Subject: Thesis Defense - Edward Brown Southworth V, MS Biology
Date: Tuesday, April 8, 2025 at 11:15:08 AM Eastern Daylight Time
From: SSB Faculty List on behalf of Diane St. Germain
To: SSB-FACULTY-LIST-L@LISTSERV.GMU.EDU

Thesis Defense Announcement
To: The George Mason University Community

Candidate: Edward Brown Southworth V

Program: M.S. in Biology

Date: Tuesday April 22, 2025

Time: 11:00 AM Eastern Time (US and Canada)

Join Zoom Meeting

https://us02web.zoom.us/j/84574207970?pwd=EsIKpMRfGdbscQh4ckCbgoqT0oF9hr.1

Conference ID: 845 7420 7970

Access code: 584063

Committee chair: Dr. Ancha Baranova

Committee members: Dr. Mark Uhen, Dr. Matthew Carrano

Title: Morphometric Analysis of Theropod Claws from Maryland's Arundel Clay Formation

Abstract:
The Arundel Clay Formation, part of the larger Potomac Group, represents one of the few Early Cretaceous terrestrial fossil-bearing units on the East Coast of North America. Despite its paleontological significance, theropod biodiversity in this formation remains poorly understood, with most identifications based on isolated and fragmentary skeletal elements. The classification of isolated theropod unguals has historically been challenging due to morphological variability within and between clades. This study aims to refine the understanding of theropod diversity in the Arundel Clay by conducting a morphometric analysis of four theropod ungual specimens (USNM 4973, 8505, 535490, and 617417), all recovered from the Arundel Formation and housed at the Smithsonian National Museum of Natural History. The measurements of the USNM specimens were compared to a dataset of theropod ungual measurements gathered from several major museum collections. A Principal Component Analysis (PCA) was conducted in R to identify taxonomic patterns and morphological variations. The PCA results reveal that some aspects of the Arundel Clay specimens are consistent with known theropod clades,

whereas others exhibit significant overlap between groups. Despite this, PCA results indicate that the specimens align most closely with specific theropod taxa, chiefly Carnosauria, Dromaeosauridae, and Ornithomimidae. Variations in curvature, robustness, and articular proportions suggest potential functional and ecological implications, though taxonomic classification remains the primary focus. These findings contribute to a broader understanding of theropod diversity in the Early Cretaceous of eastern North America. Additionally, this study provides a foundation for future research on theropod morphology within the Potomac Group and other fossil assemblages.

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