College of Liberal Arts and Sciences

Faculty Research Colloquium

20 January 2022

Via Zoom

Presentations begin at 3:00pm.

**Amy Russell** (Biology) “Trust (the studbook) but verify: African painted dogs in captivity.”

African painted dogs (*Lycaon pictus*, APDs) are highly endangered, with fewer than 7,000 remaining in nature. Captive breeding programs can preserve a genetically diverse population and provide a source of individuals for re-introductions. However, most programs are initiated from few founders and suffer from low genetic diversity and inbreeding. In this study, my collaborators and I used molecular markers to assess genetic variation, inbreeding, and relatedness among APDs in the North American captive population, used these data to realign studbook records, and compared these data to wild populations and to the European captive population to facilitate development of a global management plan. We sequenced maternally-inherited mitochondrial DNA to test mother-offspring relationships. We evaluated relatedness and diversity using variation at major histocompatibility (MHC) class II loci and at 14 microsatellite loci from 109 APDs from 34 institutions in North America. These data allowed us to identify three likely studbook errors and resolve ten cases of uncertain paternity. Overall, microsatellite heterozygosity was higher than reported in Europe, but effective population size estimates were lower. Mitochondrial sequence variation was extremely limited, and there were fewer MHC haplotypes than in Europe or the wild. This project demonstrates how genetically-informed captive management can benefit threatened and endangered populations and facilitate collaboration among institutions.

**Sofia Karampagia** (Physics) “The level densities of atomic nuclei and their role in nucleosynthesis.”

In this talk we are going to introduce the energy levels of the nucleus and we will discuss how they affect the synthesis of nuclei rich in neutrons in the universe. The first three elements of the periodic table were formed during the first few minutes of the Big Bang. Stars create heavier elements (up to iron) by combining two smaller nuclei, in a process that is called fusion. But how do elements heavier than iron or elements rich in protons or neutrons are created? We will focus our attention to the creation of neutron rich nuclei. These are produced in violent, neutron rich environments, such as the merger of two neutron stars. The process that produces them is referred to as the rapid neutron capture process or r-process. It turns out that the abundance of elements rich in neutrons in the universe depends on the energy of levels of a nucleus and their energy distribution.

**Ian Winkelstern** (Geology) “The last time the world warmed: New Interglacial fossils and climate data from South Carolina.”

In August 2021 I led a team of GVSU and University of Michigan students to collect fossils and study sediments from a geologic interval called the Last Interglacial. This is a time ~125,000 years ago when global climate is thought to have been a bit warmer than today – and when sea levels were several feet higher. Climate data from this time is therefore valuable for understanding near-future conditions.

In this talk I will show the geology in South Carolina we worked with and some of the samples brought back for further analysis. I will also discuss a bit of new paleo-temperature data from the same interval in Bermuda, 1000 miles east. These efforts are part of a broader NSF-funded effort to understand North Atlantic climate during a warm period.

Future colloquia are scheduled for:

Thursday, Feb 17

Thursday, March 17

If you would like to give a presentation at one of the colloquia in the winter semester, please send an email to [stavesm@gvsu.edu](mailto:stavesm@gvsu.edu) with a preferred date and a tentative title for your presentation.