College of Liberal Arts and Sciences

Faculty Research Colloquium

17 March 2022

Via Zoom

Presentations begin at 3:00pm.

**Brian Smith (Chemistry) “Understanding mechanisms of antibiotic resistance in bacteria.”**

Aminoglycoside antibiotics have been essential tools for treating life-threatening bacterial infections. However, many bacterial species have developed strategies allowing them to evade the activity of aminoglycosides and other antibacterial drugs thereby giving rise to various modes of resistance. One of the least understood mechanisms of resistance entails the chemical modification of these drugs by the bacterial enzyme ANT-6. ANT-6 functions by transferring an adenosine monophosphate (AMP) to the antibiotic. This chemical modification prevents the drug from binding to its target thus rendering it inactive. Therefore, developing ways of inhibiting the activity of ANT-6 would circumvent resistance caused by this enzyme and potentially restore the effectiveness of these antibiotics. Hence, understanding exactly how the enzyme performs the modification reaction is absolutely critical. We have recently optimized conditions for purifying the ANT-6 enzyme from bacteria and developed an assay that allows us to study the modification reaction in a test tube. Using our assay in combination with the three-dimensional structure of ANT-6, we aim to determine important details regarding the modification reaction that will serve as the basis for the development of inhibitory therapeutic drugs against this enzyme.

**David Álvarez (English) “Reclaiming the Strait of Gibraltar? French Rapper AbdelMalik's Journey to Morocco.”**

My presentation will focus on a song by Congolese-French rapper, Abd al Malik, entitled “Gibraltar,” which I examine in the epilogue to my book manuscript, “Infra-Maritime Mobilities: Fugitive Crossings of the Strait of Gibraltar in the Arts.” In Abd Al Malik's title, the name “Gibraltar” refers to the Strait of Gibraltar, not the Rock, and I’ll discuss how the song deconstructs tropes associated with northbound Strait traversals in imaginative literature that thematizes unauthorized migration between Africa and Europe. I’ll also discuss the tension between the emancipatory vision from neo-colonialism and systemic racism that the song proposes and its romanticization of the speaker’s return to Africa, which turns on an idealization of the Moroccan state.

**John Weber (Geology) “Trinidad and Tobago Geogenomics: reconciling and synthesizing published genetics data into a comprehensive geologic, paleogeographic and geomorphic model.”**

Geogenomics is an emerging field that links genetics and genetic clocks of key biota to geology, paleogeography, and landscape development. Over the past several decades, detailed genetic studies have been published for many endemic and cosmopolitan extant species (n = # of species) on the Caribbean islands of Trinidad (a continental island) and Tobago (an oceanic island) near mainland South America. These include studies on freshwater guppies (1), frogs (5), snakes (6), toads (1), lizards (1), and mammals (1) in this archipelago. These case studies link in time (genetic clocks) and space (paleogeography) evolutionary and paleogeographic events in the archipelago to those in mainland South America. We synthesize and assemble the Cenozoic-Recent geology including, tectonics, paleoclimate, and landscape development in the archipelago and on the mainland into a comprehensive geological model that highlights key geological events (e.g., rise and fall of the coastal Cordillera, rise of the Andes, inception and deflection of Orinoco River, STEP fault migration, glacial and interglacial sea level change, inception of Gulf of Cariaco and Gulf of Paria pull-apart basins, etc.). We synthesize the key published genetic (e.g., divergence, vicariance, common ancestor, etc.) events into this geological framework for the: Holocene-Pleistocene, Pliocene, and Miocene. Highlights to-date include: 1) A link in Trinidad between Holocene-Pleistocene differential coastal cordillera sinking and rising, headward stream erosion during glacial low stands, and a major discontinuity in freshwater guppy (Poecilia reticulata) genetics. 2) Symmetric sinking of Trinidad and Venezuela’s coastal mountains into the intervening Gulf of Paria pull-apart to isolate (on Cerro Humo, Paria, Venezuela; El Tucuche-Cerro del Aripo, Northern Range, Trinidad) amphibian subpopulations into two separate gene pools. 3) Common snake ancestors that stretch across South America and reach back into the Miocene, followed by Pliocene and glacial (Pleistocene) sea-level low-stands that allowed for migrations to bypass Trinidad and connect Tobago directly to mainland South America; the later explain unexpected fossorial and stream snake (coral snake mimic) spatial distributions and genetics.