Logan Hess

**Award:** Undergraduate Student Research; $3272.00

**Status:** Junior, Physics

**Advisor:** Adriana Durbala

**Research Topic:** A Fourier Photometric Analysis of the Spiral Arms of Late-Type Spiral Galaxies

**Abstract:** (First Paragraph of Proposal)Colossal in size and complexity, spiral galaxies host a variety of features including bulges, disks, bars, and spiral arms. The shape and properties of these features are the result of secular evolution (“nature”) and influenced by environmental interactions with other nearby galaxies (“nurture”). It has been proposed that specific properties of these features are related to environmental density. For this project, we explore the properties of the spiral arms as a function of environmental density. Two samples of spiral galaxies of morphological classification Sb/Sbc/Sbc will be considered. These galaxies are drawn from two different environments; isolated (n = 34 galaxies) versus loose groups of 4-10 galaxies (n= 80 galaxies). Overall, these samples allow for a good comparison of galaxies in isolated versus dense environments. We will analyze the spiral arms properties using Fourier decomposition/analysis to measure and model the arms, paying specific attention to the shape and number/ multiplicity of the arms. Ultimately, we would like to quantify the effect environmental density has on the formation and evolution of early-type spiral galaxies. The proposed study will complement my current WSGC research project, which uses the same methods to compare the spiral arm properties of early-type S0a/Sa/Sab spiral galaxies located in isolated vs grouped environments. By continuing this research to encompass later-type spiral galaxies, we will have a greater variety of galaxies to gather information from, and can draw further conclusions based on the results of our current research.

**Biography:** Logan is currently a junior physics major attending the University of Wisconsin-Stevens point, and has plans to attend graduate school for astrophysics in the future. He is currently conducting research related to the effect of environmental density on the arms of spiral galaxies. Logan has experience with both optical and radio telescopes, including professional telescopes such as the Greenbank and Arecibo radio telescopes, and the WIYN .9m at Kitt Peak.

**Congressional District:** 3

**Congressional Representative:** Ron Kind