ADDRESSING THE ISSUE OF COMPLETION RATE AMONG ATMOSPHERIC SCIENCI PURPOSE **RESEARCH AIMS**

This is a preliminary report of an investigation into factors which may act as a 1 barrier to success among undergraduate atmospheric science students. Degree completion rates among undergraduate students majoring in the geosciences have, in the past, significantly lagged behind completion rates of all STEM undergraduates. Due to the predicted shortage of geoscientists in the workforce, coupled with recent calls for broadened participation in the geosciences in terms of race and gender, addressing the issue of degree completion is prudent. Further, because there are marked differences in atmospheric science curriculum and career prospects, it is important to understand what unique challenges, if any, are experienced by undergraduates in the atmospheric sciences. This study aims to heighten 2. awareness for the issue of degree completion among the atmospheric sciences and related disciplines, aid the understanding of barriers to student success in the geosciences by focusing on atmospheric science, and to inform future decision making on methods to improve student success in the geosciences. This preliminary report will focus on initial results while allowing time for feedback from session participants.



Year

BACKGROUND

Logan Saucer | Department of Earth & Environment | STEM Transformation Institute 1. Riggs, Eric M.; Callahan, Caitlin; and Brey, Jim (2018). "Research on 2. Benjamin A. Wolfe & Eric M. Riggs (2017) Macrosystem FLORIDA Access and Success of Under-Represented Groups in the Analysis of Programs and Strategies to Increase INTERNATIONAL Geosciences". In St. John, K (Ed.) (2018). Community Framework for Underrepresented Populations in the Geosciences, Journal of Geoscience Education Research. National Association of Geoscience Geoscience Education, 65:4, 577-593, DOI: 10.5408/17-256.1 **JNIVERSITY** Teachers. DOI: https://doi.org/10.25885/ger_framework/6

Johnson, A., & Harrison Okoro, M. (2016). How to recruit and retain underrepresented minorities. American Scientist, 104(2), 76.

Gonzales, L. and Keane, C. (2008) Geoscience Currents 17, American Geosciences Institute.

Oil (\$USD / barrel) -inflation adjusted 2007

- undergraduates.
- exists barriers when underrepresented demographic.

LITERATURE REVIEW

Multicontextuality¹:

calls for attention to individual student identities and personal pathways by acknowledging "the effect of complex, interwoven identities of under-represented students as they learn in and interact with STEM fields, and the explicit importance of institutional attention and action to identify lower barriers to success while and providing necessary support"

Macrosystems Model²:

individual-centric interactions between elements and the broader system that shape the individual and system while influencing the direction and persistence of both.

FUTURE METHODS

- Qualtrics) using Likert Scales
- National and Local Student Recruitment Survey Analysis/Thematic Coding for emergent themes and validated by Ricci & Wilson (2014).
- Instrument Development Face-to-Face Interview
- Interview Analysis/Thematic Coding using themes 5.
- from electronic survey.

Compare and contrast enabling structures and recurring barriers to degree completion in atmospheric science with those of other STEM disciplines. This aim seeks to inform geoscience educators and practitioners on factors contributing to/inhibiting the success of atmospheric science undergraduates, which may begin to shed light on the dichotomy between completion rates among geoscience undergraduates and all STEM

Report on any differences in the way women and students of color in the atmospheric sciences identify factors that they perceive to influence degree completion. This aim seeks to understand whether an increase in prevalence of and/or an amplifying effect on enabling structures and/or recurring with an paired

Instrument Development – Electronic Survey (e.g.,

ldentified Challenges	%	Sample Comments: BA/BS
Trouble with a Specific Course	25%	"Having to take non-geology related Calculus, Chemistry, and Physics. I fee better in those courses if they were o to geology."
Financial Issues	15%	"Passing environmental geochemistr my student loans so not being able to
Personal Issue/ Concern	15%	"Entering my junior year of college, I from academic burn-out. I also wasn' wanted to go with my degree(s) and I wanted to do. I felt like I wasn't as so doing things as I'd used to be."
Time Manage- ment	12%	"The greatest obstacle to completing getting classes to meet my schedule. father of three that worked full time to college career. Balancing my home lift school demands has been difficult."
Issues with Course Availability	7%	"I was frustrated by the limited cours our department is so small. I spent tw courses outside of the department. B year started, none of our course offer
Balancing Employment and Studies	6%	"Time and Money. Geology labs and time consuming and often require exand time off work. For students that of from family, this is difficult to manage
Issues with the Professoriate	5%	"Sometimes teacher was very disresp ing; made me feel very inadequate an

Geosciences Institute.

Instructions: Below is a list of statements related to your undergraduate enrollment. Please indicate your response for each statement.

Responses: Strongly Agree, Agree, Disagree, Strongly Disagree My professor(s) understand my needs as a student.

- 5. graduation.

SResponses: Significant Barrier, Barrier, Support, Significant Support, The quantitative skills courses I need to graduate.

- English, etc.)

Recognizing and supporting under-represented students' identities in the geosciences will require the implementation of research-based approaches that account for the individual. The results of this research will lead to improved structures for supporting the diversity of the geosciences workforce, which has the potential to increase the workforce's ability to communicate information to the public. To have immediate impact, the aggregated and deidentified survey and interview analysis will be given directly to the programs of participating students. These analyses will include recommendations of how the program can immediately help their students. Recruiting students alone isn't enough. Structures to support students' degree completion must be in place while also lowering potential barriers to student success.

	NDERGRA	DUAIES
S Graduate	Sample Comments: MA/MS Graduate	Sample Comments: Phd Graduate
coursework such as el I would have done offered with respect	"Lack of prior academic experience in geology as an earth science, so the learning curve on the fundamentals was steep. The engineering part was much easier for me."	"I was not used to do research, it was hard to see the big implications."
y and maxing out o afford field camp."	"The amount of money required to complete an additional degree was a large consideration before deciding to pursue this degree. Student loan debt almost caused me not to enroll."	"Financial. I've worked full time out of school during the majority of my college career including the major- ity of my Ph.D."
began to suffer t sure where I what kind of work mart or capable of	"Currently in my MS program, it is being away from family with a 6 year old, lack of enthusi- asm about my thesis, and lack of motivation from my advisor so it's taking more time to write than it should."	"Frustration and isolation when research wasn't going well."
my degree was I am a married the first half of my fe with a family with	"Balancing my life with school. As an adult that did not go straight to college, it was difficult to balance my life and my relationship with the rigors of pursuing an advanced degree."	"Personal time management"
e offerings, since vo semesters taking by the time senior rings thrilled me."	"The greatest obstacle was not having a wide variety of classes to pick from and only having 2 graduate faculty to teach those classes."	N/A
field classes are very opensive equipment don't recieve money e."	"The greatest obstacle was working through college while also trying to find internships, which are crucial in this field."	"I had a child and went to work full time to support my family. Working and finishing a graduate degree is really, really hard."
ectful and insult- nd unimportant."	"Sometimes feel lacking of good professor."	"Graduate level courses in seismol- ogy were poorly taught by reluctant faculty that under-valued providing the fundamentals in course material"

Ricci, J. and Wilson, C.E. (2014) Geoscience Currents 94, American

EXHIBIT: SURVEY INSTRUMENT

My department offers extracurricular activities related to my major. I have means of seeking extra help with my coursework.

I know what I can expect to earn with my degree.

know which industries may hire a student like me upon

The undergraduate research opportunities available to me.

The active learning modes of instruction used by my professors. The responsiveness of my professor(s).

The general education requirements needed for my major (arts, DISCUSSION