

**Department of Biological Sciences
MCMICKEN COLLEGE OF ARTS AND SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2007

The Department of Biological Sciences is pleased to offer the following research project for the summer of 2007. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and if possible, develop a timetable for the twelve-week research period.

Sensory systems and spatial orientation

John Layne

Asst Professor
A&S-Biological Sciences
RIEVESCHL 808
P. O. Box 210006
Cincinnati OH 45221
Tel: (513)556-9718
Fax: (513)556-5299
E-mail: john.layne@uc.edu

Project Description

In my lab I study the sensory basis of spatial orientation. In particular, I study a neuro-sensory process called Path Integration (PI), wherein animals know where their home is by recording and "integrating" all of their movements since they left home. This produces a vector stored in their memory, pointing from their current location directly back to their starting point. There are two aspects of the movements that animals must record in order to produce this vector: the distances they move, and the directions in which they move those distances. Our lab performs detailed, controlled behavioral experiments to find out, first, what sensory information animals use to record distance and direction, and second, how the "home vector" is stored in memory. We have recently made the exciting discovery that the animals we study, fiddler crabs, can record the correct distance that they must run home, despite having to run home over a large barrier placed in their way. This means that they extend their running distance just the right amount to make up for the extra distance created by this barrier. How do they do this? How do they know how much extra to run? The answers will hopefully come from our next set of experiments!