

Instructor Profile

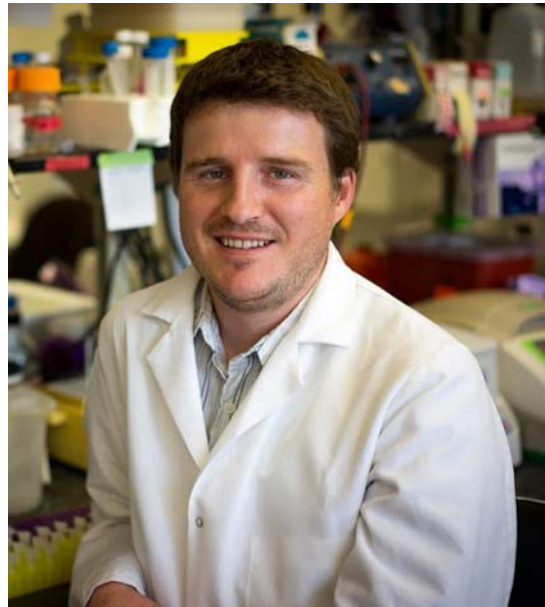
Dr. Thomas B. Lentz

Research Areas:

- Molecular Virology
- Environmental DNA (eDNA)
- Ectothermic animal cell culture

Techniques:

Animal cell culture, DNA isolation, qPCR, Gel electrophoresis, Molecular cloning, DNA sequencing, Viral plaque assay, Viral titering



My research investigates an emerging area of biotechnology, detection and identification of viruses in environmental samples. Viruses are continually circulating through our environment, infecting bacteria, plants and animals. Molecular biology tools allow us to test for these agents by the presence or absence of their genetic material. Such tools have implications for tracking human pathogens, but are powerful for detecting viruses of ecological significance as well. My work focuses on the genus *Ranavirus*. These viruses are similar to human pox viruses, but infect a broad range of amphibians, reptiles and fish. Their ecological impact is considerable. *Ranavirus* dispersal has been implicated as a contributing factor in the steep declines observed in amphibian populations around the world. Effective surveillance of these pathogens requires the development of sensitive and accurate means of detection. Projects in my group will advance in two primary directions. The first is use of PCR-based methods for detection and quantitation of *Ranavirus* and host organism DNA from environmental samples. These experiments present the opportunity for field sample collection and testing. I have recently acquired grant support to target North Carolina reptile and amphibian species, several of which are listed as 'threatened' or 'of concern' by federal and state agencies. The second direction is study of the molecular biology of this genus of viruses. Understanding how the virus infects a cell and the molecular steps

involved in this process. Toward this end, we work with *Ranavirus* isolates in amphibian cell culture. The goal of these studies is to further understand how these viruses are spread and contribute to animal disease and population decline.

I am looking for students to contribute to both projects. Working in my group on the environmental detection project you will become familiar with methods required to recover DNA from animal tissue, skin swabs, water, soil and other environmental samples. We will use PCR and qPCR to detect the DNA of the virus. Samples will be collected from local sites and in coordination with collaborators at the North Carolina Wildlife Resource Commission and the North Carolina Museum of Natural Sciences. Work on this project will hopefully result in a manuscript detailing our findings of the prevalence of Ranavirus in the state. Working in my group on the molecular biology project you will become familiar with methods of cell culture and virus propagation. Studies will involve characterization of cytopathic effect and detection of viral nucleic acids and gene expression.