Mentoring Deaf Students in UREs: The Value of Cultural Competency

Derek C. Braun

Cultivating Scientific Curiosity
BIOME Institute 2020
4 August 2020

GALLAUDET UNIVERSITY

Outline

How I got into science education research

Why diversify STEM?

What does a typical Deaf student look like?

What makes for a good mentoring experience for Deaf students?

Deaf scientist leadership in research on ASL and the Deaf community

How I got into science education research

2010: Tim Esch and Rebecca Hull

2011: Abbi Simon, Sarah Gluck, Jenna Greene, and Brienna Herold

2012: Tom Wankum and Brienna Herold

2013: Lauren Burton, Kristin Parker, and Jennifer Chin

2014: Eric Epstein, Samir Jain, and Christine McBride

Beth Craft

Why Diversify STEM?

Why Diversify STEM?

Diversifies research directions

Genetic diseases in Ashkenazi Jewish people
Women's medical issues
ASL research and its impact on neurolinguistics

Better problem solving

Diverse teams consider more varied solutions
Ultimately choose better solutions

Science education "weeds out" by being unwelcoming

No difference between stayers and leavers
Stayers seem to have a better sense of identity and belonging

What does a “typical” deaf student look and act like?

Introducing.. the typical deaf student

Often does not fit a mold or preconception

Preconceptions come from:

- Limited experience with one deaf individual
- Depictions on television or in movies

Great variation in communication, residual hearing, and identity

Some variation in accommodations

Our Starting Point

What We Knew

1. Deaf students have long reported barriers to mentoring[1]
2. Deaf students do better with deaf mentors[2,3]

What We Wanted

1. Identify the key variables in successful mentoring of Deaf students
2. Develop a meaningful measure for examining mentoring effectiveness

1. Anscombe N. Deaf to the Needs of Hearing-Impaired Scientists. Science Career Magazine. 2007 Mar 30.
2. Listman JD. Nature of deaf mentoring dyads: role of subjugated knowledge. [dissertation] Rochester (NY): St. John Fisher College; 2013.
3. Hauser PC. Deaf scientists need deaf mentors. 6th International Deaf Academics and Researchers Conference. Lisbon, Portugal; 2013.

The Deaf Mentoring Survey: A Community Cultural Wealth Framework for Measuring Mentoring Effectiveness with Underrepresented Students

Derek C. Braun,[†]* Cara Gormally,[†] and M. Diane Clark[‡]
[†]Department of Science, Technology, and Mathematics, Gallaudet University, Washington, DC 20002; [‡]Deaf Studies and Deaf Education, Lamar University, Beaumont, TX 77710

ABSTRACT

Disabled individuals, women, and individuals from cultural/ethnic minorities continue to be underrepresented in science, technology, engineering, and mathematics (STEM). Research has shown that mentoring improves retention for underrepresented individuals. However, existing mentoring surveys were developed to assess the majority population, not underrepresented individuals. We describe the development of a next-generation mentoring survey built upon capital theory and critical race theory. It emphasizes community cultural wealth, thought to be instrumental to the success of individuals from minority communities. Our survey targets relationships between deaf mentees and their research mentors and includes Deaf community cultural wealth. From our results, we identified four segregating factors: Being a Scientist, which incorporated the traditional capitals; Deaf Community Capital; Asking for Accommodations; and Communication Access. Being a Scientist scores did not vary among the mentor and mentee variables that we tested. However, Deaf Community Capital, Asking for Accommodations, and Communication Access were highest when a deaf mentee was paired with a mentor who was either deaf or familiar with the Deaf community, indicating that cultural competency training should improve

The STEM Mentoring Model[3] combined traditional capitals with Community Cultural Wealth[4]

Traditional Capital Theory

1. Academic Knowledge
2. Discipline Knowledge
3. Social Capital

Community Cultural Wealth[4]

4. Navigational Capital
5. Aspirational Capital
6. Familial Capital
7. Resistant Capital
8. Linguistic Capital

3. Hauser PC. Deaf scientists need deaf mentors. 6th International Deaf Academics and Researchers Conference. Lisbon, Portugal; 2013.
4. Yosso TJ. Whose culture has capital? A critical race theory discussion of community cultural wealth. Race Ethnicity and Education. 2005 Mar;8(1):69–91. doi: 10.1080/1361332052000341006

Research Questions

1. Does the STEM Mentoring Model explain the variable experiences of deaf mentees?
2. Are deaf scientists better mentors for deaf mentees?
3. What's important for a good mentoring experience for deaf mentees?

Examples of Survey Items: Traditional Capitals

Academic Capital

4. [Name] taught me how to work independently.

Discipline Capital

5. [Name] taught me how to use the tools, techniques, and methods of my field.

Social Capital

11. [Name] encouraged me to meet other people working in my field.

Examples of Survey Items: Community Cultural Wealth

Navigational Capital

15. [Name] made sure my communication needs were met.

Aspirational Capital

22. [Name] gave me a role model(s) to look up to.

Familial Capital

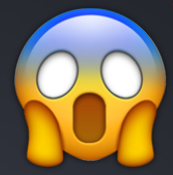
27. [Name] encouraged me to participate in the deaf community.

Linguistic Capital

29. [Name] had a positive attitude about ASL.

Resistant Capital

34. [Name] thought that hearing people should meet deaf people halfway.

The pilot survey felt like an **EPIC FAIL** 

Design

Derived from other published surveys and our focus group

Results

Clear satisficing
Much missing data
Items about traditional capitals were highly multicollinear
Respondents who'd had multiple mentoring experiences appeared to conflate these experiences together.
SPSS refused to complete the factor analysis! 

We gleaned what we could from the data, learned from our mistakes, and tried again….

Interviews

Identified communication access as a potentially important variable that was missing from our model

Second Survey

Added new items based on interviews
Greatly shortened survey by reducing items about traditional capitals
Used strategies to reduce satisficing and the missing data problem
Explicit throughout the survey about focusing on just one mentoring relationship

Results from factor analysis[5]

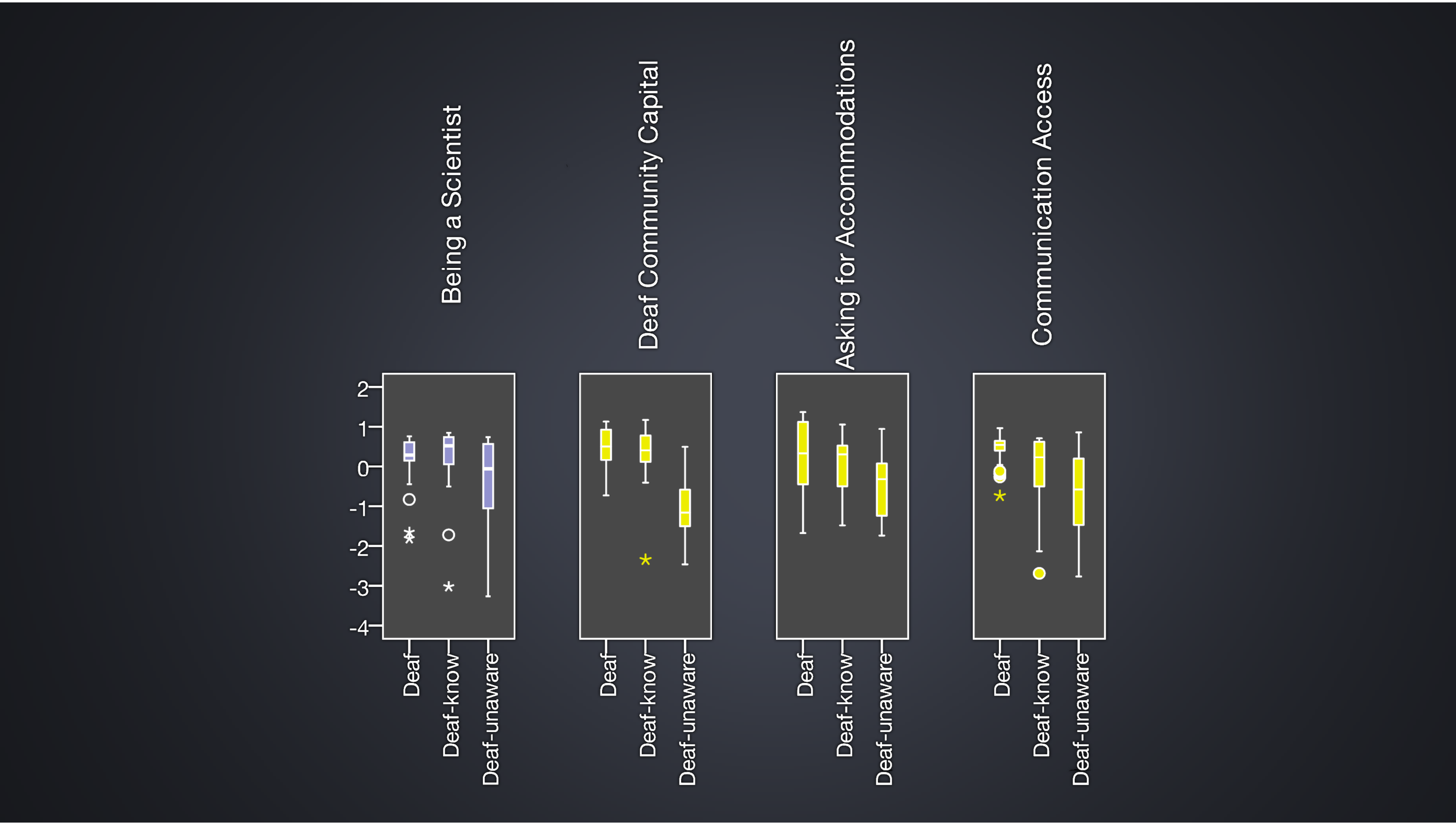
Factor I: Being a Scientist	→	Traditional Capitals + Aspirational Capital (Academic, Discipline, Social and Aspirational)
Factor II: Deaf Community Capital	→	Community Cultural Wealth (Familial, Linguistic, Navigational, and Resistance)
Factor III: Asking for Accommodations	→	Specific Items (from Navigational Capital)
Factor IV: Communication Access	→	Specific Items (from Navigational and Social Capital)

5. Braun DC, Gormally C, Clark MD. The Deaf Mentoring Survey: A Community Cultural Wealth Framework for Measuring Mentoring Effectiveness with Underrepresented Students . CBE Life Sci Educ 2017 Apr. doi: 10.1187/cbe.15-07-0155

We divided mentors into three categories:
deaf, deaf-know, and deaf-unaware

Deaf mentors were the best…

But we found that deaf-know mentors were almost equally effective!


Being a Scientist
Deaf Community Capital
Asking for Accommodations
Communication Access
2
1
0
-1
-2
-3
-4
Deaf
Deaf-know
Deaf-unaware

JOURNAL OF MICROBIOLOGY & BIOLOGY EDUCATION
DOI: https://doi.org/10.1128/jmbe.v19i1.1381

Perspectives

"Everyone Was Nice...But I Was Still Left Out": An Interview Study About Deaf Interns' Research Experiences in STEM †

Megan Majocha, Zachary Davenport, Derek C. Braun, and Cara Gormally*
Department of Science, Technology, and Mathematics, Gallaudet University, Washington, DC 20002

Science, technology, engineering, and mathematics (STEM) undergraduate research experiences improve success, persistence, and promote a feeling of belonging to a community. Like their hearing peers, deaf STEM majors often participate in undergraduate research experiences. However, deaf students typically interact with hearing faculty lacking experience with deaf students and awareness of Deaf culture, which unintentionally impacts their research experiences. This interview study sought to understand deaf students' research experiences and their relationships with hearing mentors. Findings indicate that lack of awareness of Deaf culture and lack of communication access impact students' experiences. We make recommendations on improving deaf students' research experiences.

INTRODUCTION

minority culture, mentees have improved outcomes, including

Interview data reinforced these four factors and uncovered a fifth variable: a cohort of Deaf peers[6]

First Study[5]	Interview Study[6]
① Being a Scientist	
② Deaf Community Capital	= Deaf Awareness
③ Asking for Accommodations	= Self Advocacy
④ Communication Access	= Mentor's Advocacy
	⑤ Internship Cohort

6. Majocha M, Davenport Z, Braun DC, Gormally C. "Everyone was nice...but I was still left out": An Interview Study About Deaf Interns' Research Experiences in STEM. J Microbiol Biol Educ 2018 Apr 19(1). doi: 10.1128/jmbe.v19i1.1381

Conclusions

1. Mentees self-reported the greatest benefit from Deaf and Deaf-know mentors.
   Hearing status of the mentor wasn't important. Experience with deaf students was.
2. We identified five variables for mentoring success.
   Being a Scientist, Deaf Awareness, Mentor's Advocacy, and having an Internship Cohort
3. We have a survey that is reliable and partially validated
   It will be useful for measuring mentoring relationships with deaf mentees

Surprises

1. Academic & Discipline Capital, and Social Capital, factored together
   We really thought some mentors would be social butterflies and teach more social capital than others
2. Aspirational Capital factored with Academic & Discipline & Social Capital !
   Are Deaf / other minority role models really that important?
   Our data didn't support that.

Breakout Question:

① How can cultural competence be taught and learned?

Breakout Question:

② What are the practical ways that you can make your URE welcoming to Deaf mentees?

Deaf Scientist Leadership in ASL and the Deaf Community

Cultural and Linguistic Knowledge

Affects research design

Affects interpretation of data

Affects usefulness of research

Example: An all-male research team studies women's reproductive issues. What happens?

Breakout Question:

③ Why should research groups studying a minority group always include scientists from that group on their team? Think of potential examples.

More In-Depth Resources for Mentoring Deaf Students

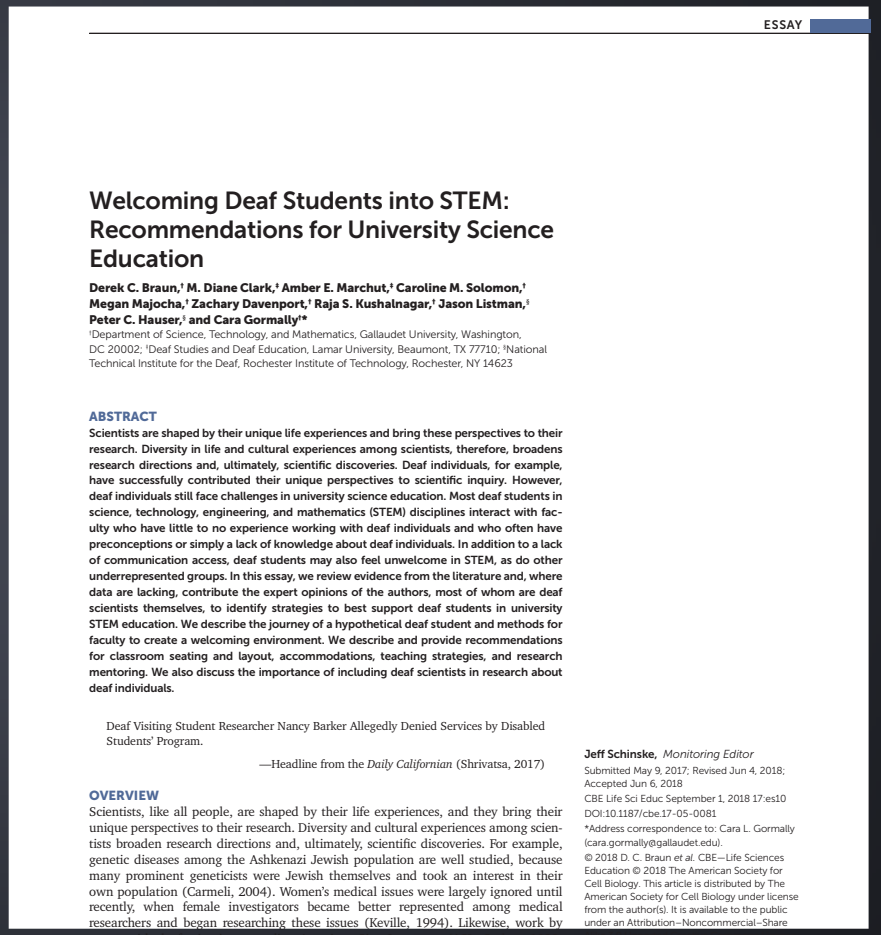
Topics Not Covered Today:

Communicating Misconceptions

Classroom seating and accommodations

Obtaining accommodations

Braun DC, Clark MD, Marchut AE, Solomon CM, Majocha M, Davenport Z, *et al.* Welcoming Deaf Students into STEM: Recommendations for University Science Education. CBE Life Sci Educ. 2018 Sep;17(3):es10. doi: 10.1187/cbe.17-05-0081



ESSAY

Welcoming Deaf Students into STEM: Recommendations for University Science Education

Derek C. Braun,[†] M. Diane Clark,[‡] Amber E. Marchut,[‡] Caroline M. Solomon,[†] Megan Majocha,[†] Zachary Davenport,[†] Raja S. Kushalnagar,[†] Jason Listman,[§] Peter C. Hauser,[§] and Cara Gormally[†]*

[†]Department of Science, Technology, and Mathematics, Gallaudet University, Washington, DC 20002; [‡]Deaf Studies and Deaf Education, Lamar University, Beaumont, TX 77710; [§]National Technical Institute for the Deaf, Rochester Institute of Technology, Rochester, NY 14623

ABSTRACT

Scientists are shaped by their unique life experiences and bring these perspectives to their research. Diversity in life and cultural experiences among scientists, therefore, broadens research directions and, ultimately, scientific discoveries. Deaf individuals, for example, have successfully contributed their unique perspectives to scientific inquiry. However, deaf individuals still face challenges in university science education. Most deaf students in science, technology, engineering, and mathematics (STEM) disciplines interact with faculty who have little to no experience working with deaf individuals and who often have preconceptions or simply a lack of knowledge about deaf individuals. In addition to a lack of communication access, deaf students may also feel unwelcome in STEM, as do other underrepresented groups. In this essay, we review evidence from the literature and, where data are lacking, contribute the expert opinions of the authors, most of whom are deaf scientists themselves, to identify strategies to best support deaf students in university STEM education. We describe the journey of a hypothetical deaf student and methods for faculty to create a welcoming environment. We describe and provide recommendations for classroom seating and layout, accommodations, teaching strategies, and research mentoring. We also discuss the importance of including deaf scientists in research about deaf individuals.

Deaf Visiting Student Researcher Nancy Barker Allegedly Denied Services by Disabled Students' Program.

—Headline from the *Daily Californian* (Shrivatsa, 2017)

OVERVIEW

Scientists, like all people, are shaped by their life experiences, and they bring their unique perspectives to their research. Diversity and cultural experiences among scientists broaden research directions and, ultimately, scientific discoveries. For example, genetic diseases among the Ashkenazi Jewish population are well studied, because many prominent geneticists were Jewish themselves and took an interest in their own population (Carmeli, 2004). Women's medical issues were largely ignored until recently, when female investigators became better represented among medical researchers and began researching these issues (Keville, 1994). Likewise, work by

Jeff Schinske, *Monitoring Editor*

Submitted May 9, 2017; Revised Jun 4, 2018; Accepted Jun 6, 2018

CBE Life Sci Educ September 1, 2018 17:es10

DOI:10.1187/cbe.17-05-0081

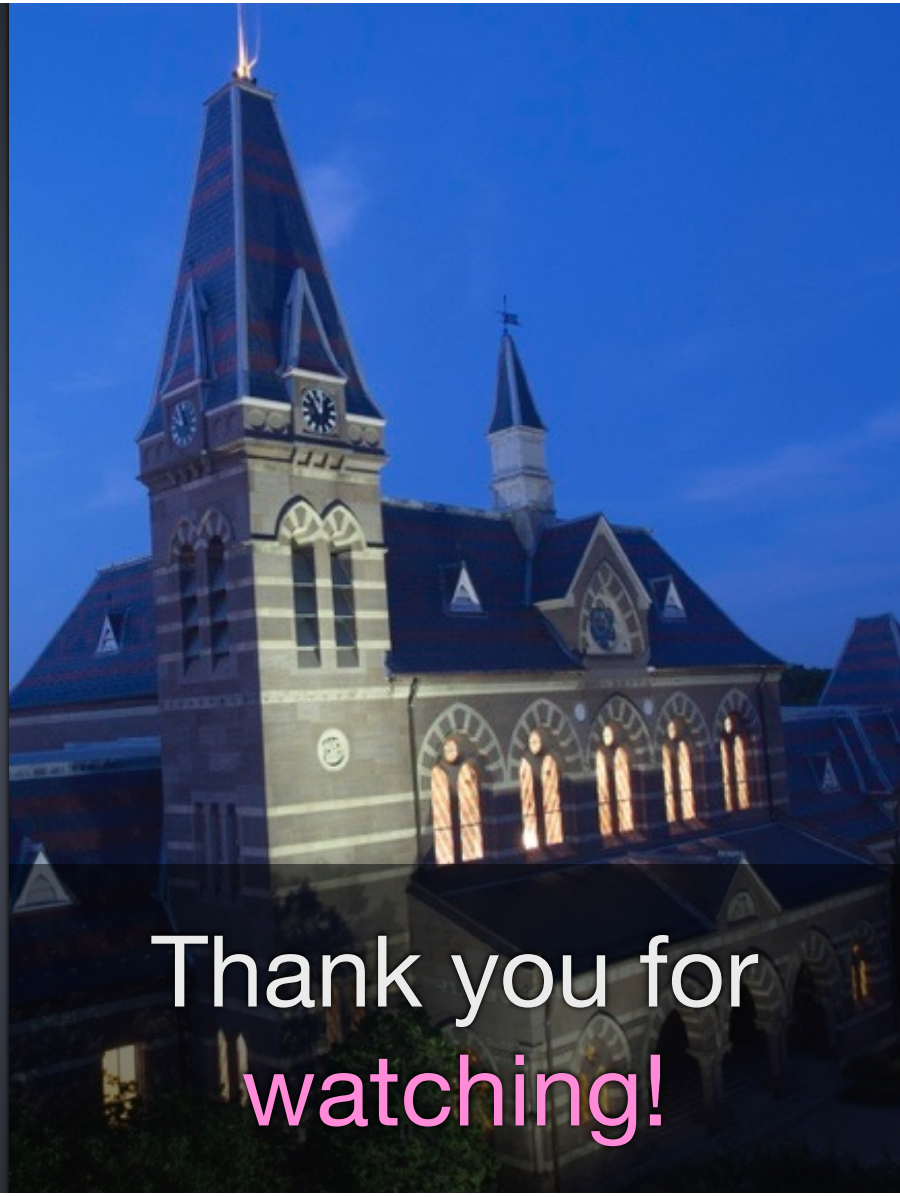
*Address correspondence to: Cara L. Gormally (cara.gormally@gallaudet.edu).

Acknowledgements

Gallaudet University
Cara Gormally
Regina Nuzzo
Megan Majocha
Zachary Davenport

Lamar University
M. Diane Clark

Rochester Institute of Technology
Peter C. Hauser
Jason Listman



Breakout Questions:

① How can cultural competence be taught and learned?

② What are the practical ways that you can make your URE welcoming to Deaf mentees?

③ Why should research groups studying a minority group always include scientists from that group on their team? Think of potential examples.