Department of Biological Sciences
MCMICKEN COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 1, 2013

Project Title: The genomic basis of trait gain and loss in the blind Mexican cavefish.

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Project Description:

The evolution of phenotypic differences between even closely related organisms involves an overwhelming number of genetic changes. These changes are manifested as the altered expression, or structure, of gene products. As a model for understanding what genetic changes accompany major evolutionary events, we utilize an emerging model system called the Blind Mexican cavefish (*Astyanax mexicanus*). This species harbors two distinct morphotypes, a blind and depigmented cave-dwelling form and a surface-dwelling form. The surface-dwelling form resembles a typical aquarium fish with normal pigmentation and well-developed eyes. In contrast, the cave-dwelling form has no eyes whatsoever and is completely devoid of pigmentation. In addition to the traits that have been lost, cave forms have evolved a significant number of constructive changes. These phenotypes, such as an expanded sense of taste and an amplified lateral line system, facilitate food-finding ability in the complete darkness of a cave. Our lab recently completed a *de novo* transcriptome of the blind Mexican cavefish, enabling powerful analyses of thousands of genes and gene sets. This summer WISE project will allow a motivated student to utilize this transcriptome, along with multiple high-throughput sequencing read experiments, to understand the genetic changes that have accompanied colonization of the subterranean environment.