

Examining Faculty and Graduate Student Attitudes on Stress and Mental Health

David Feil-seifer

David Feil-Seifer is an Associate Professor in Computer Science at the University of Nevada, Reno. His primary research interests are Socially Assistive Robotics (SAR) and User Interface design for Unmanned Autonomous Systems (UAS-UI). His research is motivated by the potential for SAR to address health-care crises that stem from a lack of qualified care professionals for an ever-growing population in need of personalized care as well as the uses for aerial robots for disaster mitigation. Prior to his tenure at UNR, he was a Postdoctoral Associate at Yale University at the Social Robotics Lab under the direction of Prof. Brian Scassellati. He was awarded a National Science Foundation/Computing Research Association Computing Innovation Fellowship to support his postdoctoral work. He received a B.S. in Computer Science from the University of Rochester and a M.S. and Ph.D. in Computer Science from the Viterbi School of Engineering (VSoE) at the University of Southern California (USC) under the direction of Prof. Maja Matarić. He helped coin the term, Socially Assistive Robotics (SAR), and studied its applications for children with autism spectrum disorders (ASD). He has been awarded the Mellon award for Mentoring, the Order of Arete, and the USC VSoE Best Dissertation award.

Mackenzie C. Parker

Mackenzie is a doctoral student at the University of Nevada, Reno in the Department of Engineering Education. She received a Master of Science degree in Materials Science and Engineering from the same institution in 2018. Her research explores facets of engineering graduate student experiences relating to professional identity, motivation, work-related stress, and mental health.

Adam Kirn (Associate Professor)

TBD

Examining Faculty and Graduate Student Attitudes on Stress and Mental Health

Abstract

Mental health is a key attribute for success in graduate programs. However, previous studies demonstrate a growing mental health crisis in graduate education, which can contribute to issues with productivity, departure, and well-being. Engineering students are not immune to this crisis, yet are one of the least likely disciplines to seek help for mental health.

Despite this trend, there is limited literature available to provide evidence-based practices for addressing the causes and persistence of mental health issues for engineering graduate students. To address this need and to begin advocating for systemic change, this project will explore how faculty and student attitudes about mental health intersect with the institutional features that direct action when a mental health crisis arises. Specifically, this project focuses on generating new knowledge about the ways faculty and students conceptualize mental health within engineering graduate programs.

Understanding these facets of mental health in academia is a first step toward changing policies and practices that have perpetuated the mental health crisis in engineering. This long-term outcome of this EEC project will develop evidence-based practices to improve student mental health services in graduate engineering programs.

Introduction

A growing mental health crisis in graduate education is a major factor in the attrition of qualified STEM MS and PhD students¹. While the factors driving attrition are multi-faceted, research demonstrates that mental health is a key contributor to high attrition rates in graduate education^{2,3}. Research indicates that approximately 40% of graduate students have anxiety, depression, or a combination of the two^{4,3,5}. Studies have noted that university students are primed for mental health concerns due to risk factors such as age, transitional life stage, and increased stress compared to the general population (mental health rates of 20%)⁶. While help-seeking for mental health concerns has increased at academic institutions, access to mental health resources can be limited, resulting in measures such as wait lists and session limits to accommodate the increasing demand for services⁷. This has only become more acute since the start of the COVID-19 pandemic⁸. Many of the mental health resources available at academic institutions are tailored to help the undergraduate population. This increasing quantity of mental health issues and lack of support for addressing those issues represents a growing mental health crisis.

Emerging research indicates that the graduate training pipeline suffers from high rates of student attrition^{1,9,10,11}. Currently, only 66% of MS and 63% of PhD students obtain their degrees in 4 or 6 years, respectively⁹. Furthermore, COVID-19 has exacerbated challenges facing graduate students while also further straining mental health resources¹². Given the high demand for STEM MS and PhD graduates, attrition due to mental health is a major cause for concern.

Mental health is a key attribute for success in graduate programs, yet the growing mental health crisis for graduate students is often neglected by students, faculty, and administrators¹. If allowed to persist, these mental health crises will exacerbate issues related to productivity, attrition, and in the worst cases, injury or death. Given the growing mental health crisis and the importance of graduate students in the development of economic innovations, it is surprising then that across STEM and within engineering students seek treatment for mental health issues at significantly lower rates than other disciplines¹³. This pattern of help-seeking along with the continual growth of mental health issues in graduate education points to a need to create systemic change in the ways we foster, monitor, and support engineering graduate students¹.

Despite this trend, there is a limited but growing body of literature available to provide evidence-based practices for addressing the causes and persistence of mental health issues for engineering graduate students^{14,15,16,17,18,19}. To address this need and to begin advocating for systemic change, this project will explore how faculty and student attitudes about mental health intersect with the institutional features that direct action when a mental health crisis arises. Understanding these facets of mental health in academia is a first step toward changing the policies and practices that have perpetuated the mental health crisis in engineering. This project will develop evidence-based practices to improve student mental health services in graduate engineering programs.

Research Design, Methods, and Instruments

To accomplish these goals, this study systematically explores how faculty and student attitudes about mental health intersect with institutional features and shape programmatic trends. We are examining the following research questions:

1. What are the institutional and individual features that influence students' attitudes about mental health?
2. What are the institutional and individual features that influence faculty attitudes about mental health? Do these align with or complement student attitudes?
3. What are the different attitudes about mental health across engineering degree programs?

To answer the three research questions, this work employs a three-phase multi-method qualitative study. In Phase 1, engineering graduate students' and engineering faculty's attitudes about mental health are being examined through the use of Interpretative Phenomenological Analysis. The attitudes of each group will be examined separately and then each group will be compared to understand the ways these perceptions intersect and influence action. Leveraging the experiences of Phase 1, Phase 2 will refine existing interview protocols and develop a codebook for deductive coding for Phase 3. Phase 3 will utilize the results of Phases 1 and 2 to phenomenographically examine how graduate student and faculty attitudes about mental health are influenced across

departmental structures and cultures²⁰. Findings from all phases will be used to shift institutional policies and practices that exacerbate the mental health crisis. This paper focuses on the steps taken during Phase 1 and the emergent results to date.

Interview Protocol Development and Piloting

We initiated Phase 1 developing and piloting an interview protocol based on literature on mental health and stress and graduate education²¹. The interview protocols, found in Appendix A, focused on the experiences of faculty and graduate students. We piloted the interviews with the research team for clarity, order, and consciousness. The research team is comprised of two engineering faculty and one engineering education PhD student. Both faculty are graduate program directors in their respective programs. Author 1 is a computer scientist who is undertaking engineering education research as part of a traineeship grant. Author 3 is a trained engineering education researcher with significant work in engineering graduate education. All three authors, are motivated to address the mental health crisis due to direct and indirect experiences with mental health in their engineering graduate programs and the inadequate systemic responses to mental health issues.

Participants, Recruitment, and Interviews

Aligning with the goals of Phase 1, recruitment emails were sent to the faculty and graduate students in one department at a Western land-grant institution. The department represents a traditional engineering discipline and is one of the larger and more research active departments within the College. Additionally, the department has undergone recent efforts to support graduate students through a training and scholarship program and the founding of their departmental diversity, equity, and inclusion committee.

At the time of writing, two faculty and two students have participated in interviews. For this work we present emergent trends from the interviews with two faculty, Megan and Ray. The faculty members represent two tenured faculty in the department each with different leadership roles for supporting graduate students, including being a graduate program director and the lead on a graduate student scholarship program. The specific nature of these roles along with who is undertaking these roles is not discussed to protect anonymity.

Each faculty member participated in a videoconference interview lasting approximately 75 minutes. Faculty were encouraged to share their experiences and knowledge around stress and mental health. The lead interviewer asked follow up questions for additional detail or to clarify what was said. The recorded interviews were transcribed using otter.ai and cleaned by the research team.

Ongoing Analysis

The researchers listened to each interview and read the transcripts to gain familiarity with each participant²². At the completion of the listening phase, the research team went through each interview line by line, conducting a descriptive coding pass at the paragraph level²³. The research team noted key definitions for stress and mental health and the participants' lived experiences that served to shape their approaches to mental health and stress in graduate education. The analysis

of these interviews along with additional data collection are ongoing. The results presented below represent the initial interpretations of the research team that will be refined in subsequent analyses and publications.

Preliminary Results

Across the participants, two themes are emerging around stress and mental health. The first, personal experiences shape faculty reactions to stress and mental health in engineering graduate students. Second, each faculty member framed mental health and stress as concerning when student productivity was declining.

Personal Experiences Shaping Perceptions

Throughout the interviews both participants spent a significant amount of time reflecting on their own experiences with stress and mental health during their graduate programs. Rather than present specific quotes, we have summarized these experiences to maintain a level of participant anonymity. One faculty member described significant concerns about money and significant relationship issues during their graduate program. In contrast, the other faculty member described physical symptoms in the form of ulcers and migraine-like reactions as a result of the significant stressors of graduate school. Both participants described how these stressors and declines in mental health led to significant declines in their ability to make progress towards their degrees.

Progress as a Signal

Building off of their experiences of stress and mental health influencing their progress, both Megan and Ray used progress as the way to assess graduate student stress and mental health. Megan organized a good deal of her thinking on both stress and mental health toward research progress. When students progressed and met deadlines, she did not see the need to intervene or interrogate student mental health. Issues were only worthy of active intervention if they interfered with student progress:

“And I do I try to [listen] like ... when I feel like [students are] not being productive, I try to see is anything going on? Or is there things that I should know about and, and be inquisitive? And sometimes they’re open with me and sometimes they’re not? Yeah, and sometimes they just say things that helped me understand why it’s more difficult for or progress is slower than I expect, and they can often put it in a way that’s okay.” (Megan)

Similarly, Ray viewed stress as a force that can build up over time due to pressures both external and internal to a graduate program. This stress can lead to mental or physical health challenges:

“You know, stress can be, you know, for graduate students, you know, like their publication, their graduations, their, their work prospects, you know, when they are toward the end of graduation, they’re trying to secure a job. I see a lot of students, they are in a stress about that.”

“...mental health can really help them be more productive, more motivated. And, you know, to do that certain job in a shorter amount of time, and even exceed the, the the initial expectation. . .” (Ray)

Both faculty discussed stress and mental health in the context of productivity with maintaining productivity as their main goal. Both had thought about stress and mental health, but in a way heavily weighted by their own prior experiences with theirs or others’ experiences with stress as formative experiences in their graduate programs.

The above themes indicate that personal experiences heavily shape the ways that faculty view mental health and stress in graduate programs with faculty using productivity as the primary metric to interrogate students’ mental health experiences that may be most like their own. While these views of mental health may limit care, Megan and Ray also began to show potential for broadening how they conceptualize mental health. As part of a graduate student mentoring program that required her to interact with students that she did not directly supervise, Megan began to see a wider range of student stress and mental health concerns. Further, Ray committed to engaging students in discussions of stress and mental health, when prompted in either his role as an advisor or as graduate director, and was very supportive of student struggles related to stress and mental health. However, he largely put the job of helping students manage stress and mental health on University organizations, such as the graduate student association (GSA) or other campus resources.

Conclusions and Future Work

Early faculty interviews show that faculty have varying attitudes toward graduate student stress and mental health. Further, we show that their desire to engage in discussions with their students about either stress or mental health is on a wide spectrum, often with work productivity at the core of these discussions. These differences relate to faculty’s own experiences and struggles with stress and mental health when they were graduate students. This highlights the ways participants’ lived experiences influence attitudes about and actions toward mental health and the ways institutional structures create variability in these attitudes. Taken together, these results begin to elucidate the ways that the prior experiences as graduate students feed into faculty practices, thus showing how the mental health crisis can propagate and persist.

Future work will continue to refine the interpretation of these interviews, while collecting additional interviews from faculty and graduate students. The inclusion of both populations will allow us to understand the unique ways the faculty and student interactions shape their lived experiences, stress, and mental health. Additionally, we will explore the ways these interactions are shaped by and shape systems of graduate education. The combined results will help highlight the practices that serve to support wellbeing and those that undermine the wellbeing of engineering graduate students.

Acknowledgement

This research is funded by the National Science Foundation PFE: RIEF program, grant number EEC-2025096. The Institutional Review Board of the University of Nevada, Reno has approved

all procedures. We also thank our participants for their time and openness during the data collection processes.

References

- [1] National Academies of Sciences Engineering, Medicine, et al. *Graduate STEM education for the 21st century*. National Academies Press, 2018.
- [2] Jenny Hyun, Brian Quinn, Temina Madon, and Steve Lustig. Mental health need, awareness, and use of counseling services among international graduate students. *Journal of American College Health*, 56(2): 109–118, 2007.
- [3] Teresa M Evans, Lindsay Bira, Jazmin Beltran Gastelum, L Todd Weiss, and Nathan L Vanderford. Evidence for a mental health crisis in graduate education. *Nature biotechnology*, 36(3):282–284, 2018.
- [4] Katia Levecque, Frederik Anseel, Alain De Beuckelaer, Johan Van der Heyden, and Lydia Gisle. Work organization and mental health problems in phd students. *Research policy*, 46(4):868–879, 2017.
- [5] C Woolston. Phd poll reveals fear and joy, contentment and anguish. *Nature*, 575(7782):403–406, 2019.
- [6] Facts & statistics — anxiety and depression association of america, adaa. <https://adaa.org/about-adaa/press-room/facts-statistics>. Retrieved February 26, 2020.
- [7] Robert P Gallagher. National survey of college counseling centers 2014. 2015.
- [8] Changwon Son, Sudeep Hegde, Alec Smith, Xiaomei Wang, Farzan Sasangohar, et al. Effects of covid-19 on college students' mental health in the united states: Interview survey study. *Journal of medical internet research*, 22(9):e21279, 2020.
- [9] Cathy Wendler, Brent Bridgeman, Fred Cline, Catherine Millett, JoAnn Rock, Nathan Bell, and Patricia McAllister. The path forward: The future of graduate education in the united states. *Educational Testing Service*, 2010.
- [10] Barbara E Lovitts. *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Rowman & Littlefield Publishers, 2002.
- [11] Barbara E Lovitts and Cary Nelson. The hidden crisis in graduate education: Attrition from ph. d. programs. *Academe*, 86(6):44, 2000.
- [12] David Feil-Seifer, Kerstin S. Haring, Silvia Rossi, Alan R. Wagner, and Tom Williams. Where to next? the impact of covid-19 on human-robot interaction research. *ACM Transactions on Human-Robot Interaction (THRI)*, 10(1), June 2020. doi: 10.1145/3405450.
- [13] Sarah Ketchen Lipson, Sasha Zhou, Blake Wagner III, Katie Beck, and Daniel Eisenberg. Major differences: Variations in undergraduate and graduate student mental health and treatment utilization across academic disciplines. *Journal of College Student Psychotherapy*, 30(1):23–41, 2016. doi: 10.1080/87568225.2016.1105657.
- [14] Sarah Jane Bork, Anu Tuladhar, and Joi-Lynn Mondisa. Board 134: Methods for conducting a scoping literature review on engineering graduate student mental health (work in progress). In *2019 ASEE Annual Conference & Exposition*, number 10.18260/1-2–32242, Tampa, Florida, June 2019. ASEE Conferences. <https://peer.asee.org/32242>.

- [15] Sarah Jane Bork and Joi-Lynn Mondisa. Science, engineering, and mathematics graduate student mental health: Insights from the healthy minds network dataset. In *2019 ASEE Annual Conference & Exposition*, number 10.18260/1-2-33255, Tampa, Florida, June 2019. ASEE Conferences. <https://peer.asee.org/33255>.
- [16] Sarah Jane Bork and Joi-Lynn Mondisa. Validation of an instrument to measure science, engineering, and mathematics graduate students' mental health (work in progress). In *2020 ASEE Virtual Annual Conference Content Access*, number 10.18260/1-2-35482, Virtual On line, June 2020. ASEE Conferences. <https://peer.asee.org/35482>.
- [17] Sarah Jane Bork and Joi-Lynn Mondisa. Work in progress: Using photovoice to examine the mental health experiences of engineering graduate students during covid-19. In *2021 ASEE Virtual Annual Conference Content Access*, number 10.18260/1-2-36525, Virtual Conference, July 2021. ASEE Conferences. <https://peer.asee.org/36525>.
- [18] C Ogilvie, TR Brooks, C Ellis, G Gowen, K Knight, RJ Perez, SL Rodriguez, N Schweppe, LL Smith, and RA Smith. Nsf rapid: Graduate student experiences of support and stress during the covid-19 pandemic. *Montana State University, Bozeman, MT, USA, White Paper*, 2020.
- [19] Rosemary J Perez, L Wesley Harris Jr, Claire K Robbins, and Cheryl Montgomery. Graduate students' agency and resistance after oppressive experiences. *Studies in Graduate and Postdoctoral Education*, 2020.
- [20] Emily Dringenberg, John Alexander Mendoza-Garcia, Mariana Tafur-Arciniegas, Nicholas D. Fila, and Ming-Chien Hsu. Using phenomenography: Reflections on key considerations for making methodological decisions. In *2015 ASEE Annual Conference & Exposition*, number 10.18260/p.25012, Seattle, Washington, June 2015. ASEE Conferences. <https://peer.asee.org/25012>.
- [21] Anna Sverdluk, Nathan C Hall, Lynn McAlpine, and Kyle Hubbard. The phd experience: A review of the factors influencing doctoral students' completion, achievement, and well-being. *International Journal of Doctoral Studies*, 13(1):361-388, 2018.
- [22] Joachim Walther, Nicola W. Sochacka, and Nadia N. Kellam. Quality in interpretive engineering education research: Reflections on an example study. *Journal of Engineering Education*, 102(4):626-659, 2013. doi: <https://doi.org/10.1002/jee.20029>.
- [23] J.A. Smith, P. Flower, and M. Larkin. Interpretative phenomenological analysis: Theory, method and research. 2009.