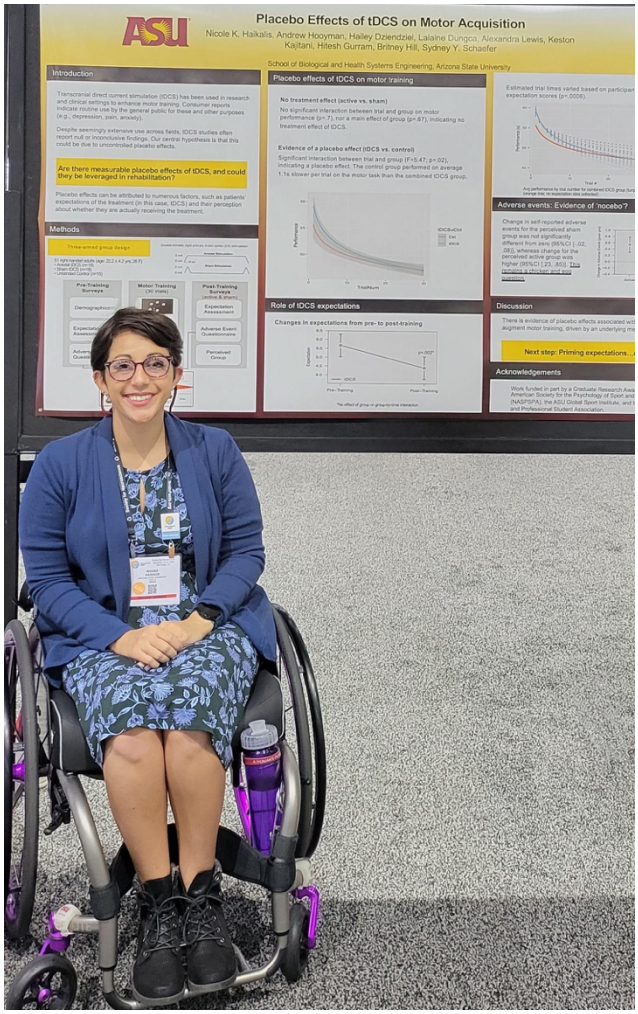
Meet Our Members: Nicole Haikalis Aguilar



Nicole Haikalis Aguilar is a Ph.D. Candidate working in the Motor Rehabilitation and Learning (MRL) Laboratory at Arizona State University, where she studies placebo effects of non-invasive brain stimulation on motor learning. She has been a member of the American Society of Neurorehabilitation (ASNR) since 2021, and ASNR was delighted to award Nicole our 2022 Diversity Travel Fellowship. Diversity is critical for advancing neurorehabilitation, and this fellowship supports underrepresented individuals by providing complimentary registration to our Annual Meeting and funding for meeting-related travel expenses. In this interview, Nicole shares more about her career path and research.

1) How did you get interested in science, and what steps did you take to get to your current role?

I learned about the immense value of science and education from my mom. My first love and lifelong hobby is astronomy and space exploration. From a very young age, I decided to become an aerospace engineer and go to space. Rather than go straight into college, I joined the Marine Corps. I wanted to do more than achieve my personal dream because I felt a more important need to serve and help others. Little did I know that I would get injured and eventually become wheelchair-bound, offering me a whole new identity on top of all the intersectional identities I already had. Upon reassignment to a unit for injured Marines, I became aware of biomedical engineering. I befriended people who just wanted to keep serving. All of us were still in the fight, regardless of our change in abilities or whether they were permanent. I was fascinated by aids for activities of daily living and adaptations that enabled disabled people to get a chance to go for their dreams. Things that eventually enabled me to adapt my dreams of scientific discovery and still get an education. When I found neuroengineering, it was love at first journal article. I was hooked on research and discovery of another undiscovered world, the human brain. Through my experiences and perspective, I believe that the goal of healthcare and rehabilitation should be to identify anything and everything that can give a person back their agency in any way. So, I pivoted and adapted my goal of helping give back to people by increasing their agency through neuroengineering research. Because I was interested in an interdisciplinary field, I decided to double-major in

Biomedical Engineering and Neuroscience and minor in Pyschology at Arizona State University. In my senior year, I began an official role as a research assistant in the Motor Rehabilitation and Learning Lab under the direction of Dr. Sydney Schaefer. This allowed me the opportunity to complete a thesis in the 4+1 Biomedical Engineering MS program at ASU. I care deeply for Dr. Schaefer's mentoring methods and genuine desire to make scientific research more inclusive. For this reason, I applied to stay at ASU for a Ph.D. in Biomedical Engineering to keep learning from incredible mentors like Dr. Schaefer and her postdoc, Dr. Andrew Hooyman. I am now in my first year and just finished my first semester!

2) What is the focus of your current research, and what are some of your findings?

Studies using transcranial direct current stimulation (tDCS) to enhance motor training are often irreproducible. This may be partly due to differences in stimulation parameters across studies, but it is also plausible that uncontrolled placebo effects may interact with the true 'treatment' effect of tDCS. In general, placebo effects are psychophysiological responses to perceived medical treatments, regardless of whether the treatment is active or inactive. My research focuses on how placebo effects of transcranial direct current stimulation (tDCS) can be leveraged to improve patient outcomes in neurorehabilitation. My master's thesis was "Measuring Placebo Effects of Transcranial Direct Current Stimulation (tDCS) on Motor Learning". So far, while working at the MRL lab, we have recently demonstrated a placebo effect of tDCS on both cognitive and motor training, likely driven by participants' perceptions of whether they received stimulation and their expectations about the efficacy of tDCS. My current study now aims to determine the extent to which reading positive or negative information about the effects of tDCS influences the placebo effect. I am interested in the intersection of research and advocacy for bodily autonomy and agency. I think there is more than meets the eye when we look at the role of agency in healthcare. I would look to uncover this and potentially use the knowledge gained to improve patient well-being and recovery. If the goal of tDCS and non-invasive brain stimulation is truly to improve patient outcomes or augment treatment, we should look into a way to maximize the placebo effects of tDCS.

3) How have you benefited from your membership in ASNR and receipt of the Diversity Travel Fellowship Award?

I presented my first research poster in person last year at ASNR's annual meeting in St. Louis, MO. It was an incredible experience. I loved meeting and discussing research with other ASNR members who are interested in helping patients recover. After presenting as a graduate student member of ASNR, I was elated with the number of people interested in discovering how to improve patient healthcare and recovery. It really encouraged me to continue my research and aspire toward a Ph.D. I was honored to receive the Diversity Travel Fellowship Award. I am grateful for the financial assistance, especially since I have certain physical limitations that make attending conferences quite expensive for a graduate student's budget. I am also so grateful for the chance to one-day mentor others and help share and advocate for new perspectives that

can help make ASNR more inclusive to all people. I have benefited greatly from ASNR, and I only hope to pay it forward over time.

4) What are your longer term career goals?

I am interested in a few areas of research that I would like to one day apply for a postdoctoral fellowship in. I am very interested in bodily autonomy and its role in neurorehabilitation. More specifically, I want to investigate further the placebo effects of non-invasive brain stimulation and how they might aid neurorehabilitation and motor learning. Ideally, I would like to apply this knowledge to various aspects of neurorehabilitation. Possibly involving things like space exploration and the effects of microgravity on humans, PTSD and Military Sexual Trauma (MST), brain-computer interfaces, or wherever life takes me where I can make the biggest impact. Above all, I want to help people heal, pay everything I can forward to future students and peers through mentorship and advocacy, and help make opportunities for as many people as possible to achieve their goals while feeling seen, heard, and encouraged to make adaptations as needed.

To learn more, you can connect with Nicole on Twitter and LinkedIn.