



Unlearning Racism in Geoscience



**COLORADO SCHOOL OF MINES**  
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## URGE Policies for Working with Communities of Color for Colorado School of Mines

This is what was found by the Mines Geoscience Pod at the Colorado School of Mines on Policies for Working with Communities of Color as well as plans for improved processes and/or needed resources.

- **Audit of previous interactions with communities of color at our organization:**
  - Geoscientists Without Borders project – Managing Water Quality in Coastal Benin, Africa using Open-Source, Low-cost Geophysical Hardware
    - Key project goals and objectives are to: (1) develop, test and validate low-cost geophysical equipment; (2) hold hydrogeophysical workshop(s) in Bénin with personnel from Colorado School of Mines (CSM), Université of Abomey-Calavi (UAC) and other universities from Francophone West Africa; (3) undertake geophysical surveying to acquire geophysical data for subsurface hydrological characterization; and (4) refine low-cost geophysical instrumentation for suitability in the West African context.
    - Mines participants included four faculty, one Geophysics MSc student and three CSM BSc Geophysical Engineering.
    - The UAC participants included: two faculty, four PhD students, and twelve MSc students.
    - UAC and Mines students completed an initial interpretation of the vertical electrical sounding (VES) DC resistivity data using an open-source DC resistivity inversion package and also undertook processing of acquired seismic refraction data using the opensource smartRefract package.
    - These observations greatly support the use of low-cost Mines-designed instruments for DC resistivity fieldwork in West Africa. The seismic data processing work is currently at an earlier stage.
  - Center for Mining Sustainability (CMS) project
    - CMS project began as direct collaboration between Mines, Purdue, and Universidad Nacional de San Agustín (UNSA).
    - After polling faculty who have projects in other countries: Quote: “it emerged that Mines has no policies for working with local/underserved populations. The only policy that governs fieldwork of this nature is requiring an Institutional Review Board review the work and approve that you are complying with human subjects research protocols. Mines does not have a formal IRB. (A faculty member sent their) IRB application to another institution for them to review.”



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- Individual efforts are listed below:
  - Adrienne Kroepsch (Mines faculty), worked with a number of colleagues from other institutions to publish a workbook and planning guide: Engaging in Energy Communities: The role of the researcher (<https://scholarworks.montana.edu/xmlui/bitstream/handle/1/16097/haggerty-energy-communities-2020.pdf>)
  - Juan Lucena (Mines faculty) and Jon Leydens (Mines faculty) have published two books (Engineering & Sustainable Community Development and Engineering Justice) that theorize how engineering can be practiced and taught so that it directly promotes sustainable community development and justice.
  - Mines students learn how to ethically, responsibly, and justly engage communities (especially those that are under-resourced) through a variety of courses.
  - Mines offers design/project opportunities on how to ethically, responsibly, and justly engage communities (especially those that are under-resourced).
  - Publications from a Mines-led NSF PIRE research project on making artisanal and small scale mining more sustainable in Colombia and Peru includes international advisors as co-authors in their publications.
  - A graduate student put together a short writeup on the steps he took (as part of a native community) to work at a reservation and included it in the appendix of his thesis.
  - UNSA faculty and students have been part of field data collection and interpretation related to the impacts of agriculture on landslide processes that may affect local infrastructure including a major highway.
  - UNSA faculty visited Mines for a workshop on developing research projects, research publishing, and working with partners from diverse backgrounds.
- **What worked well in these interactions?**
  - Geoscientists Without Borders project
    - Emphasis on low-cost instrumentation and on open-source software is beneficial for use beyond the timescale of the project.



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- Appropriate and regular communication between Mines and UAC helped facilitate keeping the project on its proposed timeline.
  - Center for Mining Sustainability (CMS) project
    - Approaching new relationships in a way that acknowledged partnership, shared institutional trajectories, and each party's area of expertise. Also, extensive work to ensure that both parties understood and agreed to the terms of the research partnership and what was required from each group.
  - We are compiling our collective and anecdotal knowledge about best practices in the field about adhering to local customs and restrictions. For example, in working on the Pine Ridge reservation, Mr. Kenneth Swift Bird writes: "Building relationships with tribal authorities, fostering community involvement and utilizing expertise of local researchers was critical to the success of this project, and acts as a starting point to navigate tribal government systems and harmoniously conduct research on tribal lands in the U.S. " and "Gaining approval to conduct research on tribal lands is not a straight-forward process, as every research proposal is unique and often requires insight from several tribal offices/departments to ensure that research projects benefit the tribe with minimal risk to its people, land and natural resources."
- **What did not work well, and how can this be better addressed in future plans?**
    - Geoscientists Without Borders project
      - The outreach and training could be expanded to engage more local people. The next field program will engage more people including others from different West African countries.
      - Internet access was a problem in the field which slowed the start of the project. Longer lead times and software/hardware discussions can lead to better starts on the ground.
    - Center for Mining Sustainability (CMS) project
      - There have been challenges relating to cultural differences with respect to co-authorship, research credit, and role of students in research that have required extensive communication to resolve/are ongoing points of dialogue.
      - All faculty surveyed agreed an institutional policy that governs field work that serves and includes local/underserved populations is a necessary step that Mines needs to take to help Mines staff and students in planning their future work outside Mines in an equitable and collaborative manner.
    - Helped Denver Police Department analyze crime statistics in "DU Analytics Challenge" to "reduce crime". CSM team received funds and took first prize.



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- Ethics should to be incorporated into data science. The dataset was likely heavily focused on under-privileged communities and communities of color due to police reporting practices.
  - Prof. N. Smith writes: "I've found that for the most part, engineering research approaches communities from an information deficit perspective--i.e. local people don't have scientific knowledge and therefore they need to be "educated." This is very different from a social science approach where local knowledge is generally placed on equal footing as scientific knowledge."
- **Are there ways to improve the outcome of projects already undertaken?**
    - We are forming a working group to create a common policy document that contains also critical elements of co-ownership and co-authorship and to add points of view from a viewpoint of communities not represented in the workbook and planning guide: "Engaging in Energy Communities" referenced above.
    - Greater long-term involvement from scientists with cultural connections (e.g. local languages or dialects) to both ends of the collaboration who can smooth the communication process and help navigate points of confusion or miscommunication/help establish trusting relationships
  - **Are there specific resources or guidelines that are needed to improve the process for planning ahead and working with communities of color?**
    - Need more organization and accountability
      - Create an organized spreadsheet of outreach efforts including best practices, lessons learned, and training resources.
      - Create a list of nonprofit organizations involved in community outreach which students can easily access and sign up for through Mines.
      - Create a set of guidelines for outreach and work on Native American land that includes code of conduct, using local names in publication, and setting up a co-learning process.