

Abstract Submitted  
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**Bacterial Invasion Dynamics in Zebrafish Gut Microbial Communities** SAVANNAH LOGAN, MATTHEW JEMIELITA, Department of Physics, University of Oregon, TRAVIS WILES, Institute of Molecular Biology, University of Oregon, BRANDON SCHLOMANN, Department of Physics, University of Oregon, BRIAN HAMMER, School of Biology, Georgia Institute of Technology, KAREN GUILLEMIN, Institute of Molecular Biology, University of Oregon, RAGHUVVEER PARTHASARATHY, Department of Physics, University of Oregon — Microbial communities residing in the vertebrate intestine play an important role in host development and health. These communities must be in part shaped by interactions between microbial species as they compete for resources in a physically constrained system. To better understand these interactions, we use light sheet microscopy and zebrafish as a model organism to image established gut microbial communities as they are invaded by robustly-colonizing challengers. We demonstrate that features of the challenger, including motility and spatial distribution, impact success in invasion and in outcompeting the original community. We also show that physical characteristics of the host, such as the motility of the gut, play important roles in mediating inter-species competition. Finally, we examine the influence of the contact-dependent type VI secretion system (T6SS), which is used by specific bacteria to cause cell lysis by injecting toxic effector proteins into competitors. Our findings provide insights into the determinants of microbial success in the complex ecosystems found in the gut.

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