Newsletter of the Conservation Paleobiology Network

Issue #23
May 2024

CPN Newsletter

Conservation Paleobiology Network

INSIDE THIS ISSUE:

Diversity, Equity, and Inclusion Statement:

The CPN upholds a commitment to diversity, equity, and inclusion as a core value. We seek to build on this commitment by striving to create an inclusive community whose members represent diverse cultures, backgrounds, career stages, and life experiences. This commitment is critical to strengthening our relevance, credibility, and effectiveness within the field of conservation paleobiology and broader STEM community. Through these efforts, we strive to transform the field in practice, while diversifying the face of conservation paleobiology for the future.

Supported by RCN-NSF Award: EAR-1922562

Events at the North American Paleontological Convention

Are you attending NAPC? Don't forget to attend the CPN town hall meeting on Wednesday, June 19th. See the conference program for time and location details.

Also, the Student Panel is organizing a social outing at Brown Jug in Ann Arbor, Michigan after the NAPC activities on Wednesday evening, June 19 for anyone interested in conservation paleobiology! We will **meet in the Rogel Ballroom immediately following the CPN town hall meeting**, and then walk to the venue together. We hope that this will be a great networking opportunity between undergraduate, graduate, postdoc students, and others!

If you are interested in participating, please fill out this one-question survey by June 3 so we have an estimated headcount:

https://forms.gle/sgrGiZfh6Pa8LD6k6

GSA Session on Conservation Paleobiology

Are you going to Geological Society of America conference in September? Consider submitting an abstract to the following session, which may be of interest of CPN members: **T125: Conservation Paleobiology and Species Invasions: Impacts of Biogeographic Shifts and Changing Community Structure in the Past and Present**

Contact the co- chairs for more info:
Priyanka Soni sonip@usc.edu
Sam Little salittle@usc.edu

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Conservation Paleobiology Research Highlight

By Todd Braje, Natasha Vokhshoori, Lindsey Groves, and Torben Rick

Integrating Coastal Archaeological and Fossil Datasets from California's Northern Channel Islands

With growing interest in the integration of interdisciplinary datasets to better understand the evolution of ecosystems through deep time, we recently published a pilot study exploring long-term continuity and change in marine invertebrate communities on California's Northern Channel Islands. These islands are an excellent laboratory for exploring the potential of such an integrated approach, as they boast well-preserved archaeological and paleontological deposits and a history of research that extends into the nineteenth century.

"These islands are an excellent laboratory for exploring the potential of such an integrated approach"

Our research integrates data from Holocene archaeological sites and Pleistocene marine terrace deposits to examine the evolution of nearshore marine ecosystems and the effects of climate change on the long-term distribution of marine invertebrates. We encountered a number of methodological, analytical, and taphonomic challenges and our findings should be considered points of departure for future research. We did, however, identify a number of interesting insights for historical ecology and conservation paleobiology.

Key findings highlight the persistence of certain species of Turban snails (*Tegula* spp.), abalone (*Haliotis* spp.), and mussels (*Mytilidae*) across Pleistocene and Holocene deposits, suggesting a long-term stability of rocky intertidal ecosystems in the region.

This pattern was evident despite changing ocean temperatures and significant glacial/inter-glacial sea-level fluctuations. In contrast, the presence and absence of other species document changes in local habitats over millennia. For example, significant differences in the distribution of Pismo clams (*Tivela stultorum*), California Venus clams (*Chione* spp.), and oysters (*Ostrea lurida*) in Holocene archaeological versus Pleistocene marine terrace deposits indicate the evolving nature of regional sandy beach and estuarian habitats. Ultimately, we found that combining archaeological and fossil data offers insights into deep time regional ecological shifts and perspectives on managing and conserving marine biodiversity in the face of ongoing environmental changes.

***Image caption**: Images of archaeological sites and marine terrace deposits on California' Northern Channel Islands used in our study: For more detail about each image, see the article linked below.*

For more information see the article by Braje et. al. 2024 in Quaternary Science Advances: https://doi.org/10.1016/j.qsa.2024.100167

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Practitioner Perspective *By Olivia Olson*

Dr. Arthur Spiess – Dr. Spiess is a senior archaeologist for the Maine Historic Preservation Commission. He received a PhD in Anthropology from Harvard University in 1978. He is responsible for the protection and identification of archaeological sites. He is also responsible for making nominations of sites to be included in the National Register of Historic Places.

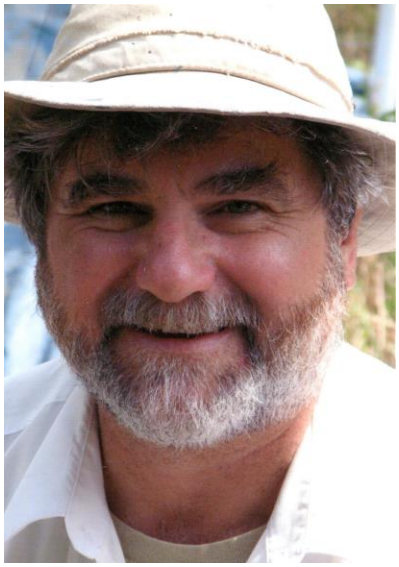

***Image caption**: Dr.* Arthur Spiess

1. Would you introduce yourself to our readers?

I'm Arthur Spiess; I got my bachelor's degree and PhD in anthropology with an archaeology specialty from Harvard University in the 1970s. My interest originally was bioanthropology, but after a while I realized it would be more fun to do field archaeology and identify animal bones from archaeological sites. My first job in Maine was with the Maine State Museum as a postdoc studying the archaeofauna from a deep, well-stratified site called Turner Farm. It is the oldest stratified coastal (shell midden) sequence in Maine and represents a 5000-year record of faunal and cultural remains. After that, I was hired as the state archaeologist of Maine. Part of the job was to design an archaeological survey set of records and to start serious record keeping of Indigenous archaeological sites. We also expanded the mapping and site naming system for the state. As part of that record keeping, we've tried to keep tabs on archaeofauna.

2. How does your work at the Maine Historic Preservation Commission intersect with conservation paleobiology?

You (Olson), of course, are well aware of the extinct sea mink (*Neogale macrodon*) and the ecological effect it had after its extinction. There has been some debate about whether it was an East Coast sea otter analog which controlled the population of sea urchin and lobsters and shellfish. And of course, the great auk (*Penguinis impennis*) falls in the same category; both the sea mink and great auk were important in Indigenous economies. The ability to identify ecological markers is another place where archaeology and paleobiology meet. For example, in Maine, there is the deer, moose, caribou issue. Their ecological habitats are slightly different and all three of them show up in Maine pre-contact sites. Caribou are mainly found in Paleoindian contexts, which date to 11 ka and older. There were none between 10k and 1k. They then show up on the coast in Hancock and Washington County sites in the Late Ceramic Period.

Practitioner Perspective continued

Woodland caribou were at the southern limit of their range as Maine's climate got cooler over the last several thousand years, and their range re-expanded into Maine. Caribou were then locally extirpated in Maine around 1910-1920 for various reasons. White-tailed deer are adapted to fragmented habitat more similar to southern New England open deciduous forests. Deer show up in mid-Holocene sites but we don't know what their population levels were. They are abundant in southern and central Maine sites through the Holocene. There are a lot of moose on the eastern Maine coast and in northern Maine today. There are lots of moose bone in coastal shell heaps in downeast Maine for the last 2000 year or so, but relatively few around Casco Bay. There were very few moose in 4 ka sites, but then their abundance in archaeological sites increased, again as the Maine climate cooled down from its mid-Holocene warmth.

3. How do you engage with the public or other entities in your role as a senior archaeologist?

I give a lot of lectures - usually to land trusts or historical societies. I also work closely with individual owners or land trusts on the management of archaeological sites on their properties. I also work on the legal and practical issues of keeping looters at bay.

The tribes within the Wabanaki Confederacy on occasion will ask questions about specific fauna. Our most recent work was working with Cobscook Bay in the St. Croix River Valley on both sides of the border on sturgeon remains. The question the tribes had was whether the sturgeon could get over the first falls on the St. Croix. We did not find sturgeon remains above the falls, but there are some around the estuary - both short nose and Atlantic sturgeon. This work is all in an effort to inform fisheries management.

Another taxon of interest were alewives: the tribes wanted to know if the alewives could make it up the St. Croix river. There were burned fish bones from archaeological lakes sites on the upper St. Croix drainage, and a couple of alewife bones were included in the assemblage. The research made it to the Maine legislature and there was a debate if the alewives were harvested there at the lakes or if they were preserved and then brought back to the lake site. We favored local harvest. The end result was restoration of alewife runs on the St. Croix by some changes to dams blocking their passage.

4. What advice would you give to students?

If you're interested in zooarchaeology, start by learning human skeletal anatomy then tackle mammals, then birds, then fish. It's helpful to get into the details of one or two critters to start off. Once you're able to identify complete bones, then you can identify parts of bones. Then, in order to interpret the data that you find, you have to learn wildlife biology. For example, you can use aging animals, like deer and beaver, and their tooth eruption patterns to tell you about the season of the year in which it was harvested. There are also microbiological techniques, like performing oxygen isotope analysis on shells which can indicate climate and seasonal use. Once you are familiar with these techniques, you then pick a specialty.

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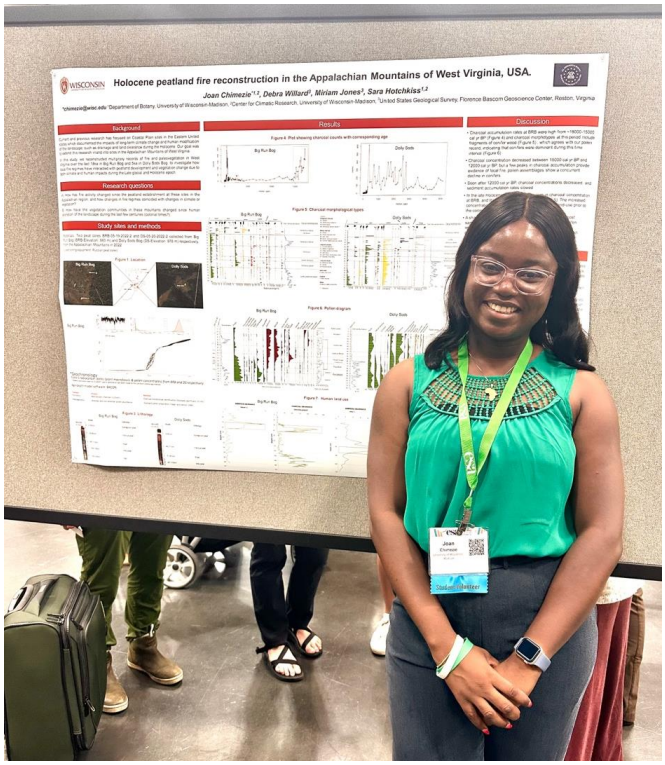
Student Section



Joan Chimezie

I want to thank the CPN for the Student Travel Grant awarded to me to help aid my attendance and participation at the 2023 Ecological Society of America (ESA) annual meeting in Portland, Oregon. I was able to give a poster presentation of my master's research at this meeting.

For my master's research, I focused on reconstructing the vegetation, fire, and climate of two peatlands at the Appalachian region of West Virginia, to help understand both human and climate impacts on the area over thousands of years. This research is in collaboration with the United State Geological Survey Florence Bascom Geoscience Center.

At the meeting I was able to show results from paleoecological proxies such as pollen, charcoal, and macrofossils. I was also able to engage with both professionals and individuals across various fields of interests about my research. I was glad to get feedback from these experts, and to also answer various questions about my findings. I am grateful for the grant, as my attendance to the ESA conference was a great opportunity for me to network and build relationships with people in research field.

Thank you, Olivia!

We would like to thank Olivia Olson for her service to the CPN newsletter team, particularly the practitioner perspective section. Olivia is currently a graduate student at the University of Maine studying the faunal archaeological record of Acadia National Park. She will be stepping down from the newsletter editorial team after this issue. Thank you for all your help, Olivia!

Paleo Proxy Spotlight – Ostracods as a proxy for paleoclimatic reconstruction *by Darja Dankina*

Ostracoda are small crustaceans that usually vary between 0.4 and 2.0 mm on average and have soft portions protected by a low-Mg calcite bivalve carapace. Their extensive evolutionary history spans from Ordovician times to the present. The hard parts of Ostracoda are their adaptability to many types of paleoaquatic ecosystems, making them a successful taxonomic group for paleontological investigations (Rodriguez-Lazaro and Ruiz-Muñoz, 2012; Gliozzi et al., 2015). Also, this group of organisms is extremely sensitive to changes in the current environment, continuous in their sedimentary record, and prolific. Reconstructing environmental circumstances involves not just shell chemical data but also community indicators (such as diversity, abundance, taxonomic composition, and indicator species). Variations of salinity, water chemistry, substrate characteristics, temperature, oxygen, and nutrient availability directly influence the composition of the ostracod assemblages and environmentally induced ecophenotypic variations of ostracod valves. Thus, it is widely used to study changes throughout the Quaternary and recent marine, brackish, and freshwater environments (Frenzel and Boomer, 2005). It is a perfect proxy for bioindicators of pollution gradients (Tan et al., 2021). An example of using Ostracoda to recreate the paleoenvironment and various contemporary environmental scenarios is given below.

Wang and colleagues (2017) claim that by examining the morphological characteristics of the Ostracoda group and learning about the preferences of their ecosystems, Mesozoic ostracods can aid in the reconstruction of paleoenvironments. There has been prior successful testing and application of ostracods as paleoenvironmental proxies to evaluate the depositional environment of Upper Cretaceous non-marine strata (Brouwers and De Deckker, 1993). It is noted that the depth, basin size, and areal extension of the paleo-lake are all related to the intensity of ostracod ornamentation development. While thick, mostly punctate to reticulated, and nodose ostracod specimens represent sub-deep to littoral depositional habitats, mostly lacustrine to fluvial (fluvial-deltaic), in the meantime, thin, spinose, and finely punctated shells were formed in deeper water.

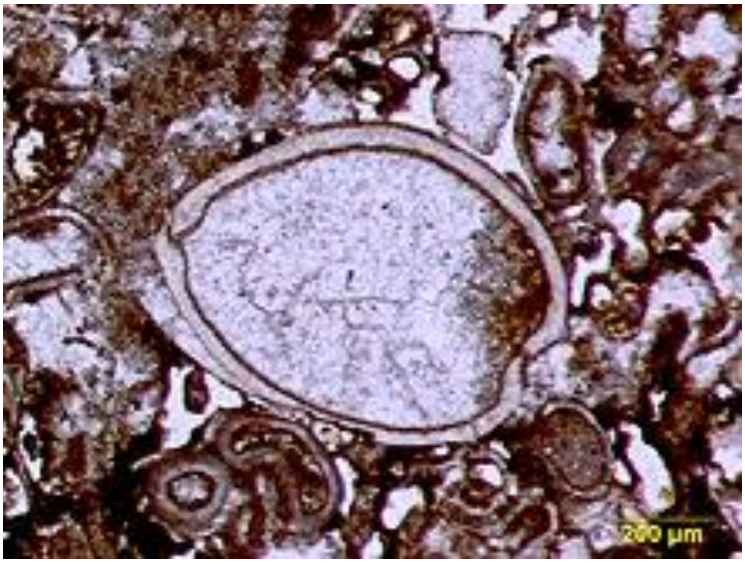


***Image caption**: Ostracod valve cross section.*

Most of the examined specimens that are included in this work have closed carapaces. But the valve/carapace ratio is extremely low, and most species are only seen as adults or as the last stage of larval development. This suggests either a gradational thanatocoenosis or a high-energy biocoenosis. It was also mentioned that a low valve/carapace ratio can be considered to be a high-energy thanatocoenosis. Since our samples are bulk rock samples covering longer time intervals, assemblage mixing and sampling biases must be taken into account. The smaller instars would then have been eliminated from the assemblage by bottom currents.

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Paleo Proxy Spotlight continued

Wang et al. (2021) carried out an experiment using modern *Limnocythere inopinata* in the lake sediments and described their results of investigation as significantly improving our knowledge based on previously conducted studies from 1989 to 2019. As a new result, Wang's team concluded that *L. inopinata* chose to occupy the water pools with temperatures in the range of 11–14 °C and salinity in the range of 3.50–6.50‰. Previous studies discovered that the tolerant range of temperature for this taxon is 11–17 °C, and the range of salinity is 0.50–9.50 °C. Based on research done between 1989 and 2019, populations of *L. inopinata* inhabiting distinct regions have developed distinct preferences that deviate from their so-called eurytopicity as a result of their adaptation to the local aquatic environment. Because there are no bioculture data available for this species, the high abundance of *L. inopinata* valve in lacustrine sediments has typically been interpreted as a sign of a variety of aquatic conditions, from freshwater to polyhaline, seemingly deviating from its particular ecological preference worldwide. Ostracods, like *L. inopinata*, have been used frequently in paleoclimatic reconstruction over the past century. Climate indicators based on ostracods have been developed and used extensively in different studies. However, the present understanding of the relationship between ostracods and aquatic environmental change is mainly based on the field survey results. Further information from bioculture experiments on other dominant ostracod species from various water sources is needed to fully comprehend this relationship.

While most geochemical approaches in paleoclimate research utilising biogenic carbonates focus on marine foraminifera, ostracods have become more and more important as microfossil markers in lake systems in recent decades. As ostracods can withstand a broad variety of salinities, they are better suited for interpreting freshwater, brackish, and coastal habitats.

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Postcards from the Field

In this feature of our newsletter, we showcase members' research in the field, lab, or other settings. Please submit your "postcards" with approximately 100 words of text to us at conservationpaleo@floridamuseum.ufl.edu.

Image caption: *My full body as the scale for the gigantic sauropods trails.*

Dr Darja Dankina – independent paleontologist/paleobiologist from Vilnius, Lithuania

My name is Darja Dankina. Recently, a small Lithuanian TV channel named "Mokslo sriuba" decided to film an episode about paleontology in Portugal for local people to improve our knowledge about what paleontologists do on a daily basis. Due to my experience working there for the last two years, I have agreed to guide the team and share my gained experience in this southern country. Due to our three filming days, we visited many beautiful spots, and one of them I would like to share the most. We had the opportunity to visit and film the longest dinosaur footprint trail located in the heart of the Serras d'Aire e Candeeiros Natural Park near the city Fatima (Portugal). The natural monument has more than 1,000 footprints spread on the limestone plate. Meantime, we can easily observe two longest tracks (142 m and 147 m length) of sauropod adult and juvenile here (see image above). During my scientific career, I participated in many fieldwork projects and expeditions in Europe. It is probably the most significant paleontological object I have ever seen in my life!

Here is more information: http://www.pegadasdedinossaurios.org/html/monumento_uk.htm

Conservation Paleobiology Network

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Are you interested in:

…contributing to **Postcards from the Field**?
…sharing a recent publication as a **Research Highlight**?
…being featured in a **Practitioner's Perspective** piece?
…providing other content suggestions for this newsletter?

If yes, please email us at conservationpaleo@floridamuseum.ufl.edu

Invite Your Colleagues to Join our Network!

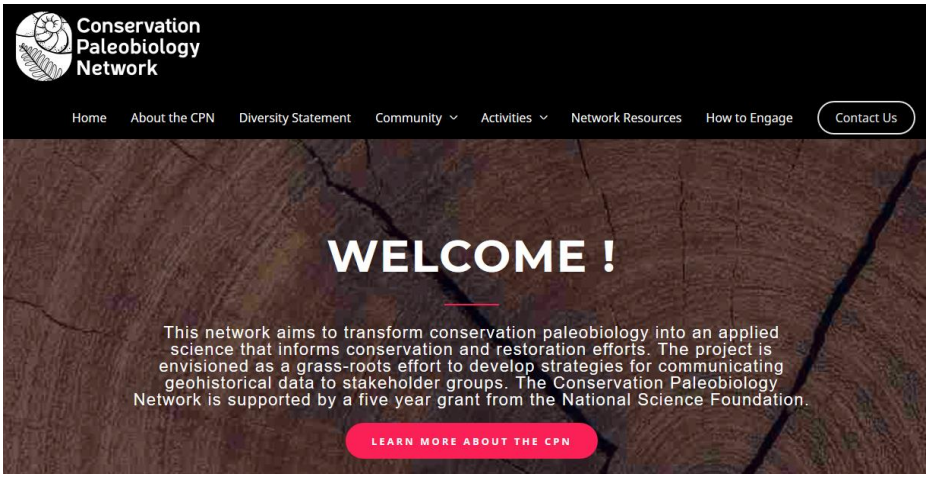
If you know people who might be interested in our network, please invite them to join. You can use the link below to extend your invitation on behalf of our network.

By joining the network, you become a member of our Community of Practice. The membership does not impose any obligations, but enables participants to engage fully in network activities. Members will be able to:

1. Participate in the CPN mailing list
2. Nominate and self-nominate for committees and panels
3. Submit announcements for publication in the CPN Newsletter
4. Apply to participate in the CPN activities
5. View CPN webinars and submit proposals for webinar modules

To join please go to our website and select "Join the Network"

Visit the website! https://conservationpaleorcn.org/



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