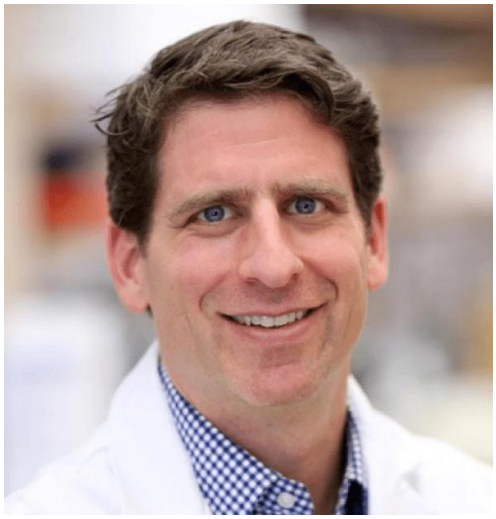
Executive Committee Spotlight: Dr. Jason Carmel



Jason Carmel, MD, PhD, is a member of ASNR's Executive Committee, currently serving in the roles of Secretary and Treasurer. Dr. Carmel is Executive Director & Research Director of the Weinberg Family Cerebral Palsy Center and the Weinberg Family Associate Professor of Neurology (in Orthopedic Surgery), and Director of the Movement Recovery Laboratory at the Columbia University Vagelos College of Physicians and Surgeons. In this interview, he shares more about his background and his work.

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

I became interested in neural injury and repair when my twin brother suffered a cervical spinal cord injury in 1999. I was a second year medical student then, and I decided to pursue science in addition to medicine. I spent a year in a spinal cord injury lab and then enrolled in a PhD program in neuroscience. After receiving my MD and PhD degrees, I entered a pediatric neurology residency. I then did a postdoctoral fellowship in movement science. There, I developed my interest in electrical stimulation as a way to strengthen spared connections after injury. The clinical and research environments at Columbia University are exceptional, and I was excited to begin working there as an attending physician in 2008. I had the opportunity to establish my own independent research laboratory and develop my research interests further at Burke Neurological Institute before returning to Columbia in 2018 in my current roles.

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

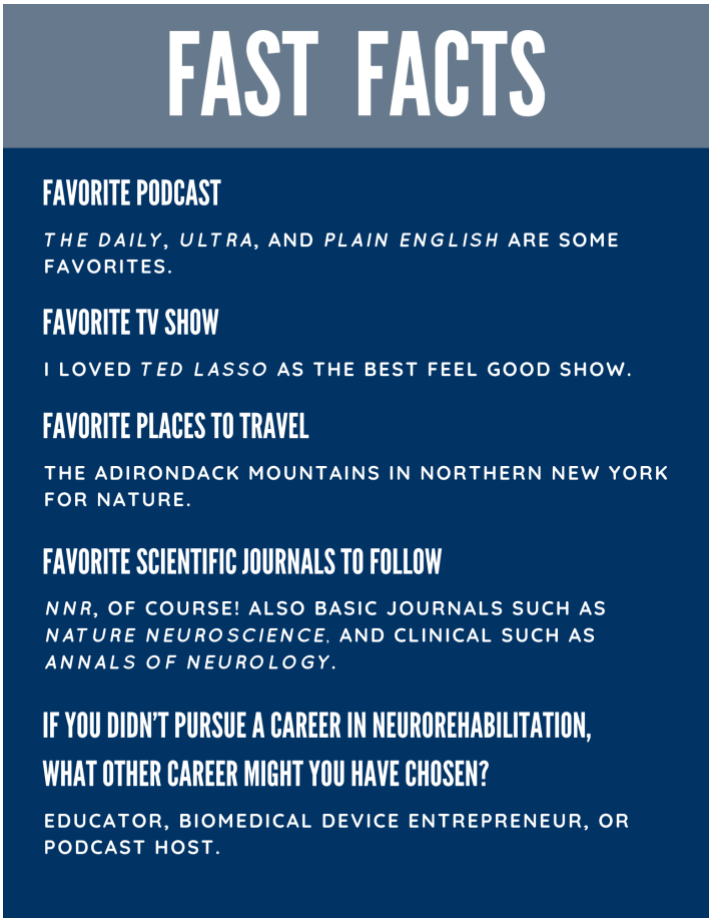
We study how brain and spinal cord injury alters sensorimotor circuits, especially long tracts connecting the brain and spinal cord. We seek to repair connections using electrical stimulation of the brain and spinal cord in order to promote the function of spared connections after partial injury. We are particularly interested in how motor commands from the brain integrate with sensory feedback in the spinal cord. Using electrical stimulation of both the motor cortex and dorsal spinal cord, we have found that these interactions are highly dependent on timing. Strong synergies only occur when these stimuli arrive synchronously in the spinal cord. When the two stimuli are paired repeatedly at the critical interval, this changes the nervous system in a lasting way, which we call spinal cord associative plasticity. In an animal model of spinal cord injury, application of this stimulation improved forelimb movement and diminished hyperreflexia. Paired stimulation also strengthens motor responses in humans, including those with spinal cord injury. Our current goals are to understand the biological basis of the plasticity and to extend the reparative effects in human.

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

I enjoyed attending the ASNR Annual Meeting, which is one of the few that enables discussions between a dynamic group of people with different backgrounds. I connected with the themes of the meeting and with the people who were there. My experiences leading a couple of symposia during Annual Meetings confirmed that ASNR feels like a home to me — both as a scientific meeting and an organization that I can be engaged in year-round.

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

Definitely my colleagues. ASNR brings together such a diverse group, but we are all motivated by overlapping interests and goals. I enjoy developing the group dynamics to help us set and then achieve our goals.



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

I think a central challenge for ASNR is to develop the core science that underpins neural recovery across different diseases and injuries. Since most societies have a defining disease or neural system, it can be difficult to draw people from diverse disciplines together. But the opportunities for us to learn from one another are huge. As a field, we will bring more people in as we develop more treatments that deliver functional improvements for people with neurological deficits.