In His Words

**LOSS OF BALANCE** and consequent, harmful falls are common in aging populations and associated with various neurological disorders. Balance is sensed using vestibular organs in the inner ear and is processed in the brainstem, the first brain center for processing sensations of both hearing and balance. This project aims to uncover how the brain transforms sensations of instability into corrective movements to restore balance.

**MY STRATEGY IS TO LEVERAGE** the relative simplicity of balance reflexes to define how brainstem cells represent information both individually and collectively. In order to measure balance responses in populations of cells located deep within the brain, I apply cutting-edge microscopy techniques to a transparent animal, the zebrafish. These fish must swim to restore balance when pushed away from the horizontal, providing a tractable model for balance control and brainstem function in general.

**WHEN WE LOOK AT FISH** from the side, they behave more like humans. Just as we tilt away from an upright stance in order to walk, dance, or play sports, fish tilt up and down to swim agilely. This insight makes fish a simple model to study how sensations of balance are integrated into the brain to perform stable yet effective movements.

**ENAMORED OF BUILDINGS** and other human-made structures, as a young child I wanted to be an architect. I now like to think of myself as a student of the naturally intricate structures of the brainstem. I am also a great fan of playing percussion in a number of genres: jazz, rock, hip-hop. Some of my earliest inspiration for studying the brain came from a fascination with how music can change one’s mood.

**MY YOUNGER BROTHER MAX** and I collaborated to design a board game. Players make up definitions for acronyms to impress their friends and family. Perhaps some inspiration came from the many acronyms used in research! We hope to eventually produce and distribute the game.

**EVENTUALLY I HOPE TO OVERSEE** a research laboratory as a professor of neuroscience. The work supported by my Emerging Research Grant is laying the technical and conceptual groundwork for studying how cells distributed throughout the zebrafish brain process sensations from the inner ear, eventually informing therapeutic strategies to treat balance deficits.