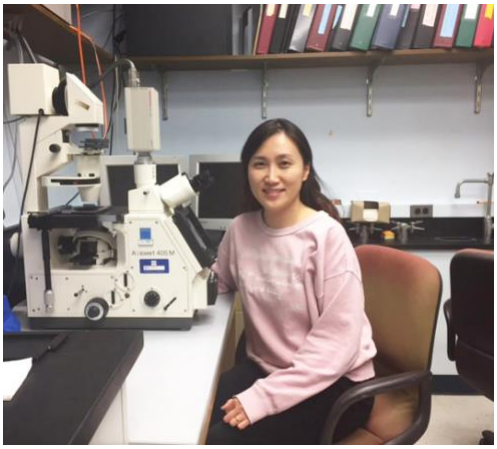
Richard Zigmond Lab Members

Jon Niemi

Jon completed a BS at the University of Mount Union in Alliance, Ohio with a double major in Biochemistry and Cognitive and Behavioral Neuroscience. During his undergraduate education, Jon participated in research looking at the beneficial effects of Vitamin E administration and enriched environment on functional recovery following traumatic brain injury under the supervision of Dr. Jeffery Smith. He also studied the neuroprotective effects of nicotine and estrogen against oxidative stress-induced cell death in Alzheimer's Disease, utilizing am in vitro culture system. His fascination with neuroscience and, more specifically, neurodegeneration and injury continued after completion of his undergraduate work. Jon joined the lab of Dr. Sophia Sundararajan as a Research Assistant at Case Western Reserve University in the Department of Neurology and studied the neuroprotective effects and therapeutic aspects of thiozolandinediones for ischemic stroke. This propelled him to pursue science as a career and obtain his Ph.D. Jon started in the graduate program as a direct admit to the Department of Neurosciences at Case Western Reserve University. He promptly joined the Zigmond laboratory and set out to answer a question that had been raised by Richard decades earlier. In a 1995 publication from the Zigmond lab, Schereiber et al. showed that macrophages accumulated in the superior cervical ganglion (SCG) after transection of the postganglionic fibers. Richard's question was what role (if any) do these macrophages play in the ganglia and do they perform functions important for peripheral nerve regeneration? Years of research showed that in two mutant murine lines, the Wallerian degeneration slow (WLD) and a C-C chemokine receptor 2 (CCR2) knockout, macrophages did not accumulate in injured dorsal root ganglia (DRG). Using these two murine lines, Jon showed that macrophage accumulation around injured cell bodies was necessary for a maximal regenerative response of those neurons. Following up that research, the lab created an adeno-associated virus to overexpress the macrophage chemokine CCL2 in sensory neurons of the DRG. Data from this project demonstrated that when CCL2 is overexpressed in uninjured DRGs, macrophages accumulate and increase the regenerative capabilities of sensory neurons in a STAT3-dependent manner. In addition to the studying the immune response to peripheral nerve injury, Jon also researched the reduced regenerative capacity of sympathetic and sensory neurons in diabetes. Using a rodent model of type-I diabetes, the lab found that hyperglycemic animals displayed significant deficits in the injury-induced gp130 cytokine signaling pathway which likely contributes to the decrease in axon regeneration observed in diabetes. Jon successfully defended his thesis on July 11th, 2016 and is now a post-doctoral scholar in the lab.

Jeong Seo



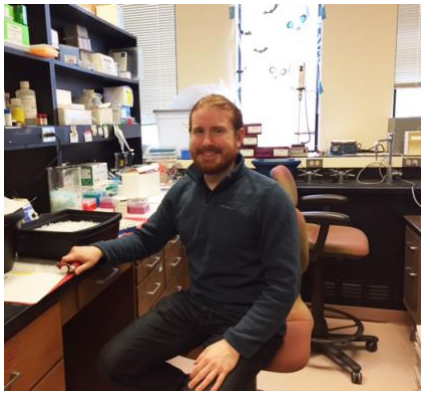
After completing B.S. in Biology at Yonsei University in Seoul, South Korea, Jeong found her great interest in the sea of neuroscience and dived into it. She got her M.S. in Neuroscience in the lab of Dr. Oh at Yonsei University where she studied neuronal cell death induced by toxicity of trace metals such as copper, iron and zinc. Then she decided to go into the pharmaceutical and biotechnology industries to experience a bigger world where she could spread her knowledge of what she learned from college.

Jeong had a good career as a research scientist in two leading pharmaceutical companies in Korea, LG Chem and SK Chemicals. She worked on analyzing biomaterials using HPLC and protein sequencing by automated Edman Sequencer in LG Chem. Then she moved onto a new job in SK Chemicals where she was directly involved in the Pharmacology and Toxicology department and performed in vitro diagnostic, pharmacological testing and in vivo behavioral testing of various natural and synthetic compounds for Alzheimer's disease, cancer and obesity. One of the natural lead compounds for Alzheimer's disease she found was tested in phase 2 clinical trial (SK-PC-B70), which led her to win an SK Chemicals Outstanding Project Awards.
After years of work experience in pharmaceutical companies, Jeong moved to Denver and started her new career as a research associate in Neurotrauma Research at Swedish Medical Center, a Level I Trauma Center in Colorado. There she investigated the effect of methamphetamine on isolated middle cerebral arterioles and cultured endothelial cells finding out that vasoconstriction induced by methamphetamine is mediated through the endothelin receptor and involves an endothelin-dependent pathway. In her current job in Case Western Reserve University, she works as a research assistant of Dr. Richard Zigmond and a lab manager of his lab. She is pursuing her project of characterizing cells that show a conditioning lesion effect with elongated mode of regeneration by using markers such as CGRP and IB4 that separate subpopulations of sensory neurons in DRG and looking for the mechanism by investigating downstream molecules that are associated with regeneration to see how the neuronal outgrowth happens in certain group of cells. In addition to doing research on her project, she teaches lab techniques to new lab members, manages lab budget and keeps track of lab finances, renews and amends protocols, prepares and processes other documentation to support lab safety and efficiency to allow lab members to be focused and organized on their projects.

Since age 5, Jeong has played piano and the passion for music still keeps going by being a church pianist and learning jazz keyboard on her weekend life. Besides her love for classical and jazz music, she writes columns for a book company and enjoys doing a book club with her beloved friends. She also likes

playing sports including tennis, swimming, ping pong and bicycling and loves travelling around the world, so far visiting 15 countries, with her family and friends.

Aaron Talsma



Aaron is a graduate of the University of Michigan. He completed his undergraduate education in 2012 with a degree in Cell and Molecular Biology and a minor in Computer Science. Aaron also began his research career as an undergraduate at U of M in the lab of Dr. Orie Shafer. He worked in Dr. Shafer's lab studying the non-circadian functions of the Drosophila circadian neuropeptide, PDF, and his work showed an evolutionary parallel between the development of circadian rhythms and intestinal regulation in flies and mammals. After graduating Aaron received a Fulbright grant and moved to Vienna, Austria to work in the lab of Dr. Barry Dickson studying the neural basis of Drosophila courtship behavior. During his year in Vienna Aaron assisted Dr. Mark Palfreyman in elucidating a portion of the neural circuit that controls female mating decisions. Upon returning to the U.S. Aaron moved to Pittsburgh and worked in the lab of Dr. Michael Palladino as a research assistant and lab manager. In Dr. Palladino's lab he studied a Drosophila model of a rare genetic seizure disorder caused by mutations in the sodium-potassium pump and his findings suggested a new possible developmental etiology of the disease. Finally, Aaron came to the CWRU MSTP where he joined the Zigmond lab in 2017. Sadly, he had to leave his flies behind.

In his free time Aaron enjoys climbing and hiking. On weekends you can often find him at the climbing gym or in the Cleveland metroparks. He also loves beer and boardgames on a Friday night.

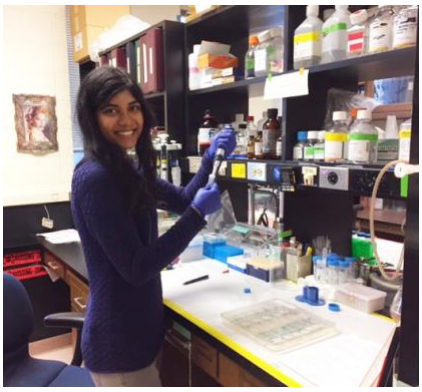
Franklin Echevarria

Franklin's love for science is encoded in his DNA, as his grandfather is a professor of oceanography at the University of Puerto Rico. During his undergraduate and post-bacc studies at Iowa State University and University of Missouri, Columbia respectively, he was involved in a variety of research topics including maize genetics (because Iowa), lysosomal storage disease, and epigenetic regulation of imprinted genes. This fascination with biomedical research led him to Vanderbilt University's Interdisciplinary Graduate Program where he was introduced to Dr. Rebecca Sappington and her work on neuro-inflammation and its effect on glaucoma- related retinal ganglion cell (RGC) degeneration. For his PhD, Franklin focused on the cytokine Interleukin-6 and its impact in RGC health in both the naive and glaucomatous retina. A few months after completing his PhD in April of 2017, Franklin took his talents to the Zigmond lab. Currently, Franklin is working on two projects that revolve around macrophage derived signals and their effect on nerve degeneration and regeneration.

The first project is looking to answer whether overexpression of the chemokine C-C chemokine ligand 2 (CCL2) promotes nerve regeneration following injury in vivo. In a 2015 publication from the Zigmond lab, Niemi et al. demonstrated that virus (AAV) mediated over expression of CCL2 increased the macrophage population in the naïve dorsal root ganglion (DRG) and significantly elevated neurite extension in DRG explants in vitro. While others in the lab are currently looking at how AAV mediated CCL2 overexpression impacts DRG axon regeneration following a sciatic nerve crush injury, Franklin is using his knowledge of the retina to work on a collaborative project the Zigmond lab has with Zhigang He's lab out of Harvard, characterizing whether AAV mediated overexpression of CCL2 upregulates peripheral macrophage infiltration and improves RGC axon regeneration following a crush injury to the optic nerve.

For his second project, Franklin is answering whether macrophages act directly on DRG cell bodies to promote regeneration after injury. Previous publications from the Zigmond lab reported that macrophage accumulation occurs at both the DRG cell body and distal axon after sciatic nerve injury and that accumulation at both sites are necessary for a complete regenerative response.Using a microfluidic device to create an environmental barrier between DRG cell bodies and their axons in vitro,Franklin is hoping to provide further insight on the relative importance of the actions of macrophages on neuronal cell bodies and on axons for promoting neurite outgrowth.

Deepti Mahajan



Deepti is a junior at Case Western Research University majoring in Biochemistry. She began research as a high school student in an Alzheimer's lab at SUNY Downstate Medical Center which sparked her interest in the neurosciences. She joined the Zigmond lab in the summer of 2016 and began to study the effect of NSAIDs on the conditioned lesion response in axon regeneration and later continued to examine the role of macrophages in peripheral nerve injury. She plans to pursue a career in medicine and hopes to continue in the research field. Apart from academics, she partakes in distance running, photography, is a birdwatching enthusiast, and works as a supplemental instructor in chemistry.

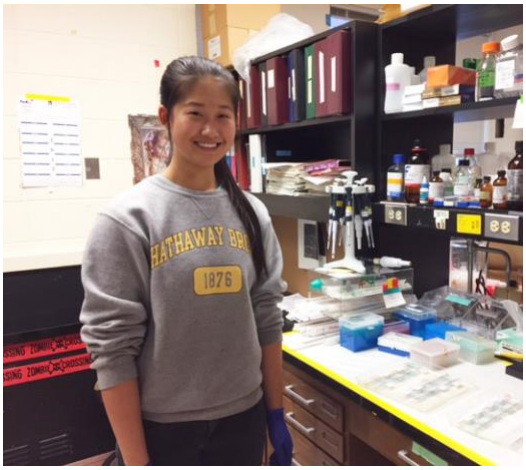
Sanika Paranjape

Sanika Paranjape is in her junior year at Case Western Reserve University, majoring in Cognitive Science and Biology. She started at the Zigmond lab in February 2017, and has really enjoyed getting a more hands on experience in the field of neuroscience. She began by sectioning SCG, DRG, and sciatic nerve tissue, and has since learned more techniques and procedures, such as tissue processing, imaging, and analyzing data. Sanika plans to pursue a career in either research or medicine. She is from Fremont, California, and has surprisingly been enjoying the cold weather in Cleveland, though she has yet to build a snowman.

Kristal Scott

Kristal Scott is currently a Sophomore at Case Western Reserve University planning on majoring in Biology and Medical Anthropology. Her time spent as an intern in high school in a psychiatric lab at the University of Chicago inspired an interest in neurological and psychiatric research, and she is excited to continue this interest by working in the Zigmond lab. She plans to continue on to medical school after her undergraduate career. Besides lab work and academics, she keeps busy by helping run the Global Medical Brigades chapter on campus and by continuing her love of music through her involvement in ensembles and musical theater.

Kathy Wang



Katherine is a junior at Hathaway Brown High School and joined the Zigmond lab through her school's Science Research and Engineering Program. Many of her experiences in the lab have encouraged her enthusiasm for medical research, including her attendance at OAS, Research ShowCASE, and the Society for Neuroscience Conference. She currently helps study the site-specific role of macrophages in response to peripheral nerve injury. In the future, she hopes to attain a career in the medical field. Besides attending school and going to the lab, she enjoys playing tennis, doing debate, and playing clarinet for the Cleveland Orchestra Youth Orchestra.