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Dynamics of a nuclear invasion MARCUS ROPER, Dept. of Mathematics, U.C. Berkeley, ANNA SIMONIN, N. LOUISE GLASS, Dept. of Plant and Microbial Biology, U.C. Berkeley — Filamentous fungi grow as a network of continuous interconnected tubes, containing nuclei that move freely through a shared cytoplasm. Wild fungi are frequently chimerical: two nuclei from the same physiological individual may be genetically different. Such internal diversity can arise either from spontaneous mutations during nuclear division, or by nuclear exchange when two individuals fuse, sharing their resources and organelles to become a single individual. This diversity is thought to be essential to adaptation in plant pathogens, allowing, for instance, an invading fungus to present many different genetic identities against its host's immune response. However, it is clear that the presence of multiple genetic lineages within the same physiological individual can also pose challenges - lineages that are present in growing hyphal tips will multiply preferentially. Nuclei must therefore be kept well mixed across a growing front. By applying models developed to describe mixing of fluids in microfluidic reactors to experimental observations of lineage mixing in a growing *Neurospora crassa* colony, we show how this mixing is achieved. In particular we analyze the individual contributions from interdigitation of hyphae and from nuclear transport.

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