



# Undergraduate Summer Internship in Systems Biology

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## Internship Project Description: Summer 2018

**Project Title:** A single cell transcriptional atlas of inner ear formation

**Supervisor Name:** Sean Megason

**Lab PI Name:** Sean Megason

### **Project Description:**

The organization of the inner ear brings about its ability to sense sound and motion. The organizational basis of the ear's physiology spans many scales: from the electric potential of a refined endolymph, the molecular machinery of mechanical sensory ion channels, the subcellular architecture of stereocilia, the exquisite patterns of adjacent hair cells and support cells, the labyrinthine tissue topology of semicircular canals, and an organ-wide strategy for pressure control that involves secretory cells, absorptive cells, cell-cell junctions, and the endolymphatic sac's relief valve. Despite the complexity of these multiscale processes, the fundamental parts are cells whose behaviors rely on particular combinations of genes. The key questions thus become what cell types are in the ear and what genes define them? In this study, we propose to systematically identify the sets of genes that define the cell types of the inner ear with a combination of genetics, light microscopy, microdissection and a revolutionary new technology—inDrops single cell sequencing using zebrafish as a model system.