Diversifying the Geosciences

Challenges Underrepresented Minority (URM) REU Students Face
Challenges of URM REU Students (Pre-REU Program Pressure)

- Weak mathematics and science foundations (Inadequate Preparation)
- Unfamiliar with the research process
- Insecure about thinking and working independently
- Limited STEM experiences
- First Generation Students (no local support + burden of representing the group + disruption of intergenerational continuity and identity shift – one identity at home and another at school)
Introduction of Pascal’s Principle

• A principle in fluid mechanics that states that a pressure change occurring anywhere in a confined incompressible fluid is transmitted throughout the fluid such that the same change occurs everywhere.

• Underlying principle for hydraulic jacks and hydraulic presses
Pascal’s Principle of URMs

\[ F_1 = 10 \text{ N} \]

\[ P_1 = \frac{10 \text{ N}}{5 \text{ cm}^2} = 2 \text{ N/cm}^2 \]

Like a liquid lever, changing areas in an enclosed fluid permit multiplication of force.

Pressure is transmitted undiminished in an enclosed static fluid.

\[ F_2 = P_2 A_2 = (2 \text{N/cm}^2)(500 \text{ cm}^2) = 1000 \text{ N}!! \]

Resulting force on bottom of jug.

\[ P_2 = P_1 + \rho gh \]

Static fluid pressure
In addition to the general REU challenges

- Stereotyping (Diversity Token ?)
- Unsupportive learning environments
- Intimidation, Disconnection, No sense of belonging to the community of scholars, Feel like an Outsider, Alienation, Marginalization, Loneliness
Challenges of URM REU Students
(Psycho-Social Issues: Internalized and Manifested)

• Friction between choosing a $500/week REU program and a full-time summer job (practical bread and butter/bills dilemma)

• Do I have to constantly prove myself?
Recommendations

- Cultural Sensitivity  (Provide an inviting atmosphere of inclusion and diversity)
- Exposure to STEM careers
- Stronger mentorship for URMs (tiered and peer)
- More hands on training
- Provide Enrichment Supports (Technical and non-Technical)
Recommendations

• Provide URM role models
• Do not only pay lip-service to diversity – demonstrate commitment to it!
• Recruitment: HBCUs, Tribal Colleges, HSIs, MSIs (direct recruitment – Deans and Chairpersons plus say minority students encouraged to apply)
Recommendations

• System: Provide adequate course work in high schools to provide a sense of what college-level STEM courses entail (early exposure)
• REU Program: Offer/Administer Pre-REU program Enrichment
Benefits of Pascal’s Principle for URMs