UFUOMA OVIENMHADA

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EDUCATION

Massachusetts Institute of Technology *Cambridge, MA*
Ph.D in Aeronautics and Astronautics *August 2020 – Sept 2024*
Focus: Satellite remote sensing, environmental justice, carceral geographies
Faculty Advisor: Dr. Danielle Wood
Dissertation Title: *Opportunities and Limitations of Applying Satellite Earth Observation Technology for Grassroots Environmental Justice Advocacy*

M.S. Media Arts & Sciences *August 2018 – May 2020*
Thesis Title: *Earth Observation to support Low-Cost Environmental Governance: A case study in Benin*

Stanford University *Stanford, CA*
B.S. Mechanical Engineering *August 2014 – May 2018*

RESEARCH/WORK EXPERIENCES

NASA Jet Propulsion Laboratory, Visiting Researcher, Remote *Sept 2020 - March 2021*
- Assimilated optical satellite data from TROPOMI and CriS satellite instruments to demonstrate a proof of concept of using ammonia observations as a proxy for methane emissions, which are a significant contributor to global warming

Planet Labs, Professional Services Intern, Remote *June 2020 - July 2020*
- Implemented a methodology to use the Planet Building Detection layer to measure a Sustainable Development Goal indicator, SDG 11.3.1, pertaining to sustainable urbanization.
- My work explored Planet data compatibility with established methods for measuring urbanization, documented difficulties of building a data pipeline with Planet data and demonstrated the temporal and spatial value of using Planet's higher resolution commercial data, as opposed to free lower-resolution options for this SDG indicator

European Space Agency Phi-Lab / University of Sannio, Visiting Researcher, Frascati, Italy *Jan 2020*
- Conducted literature review and comparative analysis on several common frameworks for measuring a nation's development using remote sensing indicators
- Managed and mentored 4 undergrads in the collection and analysis of data from NASA, ESA and global databases to apply remote sensing techniques to case studies assessing land cover change and human settlement as proxy for the Inclusive Wealth Index in Cameroon and China

NASA Goddard, Biospheric Sciences Laboratory, Visiting Researcher, Greenbelt, MD *June 2019*
- Assimilated optical and radar data from Landsat 5,7, 8, Sentinel 1, and 2 in Google Earth Engine for Mangrove Identification using Random Forest Machine Learning Algorithm. Applied Change Detection to estimate biomass changes.

Public Lab Kits Initiatives, Student Expert Intern, Providence, RI *July – Sept 2018*
- Partnered with local environmental activists to design and program a low-cost air quality sensor for use in quantitative storytelling around the impact of air pollution on low income communities in Providence
- Collaborated with the Rhode Island Dept of Environmental Management to calibrate optical air quality sensors
- Wrote 9 blog posts on the Public Lab site on guidelines for gathering, and interpreting data from optical air quality sensors

Stanford IRIS Design Lab, Undergraduate Researcher, Stanford, CA *June 2016 – Jan 2017*

- Developed a JavaScript web program and research study run on 75 subjects at a design conference, IDETC. The study explored whether engineers brainstormed more holistically sustainable designs when primed with different activities
- Designed and programmed a sustainable smart kitchen sink that morphs product behavior for specific task contexts

PUBLICATIONS

Submitted and In-Preparation

- **Ovienmhada, U.**, West, A., Wood, D. (2025). "Spatial Pattern of PM 2.5 in U.S. Carceral Facilities from 1998 - 2022". *In Prep.*
- **Ovienmhada, U.***, Baltezar, P.*, Lombardo, S., Wood, D. (2025). "Multi-sensor Change Detection and Machine Learning for Water Hyacinth Identification: A Case Study of Benin". *In Prep.* (* indicates co-first authorship)

Published

- **Ovienmhada, U.**, Hines, M., Wood, D. (2024). "Spatiotemporal, Demographic, and Facility-Level Patterns of Heat Exposure in United States Prison landscapes". *GeoHealth.* doi: 10.1029/2024GH001108
- **Ovienmhada, U.** (2024). "Resisting Detached Datafication: What Toxic Prisons Teach Us about the Imperative of Restorative/Transformative Data Science for Environmental and Social Justice". *Centre for Media, Technology and Democracy*, Mcgill University. https://www.mediatechdemocracy.com/s/CJT_Ovienmhada.pdf
- **Ovienmhada, U.***, Sayyed, T.K.*, Kashani, M*, Vohra, K, Kerr, G., O'Donnell, C., Harris, M., Gladson, L., Titus, A., Adamo, S., Fong, K., Gargulinski, E., Soja, A., Anenberg, S., and Kuwayama, Y. (2023). "Satellite Data for Environmental Justice: A Scoping Review of the Literature in the United States". *Environmental Research Letters*. (* indicates co-first authorship), doi: 10.1088/1748-9326/ad1fa4
- Bennett, M., Gleason, C.J., Alvarez León, L.F., Friedrich, H., Mathews, A., **Ovienmhada, U.**, Tellman, B. (2023). "Bringing satellites down to Earth: Six steps to more ethical remote sensing". *Global Environmental Change Advances*. doi: https://doi.org/10.1016/j.gecadv.2023.100003
- **Ovienmhada, U.**, Diongue, A., Pellow, D., Wood, D. (2023). "Satellite Remote Sensing for Environmental Data Justice: Perspectives from Anti-prison Activists on the uses of Geospatial Data". *Environmental Justice*, doi: 10.1089/env.2023.0019
- Carter, T., Kerr, G.H., Amini, H., Martin, R.V., **Ovienmhada, U.**, Schwartz, J., van Donkelaar, A. and Anenberg, S.C., (2023). PM2.5 data inputs alter identification of disadvantaged communities. *Environmental Research Letters*, doi: 10.1088/1748-9326/ad0066
- Carrera, D., **Ovienmhada, U.**, Hussein, S. and Soden, R., (2023). The Unseen Landscape of Abolitionism: Examining the Role of Digital Maps in Grassroots Organizing. *Proceedings of the ACM on Human-Computer Interaction*, 7(CSCW2), pp.1-29., doi: 10.1145/3610214
- **Ovienmhada, U.**, Mouftaou, F., Wood, D (2021). "Inclusive Design of Earth Observation Decision Support Systems: A case study of Lake Nokoue". *Frontiers in Climate*, doi: 10.3389/fclim.2021.717418

PRESENTATIONS

2024

- **Ovienmhada, U.** (2024). "Climate Justice and Mass Incarceration" Harvard Radcliffe Institute. *Invited Speaker*
- **Ovienmhada, U.** (2024). "Resisting Detached Datafication" Charting the Course: Navigating Climate Justice in the Digital Age, Mcgill University. *Invited Speaker and Essayist*

- **Ovienmhada, U.** (2024). "Satellite Data for Grassroots Environmental Justice: A Case Study of U.S. Carceral Landscapes." Realizing Human Rights Course, Carnegie Mellon. *Invited Speaker*
- **Ovienmhada, U.** (2024). "Satellite Data for Environmental Data Justice." Race and Radical Placemaking Course, University of Washington. *Invited Speaker*

2023

- **Ovienmhada, U.** (2023). "Satellite Data for Grassroots Environmental Justice: A Case Study of U.S. Carceral Landscapes." Stanford University, Spatial Analysis Center. *Invited Speaker*
- **Ovienmhada, U.** (2023). "Satellite Data for Grassroots Environmental Justice: A Case Study of U.S. Carceral Landscapes." Climate and Incarceration Symposium, CU Boulder. *Invited Speaker*
- **Ovienmhada, U.** (2023). "Environmental Racism, Incarceration and Toxic Prisons in the United States." University of Maryland Symposium on Environmental Justice and Health Disparities. *Invited Speaker*
- **Ovienmhada, U.** (2023). "Satellite Data for Environmental Justice". The Future of Technology in a Just Transition Symposium, AYA Research Institute. *Invited Speaker*
- **Ovienmhada, U.**, Hines, M., West, A., Diongue, A., Mazurek, J., Thomas, R., Minchew, B., Wood, D. (2023). "Spatial Pattern of Land Surface Temperatures and PM 2.5 in U.S. Prison landscapes using satellite-derived data." American Geophysical Union, San Francisco, CA.
- **Ovienmhada, U.***, Sayyed, T.K.*, Kashani, M*, Vohra, K., Kerr, G., O'Donnell, C., Harris, M., Gladson, L., Titus, A., Adamo, S., Fong, K., Gargulinski, E., Soja, A., Anenberg, S., and Kuwayama, Y. (2023). "Satellite Data for Environmental Justice: A Scoping Review of the Literature in the United States." American Geophysical Union, San Francisco, CA.

2022

- **Ovienmhada, U.** (2022). "Using Satellite Data and Scientific Information to Advance Environmental Justice". VALUABLES Consortium. *Invited Panelist*
- **Ovienmhada, U.** (2022). "Complex Engineering Systems and Liberation Movements." Critical Computing Seminar, University of Toronto. *Invited Speaker*
- **Ovienmhada, U.**, Wood, D. (2022). "Earth Observation Data Applied to Measure Environmental Injustice in United States Prison Landscapes." International Astronautical Congress. Paris, FR.
- **Ovienmhada, U.**, Wood, D. (2022). "Co-Producing Remote Sensing Tools to Advance Environmental Justice in Prison Landscapes." American Geophysical Union, Chicago, IL.
- **Ovienmhada, U.** (2022). "On love, truth and justice at MIT." 48th Annual Martin Luther King, Jr. Celebration, MIT. *Invited Graduate Speaker*
- **Ovienmhada, U.**, Wood, D. (2022). The Environment-Vulnerability-Decision-Technology Modeling Framework Applied to Environmental Justice Activism in Carceral Landscapes. American Geophysical Union, New Orleans.
- **Ovienmhada, U.** (2022). "STEM @ STARLIGHT: Low-Cost Water Sensors." East Carolina University.

2021

- **Ovienmhada, U.** (2021). "Surviving Global Change: GeoHealth, Marginalized Communities and Environmental Justice in the Anthropocene." American Geophysical Union, New Orleans. *Invited Talk*
- **Ovienmhada, U.**, Wood, D. (2021). "Earth Observation and in-situ data to inform understanding of water hyacinth growth on Lake Nokoue in Benin." International Astronautical Congress. Dubai, UAE.

2019

- **Ovienmhada, U.** (2019). Remote Sensing Society, Boston, MA. Nov 2019.
- **Ovienmhada, U.** (2019). Antidisciplinary: Science and Engineering in the Digital Age. American Geophysical Union, San Francisco, CA. Dec 2019.
- **Ovienmhada, U.** (2019). Citizen Science in the Future of Earth Observation. International Astronautical Congress. Washington, D.C. Oct 2019

AWARDED GRANTS

NASA A.47 Earth Action – Postdoctoral Researcher/Co-author 2024

- "Building a Scalable Prison Environmental Justice Tool With and For Communities to Educate and Inform Actionable Decisions." Award amount: $780,000.

NASA A.49 Equity and Environmental Justice – Lead Author 2022

- "Applying the EVDT Integrated Modeling Framework for Environmental Justice Applications." Award amount: $250,000.

Initiative on Combatting Systemic Racism – Lead Author 2022

- "EVDT Integrated Modeling Framework Applied to Measure Environmental Injustice and Socioeconomic Disparities in Prison Landscapes" Award amount: $40,000.

AWARDS AND HONORS

Future Leaders in Aerospace	2023	MIT Water Night, Best Poster	2019
NextProf Nexus Future Leaders in Eng.	2023	Horowitz Student Research Award	2019
MIT Graduate Women of Excellence	2023	Elements Fellowship	2018
Takeda Fellowship	2021	GEM Associate Fellowship	2018
MIT RISE Award for Excellence in DEI	2021	NSBE Stanford Chapter, Senior of the Year	2018
Future Space Leaders Scholarship	2021	AΦA Community Service Award	2017
OGE John Hennessy Fellowship	2020	NSBE Stanford Chapter, Member of the Year	2017
Secure World Foundation Scholarship	2019	Lunsford Nomination for Public Speaking	2016

TEACHING EXPERIENCE

Science, Technology, and Environmental Justice, Bootcamp – Co-Instructor 2024

- Designed and piloted a 2-week course that asks: "How can science and technology be employed in the study of and fight against environmental injustice?"

Crowd Sourced City: Data Activism (MIT Course Number 11.458) – Teaching Assistant 2023

- Developed and delivered materials for three class sessions including: 'Data Activism and Storytelling', 'Anticolonial Science', and 'Countermapping'
- Supported four student groups in creating and implementing prototype designs across a range of activism domains including housing, indigenous sovereignty, reproductive health, and violence prevention

NASA Applied Remote Sensing Training Program (ARSET) (2023) 2023

- The NASA ARSET program demonstrates how remotely-sensed environmental indicators, specifically for air pollution, can be paired with demographic data to understand disproportionate exposures among population subgroups. I feature in a 15m segment on the "History of Satellite Data for EJ" and in a 12m vignette about my research applying satellite data for EJ in prison landscapes.

Web Design I, Brave Behind Bars – Teaching Assistant 2023

- Brave Behind Bars, based out of The Educational Justice Institute at MIT, is an online 12-week college-accredited introductory computer science and career-readiness program for incarcerated people. The curriculum teaches participants the fundamentals of HTML, CSS, and Javascript.
- I was one of ~16 volunteer TAs for a course of approximately 70 students that are currently incarcerated in Massachusetts and D.C.

Kaufman Teaching Certificate Program 2022

- Designed a draft syllabus for an original course titled "Science, Technology and Environmental Justice"
- Learned inclusive teaching principles and incorporated into course design

Physical Principles of Remote Sensing, (MIT Course Number 12.621) – Guest Lecturer 2022

- Developed and delivered a 1.5hr lecture to teach concepts on volume scattering of synthetic aperture radar remote sensing
- Designed an activity in Google Earth Engine based on my research on invasive plant species to illustrate examples of volume scattering

Streetcode Academy - Instructor 2018
- Co-instructor of 25 low-income high school students for 10-week 'Makerspace' course
- Designed workshops on vinyl cutting, laser cutting, electronic prototyping and 3D printing
- Managed $2000 budget for food and class materials.

CS1C: Introduction to Computing at Stanford - Instructor 2017
- Primary course instructor for 17 students
- Built curriculum around computer security, computing resources and web development

ACADEMIC SERVICE

Journal Peer Reviewer – 2024
- Political Geography, Proceedings of the ACM on Human-Computer Interaction, Oxford Bibliographies

LEADERSHIP AND DEI

American Geophysical Union (AGU) GeoHealth Executive DEI Committee, *Student Rep* 2022-Present
- Convened panel session inviting environmental justice leaders to discuss the role of science in activism
- Convened AGU'22 oral session on geospatial data for environmental justice

MIT Working group on Reimagining Public Safety, *Co-Chair* 2020-2022
- Orchestrated focus groups to gather student and staff feedback on campus public safety
- Lead identification of recommendations to address holistic public safety on campus including the development of a co-response model leveraging mental health clinicians alongside police

MIT Black Graduate Students Association, *Co-President* 2019-2021
- Wrote and disseminated a *Petition to Support Black Lives at MIT* garnering over 5000 signatures from students, staff and faculty and resulting in several tangible changes pertaining to DEI and public safety
- Collaborated with abolitionist organizers from Boston, New York, and Chicago to host a virtual teach-in discussing the defund the police movement and reached 1000+ attendees
- Worked with the MIT Office of Graduate Education on campus-wide diversity procedures and programs
- Oversaw a 7-person team executing events for the 100+ members of the Black graduate community
- Conducted outreach events with K-12 and undergraduate students outside of MIT

Stanford Society of Black Scientists and Engineers, *Outreach Chair* 2016 - 2018
- Lead organizer of the first ever SBSE STEM Outreach Programs reaching over 600 Black Students
- Designed 4 workshops on topics like CAD, Arduino, electromechanical systems, and design thinking
- Mentored 6 project teams designing and prototyping projects

SCIENCE COMMUNICATION AND MEDIA HIGHLIGHTS

MIT News Chu, Jennifer. "Study evaluates impacts of summer heat in U.S. prison environments", 2024

Grist Younes, Lylla. "Heat exposure, cloudy water, and bad air: The data gap of toxic prisons", 2024

Centre for Media, Technology and Democracy Ovienmhada, U. "Resisting Detached Datafication", 2024

Eos Cartier, K.M.S. "Satellites Map Environmental Vulnerabilities in U.S. Prisons", 2023

Spatial Analysis Center Lambin, E., Lovell, D., White, E. "Satellite Data for Grassroots Environmental Justice by Ufuoma Ovienmhada", 2023

MIT Graduate Program in Science Writing Brown, D., Jacobs, P., Nuhu, A.T., "Spatial Justice", 2023.

MIT News Chandler, D.L., "Annual MLK celebration at MIT features call to confront America's history of racism in order to move forward", 2022

MIT Live "Reimagining Public Safety" Live Webcast, 2021

Wired Skibba, R., "Satellites Can Spy a Menace in West Africa: Invasive Flowers", 2021

International Astronautical Federation "Plenary 7 IAC 10th Anniversary Next Generation Plenary", 2019

Via Satellite Holmes, M., "Gen Z and Millennials Take Space Industry to Task", 2019

Space In Africa Onuoha, O., "Ufuoma Ovienmhada of MIT Media Lab Space Enabled Group Is Using Satellite Data to Curb The Effects Of Invasive Species In Africa" 2019