Hearing disorders of many types begin in the inner ear, but they have long-term effects in the brain. The Hearing Research Group at NEOMED is interested in how the central nervous system functions in association with hearing and vocal communication, how it is affected by hearing disorders, and how interventions of the peripheral and central nervous systems may ameliorate hearing disorders.

Merri Rosen, Ph.D. (Director)
Dr. Rosen’s team studies neural mechanisms underlying the interactive effects of early stress and early hearing loss. The lab measures how transient hearing loss, such as accompanies ear infections in children, impairs perception of speech-related sounds later in life, and the neural changes that induce these perceptual deficits. We examine how early stress can cause similar perceptual problems, and can worsen problems induced by transient hearing loss. Understanding the mechanisms behind these changes allows the laboratory to develop strategies for intervention and remediation.

Jianxin Bao, Ph.D.
Dr. Bao’s team focuses on developing new drug and gene therapies for hearing disorders such as hearing loss and tinnitus. The prevalence of age-related hearing loss is 63 percent for those 70 years of age and above. Approximately 15 percent of Americans between the ages of 20 and 69 — or 26 million Americans — have noise-induced hearing loss. Tinnitus is highly associated with hearing loss. There are no medications against these disorders. The group conducts studies to prevent hearing loss and tinnitus through development of new technology platforms.

Alexander Galazyuk, Ph.D.
Dr. Galazyuk’s laboratory studies tinnitus — the perception of sound in the ears or head when no external source is present. The American Tinnitus Association estimates that 50 million Americans experience tinnitus to some degree, with 16 million patients requiring tinnitus treatment. Tinnitus is the most prevalent disability among active military personnel and veterans. Dr. Galazyuk’s group is working to identify underlying brain mechanisms responsible for the development of tinnitus, as well as potential therapies for tinnitus.

Yong Lu, Ph.D.
Dr. Lu’s laboratory investigates the functions and cellular mechanisms of an important group of proteins (metabotropic glutamate receptors) in auditory processing under normal hearing and hearing loss conditions. The laboratory aims to provide a basic understanding of the role of these proteins in functionally well-established auditory circuits that analyze information for the localization of sound sources. Ultimately, this will provide the basis for therapeutic intervention in hearing disorders characterized by impaired sensitivity to precise temporal features in sounds.
NEOMED researchers study several hearing and communication health issues:

- Age-related hearing loss
- Noise-induced hearing loss
- Hearing loss during development
- Auditory processing disorder
- Tinnitus
- Emotional disorders in speech communication

Please visit our webpage for more information on joining or supporting our team:
neomed.edu/research/hearing