

2020 YEAR IN REVIEW





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A Note from the Director...

2020 was full of challenges, but this past year highlighted ingenuity and dedication of the people who make up the UMMP. Access to our ordinary work and collections spaces is closely controlled, and many of our museum traditions including the Case Lecture—are temporarily paused. However, our students, postdocs, research fellows, staff and faculty continue their excellent work, presenting at a range of national and international conferences, publishing papers, and securing recognition from the university and broader scientific community.



The COVID-19 pandemic restricted opportunities for fieldwork, but 2020 still saw important growth in the collections which form the heart of our scientific mission. More than a dozen new holotypes were added to the UMMP in the past year, joined by significant donations that filled gaps in our holdings. But the museum is more than a collection of fossils, and I think we can all be proud of how the individual members of our unit provided a supportive community during this exceptional period.

Every year has its comings and goings, and this unusual one has been no different. We welcomed Mackenzie Schondelmayer in January. As the museum's coordinator of social media, website, and office duties, Mackenzie takes the lead on public-facing materials and handles logistics for our two publication series: Contributions from the Museum of Paleontology and Papers on Paleontology. In April, faculty curator Prof. Tomasz Baumiller formally retired after a quarter of a century at the UMMP. But Tom has no plans on leaving the museum, and is making the most of his emeritus status to forge ahead on his research.

Remote work and teaching are the new normal, made easier by substantial improvements in digital collections access. Major contributions over the past year include migration of a majority of our fossil vertebrate records to the Global Biodiversity Information Facility (GBIF) and the enrichment of the University of Michigan Repository of Online Fossils (UMORF). These digital resources are now more accessible to a wider audience with the addition of annotated digital models of the classic "Life Through the Ages" dioramas and "Beyond Collections" modules that provide context for key specimens.

A highlight of the past year was a generous donation that established the George Junne Internship Fieldwork Award Fund, named in honor of George H., Junne, Jr., former UMMP photographer, Paleontological Society Strimple awardee, and current Professor of Africana Studies at the University of Northern Colorado. This award addresses issues of inclusivity in paleontology by supporting students not traditionally represented in the field to accompany UMMP researchers on field-based projects.

I hope you enjoy learning more about our activities over the past year. May 2021 be a safe and healthy one for you and your loved ones. - Matt Friedman, Director of the U-M Museum of Paleontology



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LSA MUSEUM OF PALEONTOLOGY



Going Digital in a Pandemic

A New Focus on Digital Access and Outreach

Although the doors to the UMMP Collection spaces remain physically closed, digital access to the vast UMMP specimens greatly expanded in 2020. COVID-19 caused many museums to invest into digital outreach and the UMMP is no exception. Efforts to digitize specimens increased tenfold, and 3D views of UMMP specimens are now available on the U-M Online Repository of Fossils (https://umorf.ummp.lsa.umich.edu/wp/).

Alongside UMORF, several virtual specimens are now paired with online lesson kits. This includes the exciting addition of classic dioramas previously displayed in the U-M Museum of Natural History. 'Beyond the Collection,' lesson plans were crafted from curators, staff, and students. 'Beyond the Collection' is available to the public, and can be found under the 'Resources' tab on the UMMP website.

UMMP Vertebrates Collection Now Available on GBIF

Accessibility to UMMP collection data took a major step forward in 2020 with publication of the museum's vertebrate records through the Global Biodiversity Information Facility (GBIF). With more than 50,000 of 85,000 cataloged specimens now searchable online, researchers anywhere in the world examine the majority of UMMP's internationally significant collection of fossil vertebrates. Since going live in July of 2020, there have been over 1,500 download events from the collection. Efforts to make UMMP's invertebrate and paleobotany collections available through GBIF are ongoing.

Follow @UMichPaleo on Twitter!



Devonian model in the 'Life Through the Ages 3D Dioramas' available in 'Beyond the Collections'



Students photographing dioramas to produce the online digital models



UMMP vertebrate specimens searchable on GBIF come from all over the world and the majority of US states.





The George Junne Internship Fieldwork Award Fund

2020 saw an exciting new initiative with the establishment of the George Junne Internship Fieldwork Award Fund. The fund will be used by the Museum of Paleontology to provide student support for summer field experience and associated education.

This fund strives to attract students not traditionally represented in paleontology, including but not limited to low-income students who are among the first in their family to pursue a college degree.



Recent UMMP field sites include the US, India, Morocco, and Siberia.

This award was established in honor of Dr. George Junne (pictured above and below), who received his BFA, MA, and PhD from the University of Michigan. Dr. Junne is an extraordinary photographer and skilled field paleontologist. His fossil collecting has greatly enriched the UMMP collections, and he was recognized with the Strimple Award of the Paleontological Society. Dr, George Junne is currently a professor of Africana Studies at the University of Northern Colorado.

"George Junne joined the Museum of Paleontology as our staff photographer, but he quickly came to love fossils and the importance of our science. When he had an opportunity to join us for summer field work in Idaho and Wyoming, his photographer's eye proved to be remarkably acute and he collected hundreds of valuable fossils." – Gerald Smith, Emeritus Curator, Museum of Paleontology



George Junne photographed at a Wyoming locality. Credit: Philip Gingerich, UMMP

George Junne's Impact on the UMMP Collection:

Donated 2,152 specimens, totaling 2.5% of cataloged vertebrate specimens

Three species (*Calcardea junnei, Macrocranion junnei,* and *Arfia junnei*) are named after him







A Little Help from the Friends of the Museum

At the start of 2020, five members of the Friends spent 26 hours in a one month span helping to curate a searchable list of the invertebrate paleontology stratigraphic collection. This work has set the foundation for collection staff to more easily find the homes of returned specimens.

On an evening in early March when the Friends enjoyed an after-hours visit to the University of Michigan Museum of Natural History, nobody imagined what the rest of 2020 would be like. No longer able to hold in-person monthly meetings, the Friends have taken advantage of their new electronic meeting format to hear from external speakers. Thanks to the efforts of Dr. Jen Bauer, the Friends enjoyed talks by faculty, students and collectors from across the the country who presented on topics ranging from sea scorpions to crocodiles. Although there were no regular meetings after March, the Friends took advantage of warm weather in the summer and early autumn to hold socially distanced field trips to Milan (Devonian Silica Shale) and Jackson (Carboniferous Marshall Sandstone).



In spring, the history of the Friends and UMMP partnership was presented virtually at the annual Society of the Preservation of Natural History Collections meeting co-authored by Jen Bauer and Friends member Mike Topor. The talk was well received, and generated a productive discussion around museums fostering and maintaining relationships with local collectors.

The Friends continued to support the UMMP, finalizing donations of fossil specimens including fishes from classic North American and European deposits, as well as a stunning specimen of the Ordovician trilobite *Isotelus*. Measuring over a foot long, this specimen was prepared by Thomas T. Johnson and is from the type locality in Adams County, Ohio. Specimens donated by member Joseph Koniecki led to the naming of a remarkable ten new crinoid species and a better understanding of Ordovician paleoecology. In addition to their valuable donations, the Friends assist the collection managers with deciphering notes left with specimens and identification of other collectors labels and handwriting. These efforts provide a more complete understanding of the fossils housed at UMMP and their connections to the Friends.

The Friends of the U-M Museum of Paleontology (FUMMP), also known as 'The Friends', is a group of avocational paleontologists, fossil enthusiasts, and collectors who support the activities, research and study of fossils at the UMMP.

You can learn more about the FUMMP, including how to join and their meeting schedule, on the UMMP website by clicking the 'About Us' tab in the top menu. To look into the Friends' personal collections head to MichiganBasinFossils.org.



3D model of Isotelus maximus, available for view on UMORF

HAPPENINGS WITH THE U-M MUSEUM OF PALEONTOLOGY

COLLECTIONS



NEW UMMP HOLOTYPES

*named by UMMP reasearchers

VERTEBRATE

Chirodipterus onawayensis Schulze 1982; UMMP118356 (Devonian lungfish) *Lavinia stuwilliamsi* McClellan and Smith 2020; UMMP 42934 (Miocene minnow)* *Primoptynx poliotauros* Mayr et al. 2020; UMMP 96195 (Eocene owl)*

INVERTEBRATE

Konieckicrinus brechinensis Wright et al. 2020; UMMP 74778 (Ordovician crinoid) (Images 1-2) Konieckicrinus josephi Wright et al. 2020; UMMP 74780 (Ordovician crinoid) Simcoecrinus mahalaki Wright et al. 2020; UMMP 74795 (Ordovician crinoid) Dendrocinus simcoensis Wright et al. 2020; UMMP 74769 (Ordovician crinoid) Pararchaeocrinus kiddi Cole et al. 2020; UMMP 74900 (Ordovician crinoid) Abludoglyptocrinus steinheimerae Cole et al. 2020; UMMP 74817 (Ordovician crinoid) Periglyptocrinus astricus Cole et al. 2020; UMMP 74820 (Ordovician crinoid) Periglyptocrinus kevinbretti Cole et al. 2020; UMMP 74820 (Ordovician crinoid) Periglyptocrinus mcdonaldi Cole et al. 2020; UMMP 74825 (Ordovician crinoid) Periglyptocrinus silvosus Cole et al. 2020; UMMP 74826 (Ordovician crinoid) Sertulaster keslingi, Blake and Koniecki 2019; UMMP 74694 (Ordovician asteroid)



NEW TAXA NAMED BY UMMP RESEARCHERS

Monosmilus chureloides Capobianco et al. 2020 (Eocene anchovy) *Lavinia stuwilliamsi* McClellan and Smith 2020 (Miocene minnow) *Primoptynx poliotauros* Mayr et al. 2020 (Eocene owl) (Image 3) *Smitanosaurus agilis* Whitlock and Wilson 2020 (Jurassic sauropod)



SIGNIFICANT ACCESSIONS



- 35 fossil specimens from the Big Hill Lagerstätte, collected and donated by Gerald Gunderson and Ron Meyer. This Ordovician deposit in the Upper Peninsula of Michigan yields soft-bodied animals like jellyfish, and has changed our understanding of a group of sea scorpion relatives called chasmataspids.
- *Isotelus maximus* trilobite specimen, now on display at the U-M Museum of Natural History, donated by the Friends of the UMMP.
- Fossil fishes from important US (e.g., Green River) and European (e.g., Holzmaden) localities, donated by the Friends of the UMMP.
- Dunkleosteus placoderm plate in concretion, donated by Joe Koniecki.
- 23 Bureau of Land Management specimens, from ongoing work in the Eocene of Wyoming by Curator Emeritus Philip Gingerich.
- 118 Bureau of Land Management specimens, mostly mammals, collected by museum alumnus Mike D'Emic.
- Graptozoans and microalgae donated by Mike Lask and others support of a publication by Dr. Steve LoDuca. These specimens are from the Schoolcraft Formation near Manistique, Michigan.
- More than 100 Eocene plant and insect specimens from Florissant, Colorado. These fossils were collected shortly before the site was incorporated in Florissant Fossil Beds National Monument.





UNIVERSITY OF MICHIGAN



A Year of Accomplishment...

Despite the challenges of 2020, critical research, work, and publications did not stop. This section highlights the work of the U-M Museum of Paleontology during the past year; including awards, grants, and published papers.

AWARDS AND GRANTS

Jennifer Bauer LSA Rising Star Staff Award

Jennifer Bauer Presidential Citation, American Geophysical Union (awarded to diverse team behind "Call for a Robust Anti-Racism Plan for The Geosciences", a petition that garnered 25,000+ signatures)

Alessio Capobianco Rackham Predoctoral Fellowship

Rodrigo Figueroa Latin American and Carribean Studies Tinker Field Research Grant

Matt Friedman NSF award DEB 2017822: "Collaborative Research: Snapshots from the ancient Indo-Pacific: remarkable Eocene fish faunas and their implications for the origin of a modern marine biodiversity hotspot" **Kierstin Rosenbach** American Federation of Mineralogical Societies Fellowship

Adam Rountrey Kay Beattie Outstanding Employee Award

James Saulsbury Rackham Predoctoral Fellowship

Selena Smith NSF award OPP 1953960 "Unearthing Antarctica's role in the Late Cretaceous evolution of flowering plants", NSF award SGP 1949151 "Closing a gap in macroevolutionary studies: Integrating fossils and phenotypes to illuminate morphological evolution in monocot flowering plants"

PUBLICATIONS

*This is a selection of the papers published by UMMP faculty, researchers and students

Bauer, J.E. 2020. Paleobiogeography, paleoecology, diversity, and speciation patterns in the Eublastoidea (Blastozoa: Echinodermata). *Paleobiology*, 1-15.

Capobianco, A., Beckett, H.T., Steurbaut, E., **Gingerich, P.D.**, Carnevale, G. and **Friedman, M.**, 2020. Large-bodied sabretoothed anchovies reveal unanticipated ecological diversity in early Palaeogene teleosts. Royal Society Open Science 7, 192260.

Castiello, M., Jerve, A., Burton, M.G., **Friedman, M.** and Brazeau, M.D. 2020. Endocranial morphology of the petalichthyid placoderm Ellopetalichthys scheii from the Middle Devonian of Arctic Canada, with remarks on the inner ear and neck joint morphology of placoderms. Canadian Journal of Earth Sciences, 1-12.

Cherney, M.D., Wilson Mantilla, J.A., Gingerich, P.D., Zalmout, I. and Antar, M.S.M. 2020. New Specimens of the Late Eocene Turtle Cordichelys (Pleurodira: Podocnemididae) From Wadi Al Hitan and Qasr El-Sagha in the Fayum Province of Egypt. Contributions from the Museum of Paleontology, University of Michigan, 33: 29-64.

Diele-Viegas, L.M., **Figueroa, R.T.**, Vilela, B. and Rocha, C.F.D. 2020. Are reptiles toast? A worldwide evaluation of Lepidosauria vulnerability to climate change. *Climatic Change* 1-19.

Domingo, M.S., Martín-Perea, D.M., **Badgley, C.**, Cantero, E., López-Guerrero, P., Oliver, A. and Negro, J.J. 2020. Taphonomic information from the modern vertebrate death assemblage of Doñana National Park, Spain. PLoS One 15, e0242082.

Dussex, N., Stanton, D.W., Sigeman, H., Ericson, P.G., Gill, J., **Fisher, D.C.**, Protopopov, A.V., Herridge, V.L., Plotnikov, V., Hansson, B. and Dalén, L. 2020. Biomolecular analyses reveal the age, sex and species identity of a near-intact Pleistocene bird carcass. Communications Biology 3, 1-6.

Gorzelak, P., Kołbuk, D., Salamon, M.A., Łukowiak, M., Ausich, W.I. and **Baumiller, T.K.** 2020. Bringing planktonic crinoids back to the bottom: Reassessment of the functional role of scyphocrinoid loboliths. Paleobiology 46, 104-122.

Karpinski, E., Hackenberger, D., Zazula, G., Widga, C., Duggan, A.T., Golding, G.B., Kuch, M., Klunk, J., Jass, C.N., Groves, P., Druckenmiller, P., Schubert, B.W., Arroyo-Cabrales, J., Simpson, W.F., Hoganson, J.W., **Fisher, D.C.**, Ho, S.Y.W., MacPhee, R.D.E., and Poinar, H.N. 2020. American mastodon mitochondrial genomes suggest multiple dispersal events in response to Pleistocene climate oscillations. Nature Communications 11, 1-9.

Loughney, K.M. and **Badgley, C.** 2020. The influence of depositional environment and basin history on the taphonomy of mammalian assemblages from the Barstow Formation (middle Miocene), California. Palaios 35, 175-190.



PUBLICATIONS

CONTINUED...

Loughney, K.M., Hren, M.T., **Smith, S.Y.** and Pappas, J.L. 2020. Vegetation and habitat change in southern California through the Middle Miocene Climatic Optimum: paleoenvironmental records from the Barstow Formation, Mojave Desert, USA. GSA Bulletin 132, 113-129.

Manchester, S.R., Kapgate, D.K., Patil, S.P., Ramteke, D., Matsunaga, K.K. and Smith, S.Y. 2020. Morphology and Affinities of Pantocarpon Fruits (cf. Apiales: Torricelliaceae) from the Maastrichtian Deccan Intertrappean Beds of Central India. International Journal of Plant Sciences 181, 443-451.

Mayr, G., **Gingerich, P.D.** and Smith, T. 2020. Skeleton of a new owl from the early Eocene of North America (Aves, Strigiformes) with an accipitrid-like foot morphology. Journal of Vertebrate Paleontology 40, e1769116.

McClellan, P. and **Smith, G.R.** 2020. Late Miocene fishes of the Cache Valley Member, Salt Lake Formation, Utah and Idaho. Miscellaneous Publications, Museum of Zoology, University of Michigan 208, 1-54.

Mondéjar-Fernández, J., **Friedman, M.** and Giles, S., Redescription of the cranial skeleton of the Early Devonian (Emsian) sarcopterygian Durialepis edentatus Otto (Dipnomorpha, Porolepiformes). Papers in Palaeontology, 1-18.

Monfils, A.K., Krimmel, E.R., Bates, J.M., **Bauer, J.E.**, Belitz, M.W., Cahill, B.C., Caywood, A.M., Cobb, N.S., Colby, J.B., Ellis, S.A. and Krejsa, D.M. 2020. Regional collections are an essential component of biodiversity research infrastructure. BioScience 70, 1045-1047.

Ng, M. and **Smith**, **S.Y**. 2020. Evaluating stasis in Metasequoia (Cupressaceae): testing the relationship between leaf traits and climate. International Journal of Plant Sciences 181, 157-174.

Peri, E., **Gingerich, P.D.**, Aringhieri, G. and Bianucci, G. 2020. Reduction of olfactory and respiratory turbinates in the transition of whales from land to sea: The semiaquatic middle Eocene Aegyptocetus tarfa. Journal of Anatomy 236, 98-104.

van der Meulen, B., **Gingerich, P.D.**, Lourens, L.J., Meijer, N., van Broekhuizen, S., van Ginneken, S. and Abels, H.A., 2020. Carbon isotope and mammal recovery from extreme greenhouse warming at the Paleocene–Eocene boundary in astronomically-calibrated fluvial strata, Bighorn Basin, Wyoming, USA. Earth and Planetary Science Letters 534, 116044.

Ramteke, D., Manchester, S.R., Nagrale, V.D. and **Smith, S.Y.** 2020. Singpuria, a new genus of Eudicot flower from the latest Cretaceous Deccan Intertrappean Beds of India. Acta Palaeobotanica 60, 323-332.

Rothwell, G.W., Stockey, R.A. and **Smith, S.Y.** 2020. Revisiting the Late Cretaceous Parataxodium wigginsii flora from the North Slope of Alaska, a high-latitude temperate forest. Cretaceous Research 116, 104592.

Sanders, W.J. 2020. Proboscidea from Kanapoi, Kenya. Journal of Human Evolution 140, 102547.

Saulsbury, J. 2020. Crinoid respiration and the distribution of energetic strategies among marine invertebrates. Biological Journal of the Linnean Society 129, 244-258.

Saulsbury, J.G. and **Baumiller, T.K.** 2020. Predation as an explanation for a latitudinal gradient in arm number among featherstars. Journal of Biogeography 47, 2657-2670.

Saulsbury, J., Moss, D.K., Ivany, L.C., Kowalewski, M., Lindberg, D.R., Gillooly, J.F., Heim, N.A., McClain, C.R., Payne, J.L., Roopnarine, P.D. and Schöne, B.R. 2020. Idiographic and nomothetic approaches to heterogeneity are complementary: Response to comments on Evaluating the influences of temperature, primary production, and evolutionary history on bivalve growth rates. Paleobiology 46, 275-277.

Saulsbury, J. and Zamora, S. 2020. The nervous and circulatory systems of a Cretaceous crinoid: preservation, palaeobiology and evolutionary significance. Palaeontology 63, 243-253.

Sheldon, N.D., **Smith, S.Y.**, Stein, R. and **Ng**, **M.** 2020. Carbon isotope ecology of gymnosperms and implications for paleoclimatic and paleoecological studies. Global and Planetary Change 184, 103060.

Soto Gomez, M., Lin, Q., da Silva Leal, E., Gallaher, T.J., Scherberich, D., Mennes, C.B., **Smith, S.Y.** and Graham, S.W. 2020. A biorganellar phylogenomic study of Pandanales: inference of higher-order relationships and unusual rate-variation patterns. *Cladistics* 36, 481-504.

Stevenson, A. and **Baumiller, T.** 2020. Threadfin hawkfish predation on a stalkless crinoid. Frontiers in Ecology and the Environment 18, 485-485.

Tate-Jones, M.K., **Peredo, C.M.**, Marshall, C.D. and Hopkins, S.S. 2020. The dawn of Desmatophocidae: A new species of basal desmatophocid seal (Mammalia, Carnivora) from the Miocene of Oregon, USA. Journal of Vertebrate Paleontology 40, e1789867.

Veitch, M.A. and Baumiller, T.K. 2020. Low predation intensity on the stalked crinoid Democrinus sp.(Echinodermata) in Roatán, Honduras reveals deep water as likely predation refuge. Bulletin of Marine Science.

Wang, B. and Secord, R. 2020. Paleoecology of Aphelops and Teleoceras (Rhinocerotidae) through an interval of changing climate and vegetation in the Neogene of the Great Plains, central United States. Palaeogeography, Palaeoclimatology, Palaeoecology 542, 109411.

Whitlock, J.A. and **Wilson Mantilla, J.A.** 2020. The Late Jurassic sauropod dinosaur 'Morosaurus' agilis Marsh, 1889 reexamined and reinterpreted as a dicraeosaurid. Journal of Vertebrate Paleontology, e1780600.

Zalmout, I.S., Mustafa, H.A., Smadi, A.A., Nazzal, J.A. and **Gingerich, P.D.** 2020. Marine mammals (Cetacea and Sirenia) from the middle and late Eocene of Jordan. Neues Jahrbuch für Geologie und Paläontologie-Abhandlungen, 121-136.