Executive Committee Spotlight: Dr. Kelsey Baker

We're excited to introduce you to ASNR's current Program Chair Kelsey Baker, PhD. Dr. Baker is Assistant Professor of Molecular Science at The University of Texas Rio Grande Valley School of Medicine. She is also a Biomedical Engineer with the Louis Stokes Cleveland Veterans Affairs Medical Center. In this interview, she shares more about herself, her career, and her involvement with ASNR over the years.

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

Growing up, my mom was a dental hygienist and my dad was a mechanical engineer. I like to say that I was the mixture of both of them. During undergraduate, I was very interested in science, given my very problem-solving mind as a child. In fact, I remember being the obnoxious child that would always ask "why" or "how does that work" and drove my parents crazy. During undergraduate, I was involved in basic science in a hematology laboratory – this was the start of my love for science. After completing my bachelor's, I knew that I wanted to work with advanced students and do research – so that meant I had to get a PhD. I ended up applying for programs that interested me. These ranged from biomolecular science to engineering to pharmacology. In the end, I received advice to choose a project I could enjoy and a mentor that I could work with – and that is just what I did. My PhD work was all in animal models, evaluating neural implants and the body's response to them after implantation. Following my PhD, I was vested in moving to clinical research. While I enjoyed animal models, I wanted to work with patients directly. For this reason, I was blessed to get a post-doc position at the Cleveland Clinic Foundation – and then I guess they say... "the rest is history"? During my mentorship as a post-doc, I was fortunate and blessed to receive many training awards and opportunities that allowed me to develop an independent research strategy for my lab (Of course, all of this coincided with attending ASNR Annual Meetings – coincidence? I think not!). However, just as my career was starting to get going in Cleveland, my husband finished his residency! Based on job availability for him, we ended up moving to sunny South Texas, and things really took off for me here.

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

My research focuses on evaluating the neuropathophysiology following neurological disorders and identifying interventions that can modify existing neurological substrates to improve quality of life. Currently, I have several active projects in the laboratory. First, we are evaluating the role of alternate motor pathways in acute stroke in a primarily Hispanic population. Our work in this area provides an opportunity for medical students interested in neurology to be involved in research. Second, we have begun to evaluate neurophysiological changes in patients with

Parkinson's disease with a history of neurotoxin exposure. We are deploying rehabilitation interventions to improve their quality of life and slow disease progression. Finally, we continue to evaluate neuromodulatory methods to improve upper limb function in individuals with spinal cord injury (SCI). My recent collaborations are now extending my work to include pain management and computational modeling of human movement. Some key findings we have determined include: (1) improved utility and efficacy of high definition transcranial direct current stimulation (tDCS) in patients with SCI compared to conventional tDCS approaches, (2) optimization of a protocol for temporary deafferentation and (3) development of machine learning approaches that can predict the development of Parkinson's disease.

3) Why did you decide to get involved with the ASNR Board of Directors?

I began going to ASNR Annual Meetings in approximately 2014. Through the Annual Meetings and my involvement with ASNR, I have made so many connections that have strengthened my research. For example, I joined the mentor-mentee program and worked with Dr. Keith Tansey to identify strategies to think about as I applied for my first training grant in spinal cord injury research. This blossomed to fruitful discussions at my poster with leaders in the field. I remember being so nervous when senior scientists in the field would come to my poster or when I would go to their posters! In fact, he may not remember this, but I remember talking about SCI areas of interest with Dr. Jason Carmel at his poster and being so nervous. Why would such a big leader in the field want to talk to someone like me?! But I was impressed by how easy it was to talk with him and how he was really open to collaborating and working with other scientists to move the field forward. When asked to join the ASNR Board of Directors, I was honored. ASNR has provided me with so many connections and opportunities to improve my research. In fact, I have met and developed future grant collaborators / grant ideas because of ASNR! It has been a pleasure to give back to the organization that has helped me in so many ways. I hope that I can help junior mentees the way that individuals like Keith and Jason helped me about 10 years ago!

4) What do you enjoy most about being an ASNR Board of Directors Member?

I enjoy collaborating with a talented group of individuals to impact meaningful change for our community. While we all come from different backgrounds, we all have the same goal at the end

of the day. This year, I have loved working with the Program Committee to develop an exciting program that hopefully will excite attendees at the 2024 ASNR Annual Meeting. It is exciting to approach the planning process with an open lens and really think about what topics and ideas will help transform the way that we approach the science we perform.

5) What do you see as the biggest challenges or areas of opportunities in neurorehabilitation research right now?

I think there is a unique opportunity related to the COVID-19 pandemic. Post-pandemic, we have shifted our minds to online, virtual, digital, and remote technologies. In addition, with the recent advances in "artificial intelligence" (AI), there have been so many changes in the past few years. In the field of neurorehabilitation, I think we need to embrace these movements and technologies to improve our methodologies, recruitment, and science. For example, in the field of biomarker research, machine learning algorithms can utilize AI to provide real-time predictions and may allow us to use our algorithms to engage with rural communities that may not receive healthcare services / diagnoses. Remote rehabilitation could improve our ability to meet recruitment goals, through decentralized clinical trials that can span states and institutions. In addition, we have to think about interprofessional team collaborations that bring together engineers, physicians, therapists, neuroscientists, clinical support, and patient perspectives to enhance the translation of our findings.