1173-92-59 **Alexandria Volkening*** (avolkening@purdue.edu). *Topological data analysis of zebrafish patterns.*

Zebrafish are small fish named for their dark and light stripes; these patterns form due to the interactions of tens of thousands of pigment cells in the growing skin. Mutant zebrafish, on the other hand, feature altered patterns, including spots and labyrinth curves. The longterm goal of my work is to better link genotype, cell behavior, and phenotype — I seek to help identify the specific alterations to cell interactions that lead to these different fish patterns. Because patterns form from the interactions of cells, an agent-based modeling approach is natural. However, agent-based models (whether for zebrafish or other applications) often have many parameters and are not analytically tractable using traditional techniques. On top of this, cell interactions are stochastic and mutant patterns are variable and messy. This makes it unclear how to objectively compare simulated and real fish images and judge models. In this talk, I will overview how methods from topological data analysis can be used to quantify images of cell-based patterns and better characterize the behavior of stochastic, agent-based models. (Received September 13, 2021)