

**VIRGINIA MUSEUM OF NATURAL HISTORY BOARD OF TRUSTEES
MINUTES OF THE RESEARCH AND COLLECTIONS COMMITTEE MEETING
Nov. 12, 2022**

Present at the meeting were Dr. Art Evans, Dr. Tom Benzing, Mark Buss, Dr. Carole Nash, Dr. Kal Ivanov, Dr. Nancy Moncrief, and Ben Williams

Committee Chairman Dr. Art Evans called the meeting to order. The minutes of the May 20, 2022 meeting were unanimously approved; the committee did not meet in August. The committee signed off on the museum's recent acquisitions.

The committee began discussing the museum's collections policy and live animals policy. These two policies must be updated, approved by the committee, and then submitted to the full board for approval as part of the museum's re-accreditation process with the American Alliance of Museums (AAM) in 2025.

Dr. Tom Benzing inquired about the process of deaccessioning museum specimens. Dr. Nancy Moncrief said that it has been many years since any materials were deaccessioned, but if it happened, it would have to go before the full board for approval.

Dr. Art Evans said that the collections policy has not been updated since 2013 and that initial updates to the policy include edits needed due to changes within the museum's hierarchy. Dr. Nancy Moncrief added that the policies had already been submitted to the State Attorney General's Office and that they reviewed the policies and made comments which had already been incorporated into the documents.

Dr. Art Evans suggested a deadline of Jan. 1 for any changes to the policies, which would be submitted to Ben Williams by committee members. Williams would then pass any changes on to Dr. Nancy Moncrief, who will incorporate the changes into final documents that would be presented to the committee and then recommended to the full board for approval at its February meeting.

Dr. Carole Nash said that the collections policy uses the word "specimens," a word that generally isn't used in archaeology given that archaeology collections also incorporate documents, maps, and photos. Dr. Art Evans said he was unaware of a collective term that would incorporate all of the items in the museum's collections. After some discussion, it was recommended that the final document refer to specimens under the umbrella term "collections" and include a glossary defining the term.

Dr. Carole Nash said that James Madison University had recently had an incident in which an employee from the marketing department brought their service dog into a biosecurity lab. After discussion with various departments, it was determined that service animals in biosecurity labs must adhere to the same regulations as humans; goggles, masks, booties, etc. This raised the question of whether the lab should be required to provide these items. Dr. Art Evans said that since the live animals policy doesn't address public behavior, that discussion could be had at a later date.

Mark Buss said that he would appreciate a way of knowing how much space is in museum collections given that the committee approves acquisitions without taking into account how much space the items will occupy. Dr. Art Evans and Dr. Kal Ivanov noted that specimens would

not be listed on the accessions sheet for committee signatures unless the responsible curator was prepared to properly care for the specimens or artifacts.

Dr. Tom Benzing inquired about the process of deaccessioning taxidermied mounts in storage at the museum's Douglas Avenue space. Dr. Nancy Moncrief said that such decisions would have to be made on a case-by-case basis and a comprehensive assessment of the collections at Douglas would be required. Dr. Art Evans said that since the board was taking a field trip to Douglas Avenue later that day, it would be a good idea to look at the mounts and get a general idea of their condition. Dr. Kal Ivanov said that many of the mounts are impossible to obtain today and have value, although some are deteriorating.

Dr. Art Evans said that when he was using the wi-fi on the Research and Collections side of the building the day prior, the connection was terrible. Dr. Kal Ivanov said that the curators and research techs frequently rely on the wi-fi because they cannot use their hardline connected state computers since VITA doesn't allow many important programs to be loaded onto state computers. Dr. Tom Benzing said that VITA is historically poor and many universities have managed to get away from it, a potential possibility since VMNH now operates within the Department of Education. Dr. Carole Nash said that it might be possible for JMU facilities management to inspect the situation and determine how to make VMNH wi-fi faster and more reliable. Dr. Tom Benzing added that it should be possible to have the VMNH internet service provider come to the museum and assess the situation.

Dr. Art Evans briefly discussed VMNH's new Assistant Curator of Herpetology Dr. Arianna Kuhn, saying that she's an excellent addition to the museum.

Dr. Kal Ivanov said that three potential biology research techs will be arriving in December for in-person interviews.

Dr. Art Evans adjourned the meeting.

OCTOBER-DECEMBER 2022 VMNH ACQUISITIONS FOR APPROVAL BY BOARD OF TRUSTEES RESEARCH AND COLLECTIONS COMMITTEE

RIM* No.	Collector/Donor	Date at VMNH	VMNH Dept.	Quantity	Description	Method	To Be Accessioned (Y/N)
RIM 18-2022	Liberty Hightower	9/26/2022	MAMMALOGY	1	Coyote (<i>Canis latrans</i>)	SALVAGE	Y
RIM 19-2022	Nancy D. Moncrief	10/11/2022	MAMMALOGY	1	Eastern Mole (<i>Scalopus aquaticus</i>)	SALVAGE	Y
RIM 20-2022	Miami University (Tom Crist, PhD)	5/19/2022	RECENT INVERTEBRATES	23,525	dry, pinned insect specimens	Gift	Y
RIM 21-2022	Liberty Hightower	10/22/2022	MAMMALOGY	1	Gray Fox (<i>Urocyon cinereoargenteus</i>)	SALVAGE	Y
RIM 22-2022	Michael Folmer	6/13/2022	PALEONTOLOGY	9	vertebrae, <i>Palaeophis</i> (snake)	Gift	Y
RIM 23-2022	Marco Gullotta	6/13/2022	PALEONTOLOGY	100+	vertebrae, <i>Palaeophis</i> (snake)	Gift	Y
RIM 24-2022	Christopher Kerr	6/13/2022	PALEONTOLOGY	13	13 slabs (reptiles, sharks, invertebrate trace)	Gift	Y
RIM 25-2022	Robert Weems	6/13/2022	PALEONTOLOGY	20+	slabs and gastroliths: 2 slabs mudstone (fish); 9+ gastroliths (trace fossils); 8 slabs shale (fish); 1 fish skull plate	Gift	Y
RIM 26-2022	William F. Schmachtenberg	7/20/2022	PALEONTOLOGY	4	<i>Cryptolithus</i> trilobites and a slab with <i>Cincinnati</i> brachiopods	Gift	Y
RIM 27-2022	William F. Schmachtenberg	7/29/2022	PALEONTOLOGY	3	<i>Cryptolithus</i> trilobites and bulk sample Butonite (no fossils)	Gift	Y
RIM 28-2022	Ryan S. Collins	7/21/2022	PALEONTOLOGY	1	<i>Callistoma</i> sp. (possibly <i>Callistoma mitchelli</i>)	Gift	Y
RIM 29-2022	Ryan S. Collins	7/21/2022	PALEONTOLOGY	40	3 Olive Shell, Pecten, Oyster Drill, 24 Turritella Snail, 5 Clam, 2 Cats Paw Oyster, 2 matrix w/add'l material, 1 Moon Snail, 1 Tusk Shell	Gift	Y
RIM 30-2022	Adam Pritchard	8/4/2022	PALEONTOLOGY	21	stones with fossil inclusions (reptiles, fish, plants)	Field Collection	Y
RIM 31-2022	Nancy D. Moncrief	12/5/2022	MAMMALOGY	1	Gray Fox (<i>Urocyon cinereoargenteus</i>)	SALVAGE	Y
RIM 32-2022	Dr. Kal Ivanov	12/16/2022	MAMMALOGY	1	Gray Squirrel (<i>Sciurus carolinensis</i>)	SALVAGE	Y
RIM 33-2022	Kathy Rucker	11/12/2021	EXHIBITS?	30+	various specimens (geology, paleo, archaeology, etc. and three books)	Gift	No – Potential use in future exhibits
RIM 34-2022	Kathy Rucker	11/12/2021	ANTHROPOLOGY	2+	1 box of ceramic sherds, 1 ceramic pipe	Gift	No
RIM 36-2022	Kathy Rucker	11/12/2021	PALEONTOLOGY	10+	fern fossils, fairystones, Green River fish fossil, small bag of crynoid stems	Gift	Y
RIM 37-2022	Adam Pritchard	9/24/2022	PALEONTOLOGY	62+	20 sandstone rocks w/vertebrates, clam, shrimp, plants; 30+ shale samples; 12 siltstone samples w/ root traces	Field Collection	Y
RIM 38-2022	Ben Kligman	12/21/2022	PALEONTOLOGY	1	isolated reptile tooth collection	Gift	Y

* RIM is an acronym for the Record of Incoming Material form

VMNH Collections Committee and Executive Director have Approved Recent Acquisitions: RIM 18-2022 through RIM 34-2022 and RIM 36-2022 through RIM 38-2022

OCTOBER-DECEMBER 2022 VMNH ACQUISITIONS FOR APPROVAL BY BOARD OF TRUSTEES RESEARCH AND COLLECTIONS COMMITTEE

VMNH Board of Trustees Research & Collections Committee Review of Acquisitions: RIM 18-2022 through RIM 34-2022 and RIM 36-2022 through RIM 38-2022

Arthur V. Evans, Chair

(signature) Arthur V. Evans, Chair

Date

Thomas R. Benzing

(signature) Thomas R. Benzing

Date

Mark J. Buss

(signature) Mark J. Buss

Date

Carole L. Nash

(signature) Carole L. Nash

Date

Melany Stowe

(signature) Melany Stowe

Date

**VIRGINIA MUSEUM OF NATURAL HISTORY
RESEARCH AND COLLECTIONS ACTIVITIES**

**Report to the Board of Trustees
October-December 2022**

**Kaloyan Ivanov, Ph.D.
Associate Curator of Invertebrate Zoology**

- Drs. Ivanov and Means, and colleagues' manuscript "Three new species of the Amazonian millipede genus *Leptherpum* (Polydesmida: Chelodesmidae)" was recently published at *Zoologia*.
- Drs. Ivanov and Means, and colleagues' manuscript "Worldwide distribution of cave-dwelling Chelodesmidae (Diplopoda, Polydesmida)" was recently published at *International Journal of Speleology*.
- Dr. Ivanov and colleagues from Virginia Tech have a manuscript in review at *Ecosphere*.
- Drs. Ivanov and Means, and colleagues have manuscripts in review at *European Journal of Taxonomy* and *Biodiversity and Conservation*.
- Using recently awarded funds from the Institute of Museum and Library Services, Dr. Ivanov, Curator of Mammals Dr. Nancy Moncrief, Deputy Director Ryan Babrber, and Education Manager Christy Deatherage spearheaded efforts in establishing VMNH's new multidisciplinary Microscopy Lab.
- Dr. Ivanov participated in VMNH's Bonez & Booz Halloween and Fall Festival and interacted with 500+ visitors.

Research & Collections

Drs. Ivanov and Means (VMNH), R. Bouzan, Drs. A. D. Brescovit and L. F. M. Iniesta (Instituto Butantan, Brazil) and T. M. Almeida's (Instituto Nacional de Pesquisas da Amazônia, Brazil) paper "Three new species of the Amazonian millipede genus *Leptherpum* (Polydesmida: Chelodesmidae)" was published in the Sociedade Brasileira de Zoologia journal *Zoologia*.

[Bouzan, R. S., J. C. Means, K. Ivanov, T. M. de Almeida, A. D. Brescovit, and L. F. M. Iniesta 2022. Three new species of the Amazonian millipede genus *Leptherpum* (Polydesmida: Chelodesmidae). *Zoologia* 39(2): 222020. <https://doi.org/10.1590/S1984-4689.v39.e22020>]

Drs. Ivanov and Means, R. Bouzan, Drs. A. D. Brescovit and L. F. M. Iniesta, and Dr. R. L. Ferreira's (Universidade Federal de Lavras, Brazil) paper "Worldwide distribution of cave-dwelling Chelodesmidae (Diplopoda, Polydesmida)" was published in the *International Journal of Speleology*.

[Bouzan, R. S., J. C. Means, K. Ivanov, R. L. Ferreira, A. D. Brescovit, and L. F. M. Iniesta. 2022. Worldwide distribution of cave-dwelling Chelodesmidae (Diplopoda, Polydesmida). *International Journal of Speleology* 51(3): 235-248. <http://dx.doi.org/10.5038/1827-806X.51.3.2448>]

Dr. Ivanov and Virginia Tech colleagues (former graduate student M. Malone, Drs. R. Schurch and S. Taylor) have a manuscript in review at *Ecosphere*. The work focuses on

the range expansion of the invasive Red Imported Fire Ant, *Solenopsis invicta* Buren, in Virginia. The manuscript also explores the potential spread of this notorious invasive species across the United States using predictive distribution modelling.

Drs. Means and Ivanov, R. Bouzan, Drs. L. F. M. Iniesta and A. D. Brescovit, D. Martinez-Torres (Universidad Nacional de Colombia, Colombia), and L. F. Vasquez-Valverde (Virginia Tech, Virginia) have a manuscript in review at the *European Journal of Taxonomy*. The work reviews the monotypic South American millipede genus *Dibolostethus* (Polydesmida: Chelodesmidae) and includes the description of two new species (one of which from VMNH's invertebrate collections), and a summary of the Chelodesmidae taxa known from the Tropical Andes Biodiversity Hotspot.

Drs. Ivanov and Means, R. Bouzan, Drs. A. D. Brescovit and L. F. M. Iniesta have a manuscript in review at *Biodiversity and Conservation*. The work is the first study to focus on the biogeography of Neotropical Spirostreptida and employs a multi-approach analysis to detect areas of endemism and patterns of distribution of the members of the order in Brazil.

VMNH Research Associate and Clemson University graduate student C. Harden, VMNH Biology Technician L Hightower, and Dr. Ivanov are completing a manuscript (to be submitted to *Subterranean Biology*) on the efficiency of two subterranean trap designs for targeting endogaeic invertebrate taxa in the Appalachian Highlands of the eastern US.

Drs. Ivanov and Yang (Virginia Tech) are working on a manuscript focused on recent additions to Virginia's exotic ant fauna and range expansions of several major invasive ants in the state. The work will also include an annotated checklist of the non-native ant taxa of eastern North America. In support of this project, Drs. Ivanov and Yang conducted fieldwork in the City of Danville, VA, the westernmost known occurrence of the invasive Red Imported Fire Ant, *Solenopsis invicta* Buren, in Virginia.

Drs. Ivanov, Means, Evans, and C. Harden submitted annual reports to the Virginia Department of Conservation and Recreation (incl. Division of Natural Heritage) regarding research activities during the 2022 field season.

This quarter, Dr. Ivanov and colleagues (primarily Dr. Means) conducted fieldwork in Halifax, Mecklenburg, Patrick, Pittsylvania, and Scott Cos in support of ongoing research projects.

VMNH Collections Manager H. Cartmell, with help from Dr. Ivanov, is continuing work on inventorying and cataloging VMNH's Mollusca (mollusks) holdings. Recent work also included the transfer of a large number of dry-preserved unionid (freshwater mussels) specimens from the museum's storage facility at Douglas Ave. Upon processing in the museum's disinfestation chamber, the specimens are currently temporarily stored in VMNH's Dry Biology awaiting curation and incorporation into the museum's holdings.

Dr. Ivanov completed the identification and curation of 690+ backlogged specimens (primarily ants and terrestrial isopods, few cockroaches, crickets, earwigs, et alia), which were (or will be) incorporated into VMNH's invertebrate holdings.

Dr. Ivanov oversaw the acquisition of Diptera expert Dr. B. Steinly insect collection (Miami U, Ohio). The collection, which comprises 23,525 pinned/pointed insects (primarily Ephydriidae and Formicidae), is currently temporarily stored in VMNH's Dry Biology awaiting curation and incorporation into the museum's holdings.

Dr. Ivanov responded to information requests regarding VMNH's invertebrate holdings: Myrmeleontini (Myrmeleontidae; Pit-trapping Antlions) (Yu-Hsiu Lin; Texas A&M U); *Apacheiulus* (Parajulidae; millipedes) (V. Zhuang; U Texas, El Paso)

Dr. Ivanov satisfied a loan request regarding VMNH's invertebrate holdings: 6 lots of Spirostreptida millipedes from Tanzania (Dr. H. Enghoff; Natural History Museum of Denmark)

Using recently awarded funds from the Institute of Museum and Library Services, Dr. Ivanov and museum staff converted an existing, underutilized museum space into a modern multidisciplinary research and education microscopy laboratory. The now fully operational facility welcomed its first students in early December, when a school group of 9-12th graders from Fieldale, VA visited the VMNH to learn more about the microscopic life of the Commonwealth's freshwater habitats.

Education & Outreach

Dr. Ivanov and museum staff participated in VMNH's first-ever Bonez & Booz Halloween and Fall Festival, which offered a variety of one-day-only displays and activities that ranged from invertebrate and vertebrate materials from the museum's collections to live performances, magic shows, and costume contests. The event, which brought a generally new audience to the museum, attracted 2,100 children and adults, including 1,000 EBT card-holders as part of the *Museums for All* program, from Virginia, North Carolina, and four additional states (Florida, Minnesota, South Carolina, and West Virginia). (October 29)

Dr. Ivanov gave a tour of VMNH's exhibits and collections to a group of 25 visitors from Martinsville, VA. (October 22)

Professional Service

Dr. Ivanov and museum staff completed interviews of applicants for the position of Biology Research Technician at VMNH and made final selection in mid-December.

Dr. Ivanov (President and co-Treasurer) and Dr. Moncrief (co-Treasurer and past President) participated in the [virtual] Virginia Natural History Society Executive Committee meeting on 17 December 2022. Among the discussed topics were the election of new officers, construction of new Society website, membership incentives, and time and location of the next general meeting of the Society. (December 17)

Dr. Ivanov copy edited four articles for the Virginia Natural History Society's periodical *Banisteria* (Volume 56, 2022). (completed November 21, 22 and December 30)

Drs. Ivanov and Means are serving as co-editors of VMNH's *Memoirs* series for a manuscript titled "The groundwater isopods of Virginia (Isopoda: Asellidae and

Cirolanidae)" by Dr. J. J. Lewis and colleagues. The manuscript, which was accepted for publication in mid-November, is currently at the copy editing stage.

Nancy D. Moncrief, Ph.D.
Curator of Mammalogy

- A manuscript about Lyme disease emergence in Virginia co-authored by Dr. Moncrief was published by the peer-reviewed journal *Ticks and Tick-borne Diseases*.
- Dr. Moncrief made arrangements to host the Virginia Chapter of The Wildlife Society's annual conference in Martinsville 15-17 February 2023.

Research and Collections

Dr. Moncrief's article about recent patterns of Lyme disease emergence in Virginia and North Carolina was published in the peer-reviewed journal *Ticks and Tick-borne Diseases* in November 2022. The full citation is: Leber, M., N.D. Moncrief, L.J. Gatens, M. Michel, and R. J. Brinkerhoff. 2022. Use of mammalian museum specimens to test hypotheses about the geographic expansion of Lyme disease in the southeastern United States. *Ticks and Tick-borne Diseases*: 13(6), 102018.

[.https://doi.org/10.1016/j.ttbdis.2022.102018](https://doi.org/10.1016/j.ttbdis.2022.102018) For this study, Dr. Moncrief and her colleagues used museum specimens to document the recent pattern of Lyme disease emergence in Virginia and North Carolina. Specifically, they screened ear clips from study skins of white-footed deermice (housed at VMNH and NCMNS) for DNA from the Lyme disease pathogen.

Throughout the quarter, Dr. Moncrief continued her collaboration with Dr. John Scheibe (Professor Emeritus of Biology at Southeast Missouri State University). They previously published an article describing geometric morphometric comparisons of the jaws of several tree squirrel species. For the current work, they are using the extensive collection of squirrel specimens in the VMNH Mammal Collection to study geographic variation in eastern gray squirrels and eastern fox squirrels. Ms. Liberty Hightower photographed hundreds of squirrel jaws for Drs. Moncrief and Scheibe, and she will participate in the analyses.

Also, throughout the quarter, Dr. Moncrief continued working with Mss. Hightower, Cartmell, and Harris to prepare, install, document, and organize traditional specimens and frozen tissues of mammals and birds and their accompanying museum documents (electronic and hardcopies). In particular, they made numerous edits to electronic databases for the mammal and bird collections.

Professional Service and Other Duties

Throughout the quarter, Dr. Moncrief met with several members of the Virginia Chapter of The Wildlife Society to plan the Chapter's annual conference, which will take place 15-17 February 2023 in Martinsville. Workshops and technical presentations will occur at New College Institute, and the annual dinner will be held at VMNH on 16 Feb 2023. Attendance for this conference averages 125 members and includes professionals from multiple state and federal agencies as well as faculty members and students from

several Virginia colleges and universities (including Radford, George Mason, Virginia Tech, Bridgewater, Randolph Macon, and Richmond).

Dr. Moncrief continued serving on the Council of the Virginia Natural History Society (VNHS). She also continued serving (with Dr. Ivanov) a four-year term (ends December 2022) as Co-Treasurer.

Scientific Programs, Exhibits, and Other Activities

In October, Dr. Moncrief participated in VMNH's Bonez and Booz Festival. She worked at the admissions table for VMNH and ASTC members with Ms. Charlotte Harter.

Also in October, Dr. Moncrief recorded a VMNHcast episode with VMNH Science Administrator Mr. Ben Williams. She discussed findings of her study of Lyme disease emergence in Virginia and North Carolina. This research was possible because several hundred specimens of white-footed mice in the VMNH mammal collection were collected before 1990, which is the year Lyme disease was first reported in Virginia. The recording can be found here:

https://open.spotify.com/show/39SacT3Cby9kOowL0XIW2C?go=1&sp_cid=10b2e99f5053c5c5b15408e0f63f480d&utm_source=embed_player_p&utm_medium=desktop&nd=1

Throughout the quarter, Dr. Moncrief worked with other VMNH R&C staff to screen applications and interview candidates for the new Biology Research Technician position.

Hayden Bassett, Ph.D.
Assistant Curator of Archaeology

NOTE: Dr. Hayden Bassett was suddenly called up for six weeks of Army Reserve training and did not have time to submit a summary for this quarter. His summary will be included in the next quarter's board report.

Adam Pritchard, Ph.D.
Assistant Curator of Paleontology

- Dr. Pritchard submitted to and now has a paper in press with the journal *Anatomical Record*, describing new fossil limb bones and the comparative anatomy of reptile thighs. The project is a collaboration with scientists from Virginia Tech, Stony Brook University, SUNY Oswego, University of Utah, and the Natural History Museum of Los Angeles.
- Dr. Pritchard submitted a grant to the National Science Foundation in collaboration with Dr. Ray Bernor, a professor at Howard University and a VMNH Research Associate. The grant would focus on development of horse-centered collections development, educational program, and a fully funded special exhibit in 2026.
- Dr. Pritchard presented on his research and VMNH reptile fossil collections as part of the Virginia Tech Department of Geosciences seminar series. The audiences included a large number of undergraduate students, graduate students, and faculty.
- Dr. Pritchard provided collections tours to a wide array of audiences including university students from the University of Lynchburg and Virginia Tech, an elementary school group from the Pamunkey Regional Library, and the board of directors of the New College Institute. He also provided specimen-based displays for hundreds of museum visitors at the “Bonez and Booz” festival event in October.

Research & Collections

Dr. Pritchard collaborated with co-authors Sterling Nesbitt, Michelle Stocker, Alan Turner, Jennifer Olori, Nathan Smith, and Randall Irmis on a scientific paper describing the first thigh bones of drepanosaurs, an enigmatic group of extinct, chameleon-like reptiles. The paper provided the first detailed comparisons of thigh anatomy in many primitive reptile groups. It has been accepted for publication in the journal *Anatomical Record* in Q1 2023.

Dr. Pritchard appointed a new research and collections intern. She is currently working on cataloging plant fossils for the EGEMS collections database. They have also collaborated on a new research project, studying variation in the backbones of an extinct sea snake species from Virginia, *Palaeophis*.

Dr. Pritchard oversaw research visits from an amateur paleontologist studying the ancient reptile collections and a Howard University professor studying the ancient mammal holdings.

Dr. Pritchard developed a new collections workstation for paleontology. The workstation includes a new, high-powered HP computer setup, the Filemaker Pro software for collections databasing, and a RAID array for constant backups of the database.

Dr. Pritchard continued developing three-dimensional renderings of the early pterosaur *Arcticodactylus* for a collaboration with scientists at Virginia Tech and Yale.

Dr. Pritchard worked with Drs. Nancy Moncrief and Alex Hastings on the Petra the Cave Cat project. He did extensive comparative study with modern and fossil cat species to help refine the species identity of Petra. He also worked with technician Lucy Treado on the continued preparation of the fossil and the identification of a bone fragment for carbon dating. They submitted the fragment to the Beta Analytics corporation, which is performing the dating.

In coordination with the Calvert Marine Museum, Dr. Pritchard prospected a newly identified Permian (290 million year old) fossil site in Allegany County, Maryland.

Education & Outreach

As part of the Virginia Tech Geosciences Seminar Series, Dr. Pritchard presented on his research on ancient reptiles and ongoing field projects run by the VMNH.

Dr. Pritchard presented collections tours to classes from the University of Lynchburg, Virginia Tech, and the Pamunkey Regional Library. He also presented a hybrid collections/exhibits tour for the board of the New College Institute.

Dr. Pritchard and Paleontology Technician Lucy Treado developed the “Frankensaurus” display for the “Bonez and Booz” festival hosted by the VMNH for the Halloween season. The display focused mistakes by early scientists, who combined the bones of many animals into hybrid creatures that never actually existed. The display is intended to show the process and progress of science to a general audience.

Dr. Pritchard assisted in the identification of over a dozen fossils found by Virginia residents.

Grants & Funding

Dr. Pritchard submitted a National Science Foundation Excellence-in-Research grant in collaboration with a Howard University team including Drs. Ray Bernor, Salman Rahmat, and Omar Cirili. The grant would provide a subaward of over \$70,000 for the VMNH to develop a fossil horse comparative collection (3D-printed) and a fully-funded special exhibit on horse evolution.

Dr. Pritchard continued the molding and casting program by VMNH paleontology, selling cast specimens of Virginia fossil vertebrates to the Museum of York County in Rock Hill, SC.

Exhibits

Dr. Pritchard worked with Research Associate Bill Schmacenberg on a computer game-based simulation of a Jurassic ecosystem, featuring a wide range of accurate dinosaurs, other animals, and plants. The display is intended for presentation as part of 2023 events at the VMNH.

Arianna Kuhn, Ph.D.
Assistant Curator of Herpetology

- Dr. Kuhn and colleagues submitted a paper for review at Ecology and Evolution.
- Dr. Kuhn and colleagues had a paper accepted in the Biological Journal of the Linnean Society.
- Drs Kuhn and colleagues have a manuscript in review at Molecular Ecology Resources.
- Dr Kuhn and colleagues submitted a grant application to the Foundation for the Conservation of Salamanders
- Dr. Kuhn gave an invited seminar at Villanova University for the Biology Departmental Fall Seminar Series.
- Dr. Kuhn gave an invited talk at the Fall 2022 Virginia Herpetological Society meeting.
- Dr. Kuhn is serving as the Associate Editor for Herpetological Journal.
- Dr. Kuhn is serving as counselor for the Virginia Society of Naturalists.
- Dr. Kuhn gave a VMNH collections tour to Averett University students in Dr. Herberts' Fall 2022 herpetology class.
- Dr. Kuhn participated in the VMNH festival "Bones and Boos" and interacted with 700+ visitors.

Research & Collections

Drs Kuhn (VMNH), Burbrink FT (AMNH), Ruane S (FMNH), Raxworthy C (AMNH), Rabibisoa NHC (UAntananarivo, Madagascar), and Achille R (UAntananarivo, Madagascar) submitted a paper for review at Ecology and Evolution. The paper uses genomic data and evolutionary modeling to explore the relationship between Speciation rates and formation of population structure using Malagasy Gernsnakes as a case study.

Drs Kuhn (VMNH), Kizirian D (AMNH), Campbell G, Donnelly MA (Florida International University), Overcast I (UMaine), Padijal JM, Povenika R, Quitian M, Saporito R, and Segall M (Natural History Museum in London) had a paper accepted pending minor revision in Biological Journal of the Linnean Society. The review discusses the autocatalytic evolution of mimetic trophic systems.

Drs Kuhn (VMNH), Schiebelhut LM, Guillaume AS, Schweizer RM, Armstrong EE, Beaumont MA, Byrne M, Cosart T, Hand BK, Howard L, Mussmann SM, Narum S, Rasteiro R, Rivera-Colón AG, Saarman N, Sethuraman A, Taylor HR, Thomas GWC, Wellenreuther M, and Luikart G. are working on revisions for a manuscript accepted pending revision at Molecular Ecology Resources that reviews practical guidance in conservation genomics from study design to application.

Drs Kuhn (VMNH), Burbrink FT (AMNH), Ruane S (FMNH), Raxworthy C (AMNH), Rabibisoa NHC (UAntananarivo, Madagascar), Achille R (UAntananarivo, Madagascar) and Overcast I (UMaine) are working on a manuscript that uses genomic data to examine the co-demographic history of snake assemblages on Madagascar using newly developed phylogeographic methods developed by Overcast. The target journal for this manuscript submission is Molecular Ecology.

Drs Kuhn (VMNH), Lee-Yaw J (UOttawa) and Weisrock D (UKentucky) are analyzing data and preparing a manuscript and provincial report resulting from Dr Kuhn's postdoctoral research that uses genomic data to provide critical insights in the guidance of successful amphibian reintroductions. This work integrates spatial, ecological, and genomic data with careful study design to provide the best opportunity for successful protected species' reintroductions. The target journal for this manuscript is Biological Conservation.

Drs Kuhn (VMNH), Lee-Yaw J (UOttawa), and Weisrock D (UKentucky) along with Master's student Hunter D (ULethbridge) are working data analysis and manuscript are analyzing data and preparing a manuscript and provincial report resulting from Dr Kuhn and D Hunter's field and laboratory work at the University of Lethbridge and Waterton Lakes National Park in southwest Alberta, Canada. This research uses genomic data and occupancy modeling to investigate the impact of an extreme fire in a national park on genetic diversity over space and time for small terrestrial vertebrates. The target journal for this manuscript is Conservation Biology.

Drs Kuhn (VMNH), Lee-Yaw J (UOttawa) and Weisrock D (UKentucky) are analyzing data and preparing a manuscript resulting from Dr Kuhn's postdoctoral research that uses genomic data to understand the role of refugial dynamics in driving intraspecific amphibian divergence in the Pacific northwest. The results of this study will underscore the importance of wide-ranging taxa to understanding the role of LGM dynamics in promoting amphibian diversity in this region which has been understudied from a phylogeographic perspective. The target journal for this manuscript is Journal of Biogeography.

Drs Kuhn (VMNH), Bauer AM (VillanovaU), Jackman T (VillanovaU), and Brennan I (Natural History Museum in London) are working to finalize a manuscript entitled "Rhoptropus day geckos support the antiquity of the Namib". This study identified several new species from Angola and Namibia, and estimates the diversification history and speciation of endemic terrestrial Namib day geckos from the pro-Namib region. The diversification of this group provides insight into the role of historical climate change in shaping regional biodiversity in the Namib Desert. The target journal for this manuscript is the Biological Journal of the Linnean Society.

Dr. Kuhn gave an invited seminar at Villanova University in southeast Pennsylvania. Her talk entitled "A window into the past informs species preservation in the future – lessons from reptile and amphibian genomes" explored some of her previous research which integrates genomic, morphological, and ecological data from museum tissue and specimen collections across spatial, temporal, and taxonomic levels to document and describe biodiversity in Madagascar, and discussed how these techniques will apply to her new research program in southwest VA. The seminar was attended by faculty, graduate, and undergraduate students in the biology department and was well-received and sparked many exciting discussions about her new position.

Dr. Kuhn was invited to give the departmental seminar at the Field Museum of Natural History in Chicago to disseminate her work on the conservation genomics of Long-Toed Salamanders in the Pacific Northwest. The seminar is scheduled for April 3rd, 2023.

Dr. Kuhn was invited to give the departmental seminar on April 3, 2023 at James Madison University to disseminate her work on the conservation genomics of long-toed salamanders in the Pacific Northwest and applications to this design for Appalachian salamanders. The seminar is scheduled for March 31.

Dr. Kuhn gave an invited talk at the Virginia Herpetological Society Fall meeting in Richmond VA. Her talk entitled “Understanding historical change to predict the future of biological communities” discussed her postdoctoral and doctoral work that uses genomic data to model speciation and co-demographic scenarios. At this meeting, she had the opportunity to network with prominent herpetologists involved in regional research from the Department of Wildlife Resources, Virginia Tech, Liberty University and James Madison University.

Dr. Kuhn attended the North Carolina Herpetology Society (NCHS) Fall meeting. The goals of this conference are networking, disseminating her research program and the VMNH, and attending conference talks on relevant research in phylogenetics and phylogeography. Dr. Kuhn registered to attend a conference at the Universidad Nacional Autónoma de México (UNAM) in México City, México for the Annual standalone meetings for the Society of Systematic Biologists (SSB). The goals of this conference are networking, disseminating her research program and the VMNH, and attending conference talks on relevant research in phylogenetics and phylogeography.

Dr. Kuhn submitted an abstract to Wildlife Society – Virginia Chapter Meetings that will take place at the VMNH on February 14–16, 2023. This presentation will introduce her research on the practical use of genomic data to provide critical insights in the guidance of successful amphibian reintroductions in North America to a highly applicable audience of wildlife and conservation biologists.

Drs Kuhn, Ivanov, Means, Moncrief and Hightower (VMNH) interviewed and hired a new biology research technician to facilitate the curation, mobilization and digitization of the vertebrate biology collections. The technician, M. Boyd, has extensive expertise in collections based management and research at the Smithsonian National Museum of Natural History (NMNH). He will begin training for this position on Jan. 9, 2023.

Dr. Kuhn visited the North Carolina State Museum of Natural History (NCSM) in Nov, 2023 for training in best practices of state herpetology collections management and curation by B. Stuart. This meeting also served to launch a collaboration between the herpetology departments of the VMNH and the NCSM. Dr. Kuhn visited the American Museum of Natural History (AMNH) in Nov, 2023 to attend a meeting on ancient DNA methods and discuss ongoing projects that investigate snake biodiversity and evolution and future collaborations with curator F. Burbrink on North American snake evolution.

Dr. Kuhn is overseeing the acquisition of locally collected herpetological specimens and tissue donations from colleague and research associate J. Gibson (Patrick and Henry County Community College) to the VMNH. The specimen materials will be processed by Dr. Kuhn and new biology research technician M. Boyd, and will represent the first herpetological tissues accessioned in the VMNH collection.

Dr. Kuhn (VMNH) and collaborator N. Claunch (University of Florida) will be launching a new project aimed at conduct spatial analyses to assess which species, genera, or

families may be most at risk of contracting fungal infections based on local thermal environment, similarity of thermal preferences to the pathogen's documented optimal thermal environment and susceptibility to Bsal in laboratory infection trials. In this study, comparative methods will be used to assess whether plasticity may drive diversification through thermal niche partitioning among species. Data collection and training for field methodologies will commence in late February, with targeted field work taking place in mid-March of 2023. When completed, this publicly available data will be used for other studies, such as responses to climate change, responses to different diseases, or evolutionary relationships driving thermal niches.

Education & Outreach

Dr. Kuhn, along with M. Gunter-Basset and L. Treado gave a VMNH collections tour to 18 Averett University students in Dr. Herberts' Fall 2022 herpetology class. This is the first time this yearly course has been connected with the VMNH, and several students expressed interest in future internships with the collections.

Dr. Kuhn and museum staff participated in VMNH's Bonez and Booz Festival, which offered a variety of one-night-only displays that ranged from invertebrate to vertebrate materials from the museum collections.

Dr. Kuhn designed education materials for a herpetology focused booth, which highlighted skeletal adaptations and biological representation of regional herpetofauna. The event, which brought a new audience of both young and adult individuals to the museum and attracted over 2,000+ visitors.

Dr. Kuhn is working to prepare new herpetology signage and displays for the annual Bug Fest at the VMNH taking place Jan. 28, 2023. This display will highlight both global diversity in reptiles and amphibians of interest and explore invertebrate dietary specialization in regional reptile and amphibian taxa.

Dr. Kuhn is preparing a lecture and workshop on regional herpetofauna and snake identification for the local chapter of the Virginia Master Naturalists. This webinar will take place on zoom this February. Dr. Kuhn visited the North Carolina State Museum of Natural History (NCSM) in Nov, 2023 to acquire a donation of herpetological education specimens to use in her outreach program at the VMNH. These donations include both wet and osteological specimens.

Dr. Kuhn and collaborator N. Claunch (University of Florida) are preparing materials to use illustration to bring awareness to the conservation threats of southwest Appalachian salamanders by creating downloadable coloring pages with lesson plans for use in early education courses in English and Spanish, publicized and made accessible to educators through the Florida Museum's online Learning Resources and the VMNH education program. The illustrations will be integrated into informational posters and brochures that will be made available for public use by nature centers, parks, and science classrooms.

Media

Dr. Kuhn was interviewed and had an article written about her new herpetology program at the VMNH in the Martinsville Bulletin.

Dr. Kuhn was interviewed by Research and Collections administrator B. Williams to prepare a herpetology-focused podcast for the VMNHcast.

Dr. Kuhn was interviewed by the Henry County Enterprise newspaper for an article about her work at the VMNH as the new Assistant Curator of Herpetology.

Dr. Kuhn presented the goals of the new Herpetology lab at the VMNH to the VMNH Board of Trustees in October 2022.

Professional service

Dr. Kuhn has accepted a position as Associate Editor for the Herpetological Journal (the journal of the British Herpetological Society). Together with the board of editors, she is helping to increase focus on leading female academics as well as overall increased diversity and representation in the herpetological sciences.

Dr. Kuhn has accepted a new role serving as counselor for the Virginia Natural History Society.

Dr. Kuhn reviewed a paper for Molecular Phylogenetics and Evolution on the evolution of scincid diversity and speciation on Madagascar. The publication is now available online.

Dr. Kuhn has helped to prepare a workshop she will be co-presenting entitled "Phylogeographic Temporal Analysis (PTA): Model based comparative phylogeography with machine learning" at the fifth standalone meeting of the Society of Systematic Biologists (SSB) at the Universidad Nacional Autónoma de México (UNAM) in México City, México with collaborators Isaac Overcast (University of Maine, primary developer) and Ella Vázquez-Domínguez (Instituto de Ecología, UNAM). The workshop will be attended by students, postdoctoral fellows, and professionals interested in learning about our new methodological approach developed for application in the field of comparative phylogeography using genomic data

Research and Collections

Jill K. Harris, Registrar

Eighteen (18) collections acquisitions were recorded for over 23,850 specimens. These specimens were added to the invertebrate zoology, paleontology, archaeology, and mammal collections.

Three (3) outgoing loans were recorded this quarter from the department of education, paleontology, and invertebrate zoology collections. Loans were made to: Reynolds Homestead Forest Research Center, Duke University Lemur Center, and the Natural History Museum of Denmark (University of Copenhagen).

In efforts to standardize electronic data within the collections management database, Ms. Harris modified one or more fields in approximately 2,730 electronic records.

Haley Cartmell, Collections Manager

Curators and staff modified/updated 5,394 existing records and added 1,225 new records to the VMNH collections databases Proficio (all museum collections) and EGEMS (paleontological collections only).

Ms. Cartmell and Ms. Harris began taxidermy inventory in December 2022 and will continue this inventory in 2023.

# of Activities	TYPE OF ACTIVITY	PROFESSIONALS AND 13+ STUDENTS	K-12 STUDENTS	K-12 TEACHERS	PUBLIC			TOTAL #	
0	Conference presentations (A)	0	0	0	0			0	
1	Meetings chaired (B)	8	0	0	0			8	
3	Review documents/manuscripts (B)	4	0	0	0			0	
2	Requests for information about collections (C)	2	0	0	0			2	
0	Visiting researcher (C)	0	0	0	0			0	
0	Collections tours (D)	0	0	0	0			0	
1	Lab Tours (D)	0	0	0	25			25	
0	Receptions	0	0	0	0			0	
0	Responses to requests for information about specimens at VMNH (D)	0	0	0	0			0	
0	Lectures and presentations at VMNH (D)	0	0	0	0			0	
0	Technical consultations (B, D, & E)	0	0	0	0			0	
6	Display table with specimens	0	0	0	2100			2100	
0	Off-site education programs	0	0	0	0			0	
0	Lectures Not at VMNH (E)	0	0	0	0			0	
1	Off-site presentations (E)	0	0	0	1125			1125	
0	Field trips/Field Work	0	0	0	0			0	
0	TOTALS							3260	

TOTAL # INDIVIDUALS SERVED

3260

New Records Added to VMNH Co

	QTR 1 (July-September 2022)			QTR 2 (October-December 2022)	
	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
PROFICIO	0	0	47	304	784
EGEMS	0	0	105	0	27
TOTAL # NEW RECORDS	0	0	152	304	811

Existing Records Updated/Modified in VM

	QTR 1 (July-September 2022)			QTR 2 (October-December 2022)	
	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
PROFICIO	58	13769	6142	1615	770
EGEMS	0	0	57	1	0
TOTAL # UPDATED RECORDS	58	13769	6199	1616	770

	QTR 1	QTR 2	QTR 3	QTR 4	FY TOTAL
TOTAL # NEW RECORDS	152	1225	0	0	1377
TOTAL # UPDATED RECORDS	20026	5394	0	0	25420

ollections Management Databases

ber 2022)	QTR 3 (January-March 2023)			QTR 4 (April-June 2023)		
DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
108						
2						
110	0	0	0	0	0	0

ANH Collections Management Databases

ber 2022)	QTR 3 (January-March 2023)			QTR 4 (April-June 2023)		
DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
3008						
0						
3008	0	0	0	0	0	0