

The Hammond Lab is primarily interested in an epigenetic process called meiotic silencing by unpaired DNA (MSUD) and a common phenomenon in fungi known as spore killing. We are also interested in viruses of fungi and fungi that infect plants.

Most of our projects involve an organism called *Neurospora crassa*. This filamentous fungus was first made famous in the 1940s by Beadle and Tatum, who were among the first to recognize its usefulness for genetic studies. Since then, experimentation with *N. crassa* by geneticists, biochemists, and other scientists from around the world have contributed to making it an excellent model organism for discovering and understanding key biological processes.

One of our most exciting projects aims to understand a mysterious aspect of MSUD. Just like humans, *N. crassa* progeny inherit chromosomes from a male parent and a female parent. MSUD carefully compares the chromosomes from each parent to make sure that the genes on each chromosome are perfectly matched between each parent. Any gene out of place is turned off during reproduction. This process may help protect the fungus from rogue genes or viruses. IN the near future, we hope to learn how this process works and how widespread it is among diverse organisms.

*Spore killer* is another one of exciting projects. Spore killers exemplify what can happen when a gene (or group of genes) finds a way to improve its own chances of survival at the expense of other genes in the genome. Although we have focused most of our efforts on *Spore killer-2* from *Neurospora* fungi, we are interested in Spore killers from other fungi as well. We are currently collaborating with scientists at the National Center for Agricultural Utilization Research in Peoria IL to find and characterize a Spore killer in an agriculturally important plant pathogen called *Fusarium*. Studies of Spore killers could one day give us the ability to slightly adjust the genome of a whole population of pathogenic fungi to make them less harmful.

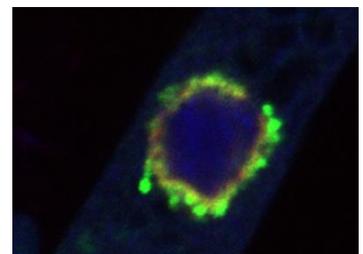
#### *Selected publications:*

Harvey, A. M., D. G. Rehard, K. M. Groskreutz, D. R. Kuntz, K. J. Sharp, P. K. T. Shiu, and T. M. Hammond, (2014) "A Critical Component of Meiotic Drive in *Neurospora* Is Located Near a Chromosome Rearrangement" *Genetics*, *in press*.

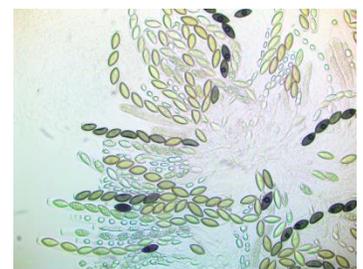
Hammond, T.M., H. Xiao, E. C. Boone, L. M. Decker, S. A. Lee, T. D. Perdue, P. J. Pukkila, and P.K.T. Shiu (2013) "Novel Proteins Required for Meiotic Silencing by Unpaired DNA and siRNA Generation in *Neurospora crassa*" *Genetics*, 194:91-100. [PMID:23502675].



*N. crassa* growing on a petri dish



Fluorescent protein-tagged MSUD proteins surrounding a nucleus during meiosis.



Sexual spores of *N. crassa*