, and STEM is represented by the wheel.

This is to say, inclusivity and equity should be engrained into the structure of STEM academia instead of at the fringes of it.

Some of the mechanisms for transforming science academia include science-positive messaging for youth, inclusive cultural climates for college and university faculty, alternative conceptualizations of "environment" and increased applications of science to issues of environmental justice via praxis.

The responsibility of realizing this transformation falls to university and college actors as the educators of the next generation of scientists. Science academia has the capacity to become both inclusive and equitable; by rejecting binaries, embracing intersectionality, and welcoming intersectional approaches, it can enter a new era.

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creator

BIO



My name is Olivia Wilborn-Pilotte and I am a third-year biology major at the University of Oregon. My experience as a woman and a first-generation college student in STEM has shaped my interest in equity within my field and how students of all sorts of different backgrounds navigate this space.

I hope this zine prompts readers to consider the role that science plays in their own lives and how it could continue to be applied if marginalized voices were more amplified. We have the power and the responsibility to actively shape the spaces we learn and grow in to be more inclusive for everyone.