2012-2013 NREF Research Grant and Young Clinician Investigator Testimonials

Neil Rainer Malhotra, MD
NREF/Section on Disorders of the Spine and Peripheral Nerves Young Clinician Investigator
University of Pennsylvania
Project Title: Novel Bioactive Implants to Reverse Degenerative Disc Disease Via Mechanical Support and Drug Delivery
Sponsor: Dawn M. Elliott, PhD

“The NREF has been an excellent supporter of cutting edge research in neuroscience.

NREF funding made my transition to clinician scientist possible. As I apply for NIH funding to support my innovative translational research I recognize that I am competitive because of the pilot data achieved with the help of NREF funding.

My research has progressed to testing hypothesis in a large animal model. This is a major milestone that could not have been achieved without preliminary data ascertained through my NREF Young Investigator Grant.

Successful implementation of an injectible implant to treat disc degeneration might treat 4 million patients per year in the US alone. The NREF’s support of innovative, neurosurgeon driven, research projects will lead to treatments for the complex diseases our patients face.”

Adam M. Sonabend, MD
NREF Research Fellow
Columbia University Medical Center
Project Title: Evolution Following Treatment in Glioblastoma: A Predictable Phenomenon or Pure Chaos
Sponsor: Peter Canoll, MD, PhD; and Jeffrey N. Bruce, MD, FAANS, FACS

“I have been very fortunate to be awarded with NREF funding, as this grant has helped me pursue the goal of academic neurosurgery with a focus on translational research in brain tumors. NREF is the most prestigious research award that can be obtained as a neurosurgery resident. Thus, as a consequence of being granted with it, I have gotten additional support and enthusiasm for my scientific endeavors by colleagues, collaborators and mentors. Past recipients of this award stand out among the most prominent neurosurgeon-scientists and have developed very accomplished careers. I feel humbled and honored to be granted with this award.

For me, NREF funding has made possible some degree of scientific independence to pursue an ambitious research project that I feel passionate about, but that is not necessarily directly in line with the ongoing
funded work being done at my mentor’s lab. As a neurosurgery resident, I am interested in investigating the dynamic process of malignant progression and evolution of glioblastoma, particularly in the setting of the tumor’s adaptation to treatment, and the emergence of recurrence. With the support of the NREF award, I am characterizing the genetic alterations that occur during tumor progression on a mouse glioma model, and performing cross species comparisons with human tumors. This approach is allowing me to investigate what genetic alterations appear following treatment in a highly controlled setting, and perform experiments that are nearly impossible to achieve with human brain tumor patients at this stage.

The work I am pursuing is focused on understanding the factors that affect the appearance of genetic alterations during malignant progression of brain tumors, and in the setting of recurrence. By using a highly reproducible mouse model of brain tumors, I hope to learn valuable information that might allow us to predict the molecular features of recurrent tumors before these appear on a patient. The ultimate goal is to investigate novel approaches to treat recurrence before it takes place, and therefore prolong the survival and quality of life for patients with malignant brain tumors.”

Fady Girgis, MD
NREF/Section on Pediatric Neurological Surgery
University of Calgary
Project Title: The Roles of the Dorsal Anterior Cingulate Cortex and Ventral Medial Prefrontal Cortex in Fear Conditioning and Extinction in the Non-Human Primate
Sponsor: Emad Eskandar, MD, FAANS

“The NREF funding I have received over the past year has allowed me to complete primate research in the field of psychiatric neurosurgery. I have made advances that have furthered the understanding of the way in which the brain processes and makes decisions, deals with aversion, and computes fear and fear-related stimuli. These advances will improve the neurosurgical treatment of Obsessive-Compulsive Disorder, and may be the first step in defining surgical therapies for Post-Traumatic Stress Disorder. In addition to the implications for patient care, this prestigious award has provided me with the experience and training required to pursue independent neuroscientific research efforts in the future, and therefore has directly allowed me to further my career and my prospects as a neurosurgeon-scientist. Had it not been for this NREF funding, I would not have had the financial means to conduct this research, and as such, I am deeply grateful for your kind and generous support. Thank you.”

Katharine M. Cronk, MD
NREF/Biomet Microfixation Research Fellow
Barrow Neurological Institute

**Project Title:** Degradable Local Analgesic Devices for Targeted Pain Management and Improved Surgical Success  
**Sponsor:** Nicholas Theodore, MD, FAANS

“The NREF program provided the critical funding I needed to combine my engineering background with my clinical experience to research an innovative post-operative pain relief mechanism. During this year long project supported by the NREF I was able to translate my research findings into real world clinical applications. I am looking forward to a career of advancing patient care with new and innovative neurosurgical techniques.”

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Heather H. McCrea, MD  
**NREF Research Fellow**  
Weill Cornell Medical Center  
**Project Title:** Role of Angiocrine Expression of Notch Ligands in Glioma Progression  
**Sponsor:** Shahin Rafii, MD

"I was honored to receive an NREF fellowship during my third year of residency. The fellowship has allowed me to purchase reagents and supplies that have been invaluable for my research. This has significantly improved my ability to conduct research in the lab, particularly at a time where budgets are so tight in even well-established laboratories. My goal is to ultimately combine research with a career in pediatric neurosurgery. The NREF has helped me to further the research aspect of this goal."

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Matthew R. Reynolds, MD  
**NREF/Cerebrovascular Section Research Fellow**  
Washington University School of Medicine  
**Project Title:** Examining the Role of Heparin Sulfate Proteolycans in the Amyloid-Beta-Induced Cerebrovascular Dysfunction of Alzheimer’s Disease  
**Sponsor:** Gregory J. Zipfel, MD, FAANS

“As a neurosurgery resident interested in an academic, basic research-based practice in neurovascular surgery, I actively pursued funding for an individual research fellowship during my 18 months of dedicated research time. I consider myself very fortunate to have been awarded the AANS NREF Cerebrovascular Fellowship during the 2012-13 year. During this time, I chose a research mentor—Dr. Gregory Zipfel—who is actively involved in clinical neurovascular surgery and runs a busy, NIH-funded basic science laboratory investigating the molecular mechanisms of cerebral amyloid angiopathy and its effects on vascular dysfunction in Alzheimer’s disease. Dr. Zipfel has been an ideal mentor, affording both a significant degree of scientific autonomy as well as substantial expertise and guidance in a field in which he is an expert. The technical skills and conceptual developments that I have gained during this year of NREF funding have allowed me to develop scientifically and assume a much greater understanding of basic disease mechanisms at the cellular and molecular level.

I am currently in the process of submitting my first (of several) article to a prestigious, basic science, peer-reviewed journal for publication based on my work in Dr. Zipfel’s lab. I have also been afforded the
opportunity to present this research at both regional and international meetings in the past 3 months. At these meetings, I was able to meet other known experts in the field of neurovascular biology/surgery which greatly facilitated my obtaining a highly-competitive fellowship position after residency. The research conducted in Dr. Zipfel’s lab will serve as a foundation from which to further evolve as a surgeon-scientist and eventually obtain a competitive faculty position as an independent investigator and neurovascular surgeon. I plan to use the data acquired during this year to segue into other NIH funding opportunities (e.g., KO8 award) and continue this research for the remainder of my career. In short, the NREF Fellowship has provided me with an opportunity that has greatly enhanced my research development, clinical understanding of complex scientific concepts, and, eventually, my ability to deliver patient care. I cannot understate my gratitude for this award and I look forward to working with the AANS NREF foundation in the years ahead.

Timothy Ryan Owens, MD
NREF/American Academy of Neurological Surgery (AAcNS) Research Fellow
Duke University Medical Center
Project Title: Characterization of Transcriptional Targets of Brachyury in Chordoma
Sponsor: Michael Kelley, MD

"Funding for my chordoma research through the NREF has afforded me the opportunity to perform high-level basic science research while still in residency. This experience will without a doubt have a tremendous impact on my future career in neurosurgery. Thank you."