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Edited by Melissa Grey and Jason Loxton
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CONFERENCE SCHEDULE

Pre-conference Field Trip: Cabot Trail, August 24-25

**Departs at 8:30 am in front of the Cambridge Suites, 380 Esplanade, Sydney.**

Friday, August 26:
17:00  Registration opens, CBU, Great Hall
17:45  University tour (optional) (Leaves from Great Hall)
18:30–20:30  Welcome and Introduction & Technical session 1, CBU, Royal Bank Lecture Theatre (CE258)
20:30–22:00  Icebreaker and poster session, The Pit (student lounge)

Saturday, August 27
9:00  Technical session 2-3, CBU, Royal Bank Lecture Theatre (CE258)
11:45  Field trip to Miner’s Museum (included in registration)
17:30  Rum tasting, tour, banquet, and dance, Louisburg (included in registration)

Sunday, August 28
9:30 – 12:30  The art and science of Jurassic Park (talk and screening of Jurassic Park 3D—including in registration), Cineplex Cinemas
14:00 – 16:00  Special Session: Geoheritage/Geotourism/Museums, Doktor Luke’s (see map)
19:30 – late  Kitchen Party! (must pre-register)
Technical Sessions: August 26-28

Asterisks (*) indicates student presentation

Friday, August 26

TECHNICAL SESSION 1
Chair: Jason Loxton

18:30  Welcome and Introduction

18:45  The road to and from extinction
Billings Award Winner 2015, Paul L. Smith

19:10  More than trilobites—the extraordinary geology of the Mount
Stephen Trilobite Beds, Burgess Shale Formation, Yoho National
Park, SE British Columbia
Paul A. Johnston and Kimberley J. Johnston

19:25  Late Ordovician chelicerate diversity—new insights from Manitoba
Konservat-Lagerstätten
Michael B. Cuggy, David M. Rudkin, and Graham A. Young

19:40  Anagenesis and cladogenesis in some early Aeronian (early Silurian)
species of Demirastrites (Monograptidea, Graptoloidea): evidence
from the Prague Basin
Michael J. Melchin and Petr Štorch

19:55  Seeing the trees in an invisible forest: the life and times of
noncalcified macroalgae from the Silurian Eramosa Lagerstätte of
Ontario, Canada
Denis K. Tetreault and Steven T. LoDuca

20:10  The Devonian placoderm Titanichthys: the first massive vertebrate
pelagic planktivore?
Michael J. Ryan and James Boyle

20:30  Icebreaker/posters, The Pit (student lounge)
Saturday, August 27

TECHNICAL SESSION 2

Chair: Paul Smith

08:30  Doors open. Digital presentations for the oral sessions must be loaded prior to 09:00 [Coffee and light snacks in A108 until 9 am]

09:00  An exquisitely preserved, new eucapone dissorophid (Temenospondyli) from the Carboniferous of Nova Scotia, Canada
Hillary Maddin, Diane Scott, Deborah Skilliter, Melissa Grey, Ken Adams, and Robert Reisz

09:15  New amniote material from the Garnett Quarry, Upper Carboniferous of Kansas
Patrick Cufino*, Marissa Bryden, Sean Modesto, and Robert Reisz

09:30  A large amniote tooth plate from the Lower Permian Clear Fork Formation of Texas
Sean Modesto, Vonica Flear, Melissa Dilney, and Robert Reisz

09:45  Early Permian amphibamid Pasawioops (Amphibamidae, Dissorophoidea): an ontogenetic series
Jade B. Atkins*, Robert R. Reisz, Nadia B. Fröbisch, and Hillary C. Maddin

10:00  The unique preservational environment associated with the cave system found at the Early Permian (289 ma) Richards Spur locality, Oklahoma, USA.
Mark MacDougall*, Neil Tabor, and Robert Reisz

10:15  Holotype of the Late Cretaceous dinosaur Dromiceiomimus brevetertius, with implications for the utility of distal caudal vertebrae in ornithomimid classification
Bradley McFeeters* and Thomas Cullen
10:30       BREAK

TECHNICAL SESSION 3  
Chair: Michael Cuggy

10:50         Trends, tropes and speculation in paleoart  
              Greer Stothers*

11:05         JMorph: a digital tool for measuring fossils  
              Peter G. Lelièvre and Melissa Grey

11:20         What fossil foraminifera and detrital zircons can teach each other about sampling bias and replication in geochronological studies  
              Deanne van Rooyen

11:45         Bus departs to Miner’s Museum

12:05         Lunch (included in registration fee)

12:30         Miners’ Museum underground tour and Nova Scotia’s Coal Age Foundation (John Calder, NS DNR)

2:30          Bus departs for Marconi Trail

17:30-late!   Rum tasting, tour, banquet, and dance (Fortress of Louisburg)
Sunday, August 28

SPECIAL SESSION ON GEOHERITAGE/GEOTOURISM/MUSEUMS

Session Chair: Melissa Grey

14:00  The future of public outreach: virtual reality apps, drones, and 3D printing. Protecting sensitive field sites and making field trips accessible to everyone
       Jennifer Ward*

14:15  Tracing the history of the Parrsboro Rock and Mineral Shop and Museum: citizen science and tourism on the Bay of Fundy
       Tim J. Fedak

14:30  The benefits of public research sites, an example from Wasson Bluff
       Regan Maloney and Tim Fedak

14:45  Virtual collections and virtual access to collections: low cost solutions to imaging and sharing types
       Jason Loxton

15:00  BREAK

15:15  The changing face of palaeontology at the Royal Ontario Museum
       Janet Waddington

15:30  Recognition of geoheritage in Nova Scotia with special reference to paleontology
       John Calder

15:45  From the field to your smartphone: communicating paleo in 2016
       Brian Switek

16:00  Closing remarks
Posters

Two juvenile specimens of *Prosaurolophus maximus* (Hadrosaurinae; Saurolophinae) from the Upper Cretaceous Bearpaw Formation of Alberta provide insight into the ontogenetic changes in cranial morphology; Eamon T. Drysdale et al.

Current and recent research at the Joggins Fossil Cliffs UNESCO World Heritage Site; Melissa Grey

Using cladistics to study the early evolution of Silurian monograptid graptolites; Sonya Shuster* and Mike Melchin

Organic-walled microfossils from the Ediacaran–Cambrian boundary stratotype section, Chapel Island and Random formations, Burin Peninsula, Newfoundland, Canada; Teodoro Palacios et al.

Two correlated Late Middle Eocene micro-mammal faunas from the Central Rocky Mountains and Gulf Coastal Plain and their paleoecologic implications; James Westgate et al.

High dinosaur diversity in an end-Cretaceous formation of Alberta revealed by fossil eggshells; Darla K. Zelenitsky et al.
Early Permian amphibamid *Pasawioops* (Amphibamidae, Dissorophoidea): an ontogenetic series

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Amphibamids (Temnospondyli: Dissorophoidea) were small, amphibian taxa that lived mostly during the Early Permian (~270 to 300 Mya). These taxa are generally considered to be close relatives of modern amphibians (Lissamphibia). Thus, detailed analysis of their morphology and phylogenetic relationships sheds light on the evolution of lissamphibians and the origin of several of their unique traits. Amphibamids are additionally interesting because in some taxa larval, juvenile and adult specimens have been found, allowing researchers to discern the ontogenetic progression of morphological traits. However, because many adult amphibamids have a more juvenile appearance than other amphibians (e.g. comparatively large orbits and small body size), distinguishing between ontogeny dependent traits and taxonomically diagnostic traits has been challenging. The goal of the present research is to first document the detailed morphology of the skull of the recently described amphibamid *Pasawioops* (OMNH 73019; 32.6 mm skull length) using new CT data, and to second, explore the nature of potential ontogeny dependent traits in this taxon through comparison with a recently referred specimen of *Pasawioops* (MCZ 1415; 64 mm skull length). We found the smaller, holotype specimen OMNH 73019 specimen differs from MCZ 1415 in the following ways: the skull bones are not as tightly sutured, the anterior skull margin has a more rounded appearance, the orbits occupy a greater proportion of the skull roof, and the jaw articulations do not extend as far posteriorly beyond the occiput. These features are consistent with those hypothesized to be ontogeny dependent in other amphibamid species, and suggest OMNH 73019 likely represents a juvenile specimen of *Pasawioops*. These data further reveal the conservation of ontogeny dependent traits across Amphibamidae, and as they are among the best preserved amphibamid specimens currently known, they contribute to a better understanding of amphibamid development, diversity and evolution.
Recognition of geoheritage in Nova Scotia with special reference to paleontology

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The concept of geoheritage is an important concept for engaging the public and for quite literally putting geology and paleontology ‘on the map’. The list of Geoheritage Sites in Nova Scotia has its roots in the Geological Highway Map of the Atlantic Geoscience Society, with many contributions from the geoscience community. Geoheritage sites can serve as an inventory for geotourism-related initiatives such as UNESCO Global Geoparks, and often forge linkages between an area’s cultural and geological heritage. Natural sites of geological outcrop (e.g. Green Cove) and Cultural sites (e.g. Cape Breton Miners’ Museum) where humanity has interacted with the geology of a site are both recognized on the list, inspired by the convention on the recognition of World Heritage. The identification and celebration of paleontological sites in particular presents unique challenges in balancing protection and education, but can be a meaningful way to engage communities in stewardship through awareness of a site’s significance, and of existing protective legislation. Decisions may be made not to disclose detailed information about vulnerable sites until protective measures are in place, although the case of unauthorized and damaging collecting at Mistaken Point, NL, some years ago illustrates that unethical collecting by geoscientists can be the greatest threat to a site’s integrity. The successful reporting of the case at Mistaken Point and subsequent intervention by authorities also exemplifies community stewardship in action. The database and map of Nova Scotia’s geoheritage sites is scheduled for release by the Department of Natural Resources later in 2016, and selected sites are highlighted in a highly visual ESRI StoryMap application that can accessed at https://fletcher.novascotia.ca/geoheritage_ns_tour/index.html
New amniote material from the Garnett Quarry, Upper Carboniferous of Kansas

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The Garnett Quarry in eastern Kansas preserves the richest fauna of early amniotes of Kasimovian age (ca. 305 Ma), including the oldest known diapsid reptile *Petrolacosaurus kansensis* and the oldest known sail-backed synapsid *Ianthasaurus hardestiorum*. Past practice has been to cut out blocks of shale matrix ‘blind’, jacket them, and prepare them back in the laboratory. We opened up several blocks that were collected in the 1980s and the 1990s and since stored at the University of Toronto in Mississauga. Most of the vertebrate material we have discovered is identifiable as disarticulated and/or closely associated limb and girdle bones, vertebrae, and cranial elements of *P. kansensis*. We also uncovered two loosely associated dentigerous elements that resemble homologous elements previously assigned to Synapsida. One of these is a partial maxilla and the other is an associated premaxilla. The first of these, a right premaxilla, bears seven tooth positions, five of which are occupied by functional teeth. This element closely resembles that of the yet-to-be described ophiacodontid Garnett synapsid. The teeth are elongated, sharpened cones that decrease in size posteriorly. The other, a right maxilla, bears marginal teeth that are closely comparable to those in a disarticulated specimen of *I. hardestiorum* described in 2010. The crowns are slightly expanded and bear fine carinae on their mesial and distal edges. At the time of abstract submission, two additional blocks were opened and undergoing preparation.
Late Ordovician chelicerate diversity—new insights from Manitoba Konservat-Lagerstätten

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Two recently discovered Konservat-Lagerstätte deposits in central and northern Manitoba are yielding many exciting new fossils. Some of these provide a compelling (and often confounding) record of emerging chelicerate arthropod diversity in Late Ordovician (Richmondian) restricted shallow marine environments of central Laurentia. Biotic assemblages from the William Lake (Grand Rapids Uplands; Williston Basin) and Airport Cove (Churchill area; Hudson Bay Basin) sites both contain representatives of the early xiphosurid horseshoe crab Lunataspis aurora, including juvenile individuals revealing allometric growth of the prosomal shield and telson. Elements of unusual new eurypterid taxa have so far been identified from William Lake. It possesses a puzzling chimera-like combination of exoskeletal characters, including a novel swimming paddle morphology, setting it apart from all other described forms. The William Lake section, in addition, includes the first Ordovician record of a sea spider - the only known fossil occurrence of the rare and bizarre Pycnogonida in rocks of demonstrable shallow-water origin. Fragmentary remains of other non-biomineralizing arthropods found at both sites hint that other chelicerate groups, such as the ‘synziphosurines’ and chasmataspidids, may be present. These discoveries provide a unique window into the early radiation of the chelicerate arthropods and suggest that Ordovician marginal marine habitats may have been the setting for much of their initial diversification.
Two juvenile specimens of *Prosaurolophus maximus* (Hadrosaurinae; Saurolophinae) from the Upper Cretaceous Bearpaw Formation of Alberta provide insight into the ontogenetic changes in cranial morphology

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*Prosaurolophus maximus*, a saurolophine hadrosaur found in the Dinosaur Park Formation of Alberta and Two Medicine Formation of Montana, is primarily known from subadult-adult specimens. Although ontogenetic changes among larger skulls were studied previously, a more comprehensive understanding of these changes in the taxon is limited by the lack of juvenile individuals. Here the skulls of two juvenile *P. maximus* specimens from the Bearpaw Formation of Alberta are analysed in order to shed further light on skull ontogeny in the species. Twenty-four linear measurements of the juvenile, sub-adult, and adult skulls (n=15) were plotted against quadrate height, a proxy for skull size, using Reduced Major Axis model regressions. Results reveal that the inclusion of the juvenile specimens alters the slope of regressions previously based exclusively on subadult and adult specimens. Inclusion of juveniles shows that crest length and height, dentary height, and diastema length increased at a slower rate than previously inferred from sub-adults/adults, whereas jugal length and dentary length increase at a faster rate. Principal Component Analysis of the cranial linear measurements reveals a difference in the crest and snout morphology between juvenile and subadult/adult *P. maximus*. While the first principal component separates specimens based on characters related to skull length, the second principal component segregates juveniles from adults based on crest-snout length, naris length, prenarial length, and circumnarial depression length. Our study shows that the crest of *P. maximus* becomes more prominent during ontogeny, due to the deepening of the circumnarial depression and dorsal extension of the crest. However, it is evident that the crest morphology of *P. maximus* does not change as drastically through ontogeny as in some other hadrosaurs.

This project is funded by the Faculty of Graduate Studies Summer Stipend Award from the University of Calgary and The Student Research Program of the Royal Tyrrell Museum Co-operating Society.
Tracing the history of the Parrsboro Rock and Mineral Shop and Museum: citizen Science and tourism on the Bay of Fundy.

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Eldon George began looking for beach shells and fossils in 1940 after experiencing a traumatic injury to his right arm when only 8 years old. His mother and local community encouraged his interest in drawing and natural history. Having established a considerable mineral collection, he opened the Parrsboro Rock and Mineral Shop and Museum in 1948. Eldon then encouraged growth in local geotourism when featured prominently in the 1957 National Geographic Magazine article, the Great Tides of Fundy. Eldon worked regionally as field geologist for over fifteen years, but throughout his life he had a particular passion for museums. He worked at the Museum of Natural History alongside Peter Von Bitter from 1966-67. Eldon devoted over sixty years to discovering and collecting fossils and minerals from sites along the Fundy coast near his hometown of Parrsboro, Nova Scotia, and he received the Order of Nova Scotia in 2013. For over fifty years, Eldon and Elaine George developed The Parrsboro Rock Shop as a popular tourism destination in the small coastal rural community on the shores of the Bay of Fundy. The playfulness and creativity of the iconic Rock Shop encouraged interest in the displays of minerals and fossils. Eldon had developed a network of connections among the geological communities of Maine, Connecticut, Arizona and New Mexico, exhibiting and purchasing material at Gem and Mineral Shows. Inspired by these experiences, Eldon played a central role in developing the Nova Scotia Gem and Mineral Show that has recently celebrated its 50th Anniversary. During his career, Eldon also established a collection of 1500 fossil specimens collected between 1948 and 2004 from the Carboniferous and Mesozoic coastal exposures on the northern shore of the Minas Basin, Bay of Fundy. The most famous specimen is “the world’s smallest dinosaur footprints” mentioned in a Time Magazine article in 1986. His collection also includes important carboniferous fish and insect specimens. Eldon George is an accomplished citizen scientist who carefully maintained notes, examined specimens in detail, and collaborated with international researchers, including Donald Baird and Paul Olsen.
Current and recent research at the Joggins Fossil Cliffs UNESCO World Heritage Site

Melissa Grey, Curator of Palaeontology, Joggins Fossil Institute; curator@jogginsfossilcliffs.net

The Joggins Fossil Cliffs, a Carboniferous coastal section within the Bay of Fundy, has recently celebrated its eighth anniversary as a UNESCO World Heritage Site. The Cliffs represent the finest example in the world of the terrestrial tropical environment and ecosystems of the Pennsylvanian (Late Carboniferous). The Site is co-managed with the province of Nova Scotia: all fossils in Nova Scotia legally belong to the province and collecting is only allowed with a Heritage Research Permit. The Joggins Fossil Cliffs has a long history of scientific research with more than 100 site-specific publications in over 150 years. Recent research has become broader, reaching far beyond the broad categories of paleontology, geology, and historical study. Inscription on the World Heritage List and its close proximity to the Fundy Biosphere Reserve has also made the Site of interest to economists, biologists, and geographers. Highlighted here are very recent studies (recently published or in progress) that span the broad range of classically paleontological or geological research at the Site: from taxonomy to paleoecological studies to providing sedimentological frameworks. Much of this work has been undertaken by Maritime institutions that include universities and provincial and federal governmental departments. While research from the past 150 years has made large strides in our understanding of the Late Carboniferous, many questions remain to be resolved and interest in the site is clearly expanding into new fields.
Unusual geologic features at the Mt Stephen Trilobite Beds (Burgess Shale) in Yoho National Park provide paleoenvironmental context for abundant middle Cambrian trilobites and other organisms that are the focus of park interpretive programs at this site. The fossils are concentrated in a surprisingly small area of predominately green-weathering rock, only about 80 m wide along strike. Coeval strata just tens of metres to the north differ lithologically and are much less fossiliferous, which raises interesting questions as to what factors limited trilobite distribution laterally on the seafloor. Talus here hosts pieces of black clinochlore mudstone that weather from clinochlore dikes two hundred metres up-dip. The main dike occurs at the Fossil Gully Fault, which truncates the up-dip edge of the Trilobite Beds. Bedded clinochlore within the Burgess Shale near the fault yields rare trilobites, indicating that emplacement of the clinochlore was syndepositional. The Fossil Gully Fault therefore must be Cambrian-aged, not Laramide, which supports earlier claims of middle Cambrian tectonic activity in this area. In places the shales have slumped downslope to reveal broad exposures of the underlying Yoho River Limestone Member (YRL). This surface shows local topography of the seafloor, which was broadly undulating and in places produced carbonate mounds up to seven metres high. Extensive bedding surfaces are ripple-marked. Much of the upper surface of the YRL here shows polygonal cracks that are produced on both the upper and lower surfaces of beds. Upper and lower cracks are mostly non-corresponding and widen toward the upper and lower surfaces, respectively. Polygons defined by the cracks are in places disheveled. The features described here are best explained by penecontemporaneous mud volcanism and associated brine seeps. Clinochlore mud was delivered to the seafloor via faults that acted as conduits. Brine seeps promoted localized microbial productivity that in turn concentrated animals, as occurs on flanks of modern submarine mud volcanoes. Cracks on bedding surfaces of the YRL may have resulted from seafloor heaving/sagging associated with mud volcanism and/or other seismic activity. All features mentioned here occur within a 400 m radius of the current visitor viewing area at the Trilobite Beds and present opportunities for expanded interpretive programs.
**JMorphy: a digital tool for measuring fossils**

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Morphometrics is the quantitative analysis of form (size and shape). Morphometric analyses are widely used in palaeontology, especially for taxonomic and evolutionary research. Data collection is integral to the process to provide the form-related measurements on which to apply the morphometric analyses. While much software has been developed to aid data collection, few are designed specifically for fossil assemblages. We have created a new software tool, JMorph, that is custom-built for efficiently measuring micro- to macrofossils from digital images. JMorph provides the means to specify landmark points and to measure lengths, areas, angles, radii and separations. Outlines can also be digitized and processed with built-in Fourier analysis tools. The collected data is written to comma-separated-variable files for use with spreadsheet or other data-processing programs. The software has already been used in a variety of published studies on bivalves and ostracods for the purposes of taxonomic classification and evolutionary trend delineation. JMorph is freely available from the authors. It is written in Java and will therefore run on most major operating systems. The graphical user interface is simple and basic documentation exists. The code has been designed for extensibility, to allow researchers the freedom to add new types of measurements or data analyses. In our presentation we highlight the usability of the program and its key benefits.
Virtual collections and virtual access to collections: low cost solutions to imaging and sharing types

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Most areas of paleontology, including systematics, biostratigraphy, and extinction studies, require comparing specimens housed at globally distributed collection centers. The high cost of travel and restrictions on the transport of specimens means that researchers often have to rely on illustrations and descriptions, which in many cases are inadequate to make confident identifications, especially in older publications. An additional problem is that even high quality illustrations produced via microscope photography are often at a scale that either provides insufficient resolution to allow fine features to be examined or does not include the entire specimen, hiding species-diagnostic differences such as rate of widening. Rapidly falling prices for electronics, combined with newly available, free and user friendly image stitching and video software, provide a solution to these problems. This presentation presents a case study using graptolites, i.e., macrozooplankton that are in the mm to low cm scale. A simple off the shelf eye piece microscope imager (Celestron 44421), combined with Microsoft’s free Image Composite Editor, allowed high-resolution composite images of entire specimens to be produced, which could be examined at various scales, as necessary. Images like these can form the basis for virtual type collections. Additionally, the same microscope imager, used in video mode and combined with free video conferencing software (Skype), allowed real time collaborative examination of specimens by multiple researchers in different localities. The total cost of this hardware and software was <$75.
The unique preservational environment associated with the cave system found at the Early Permian (289 ma) Richards Spur locality, Oklahoma, USA.

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The Richards Spur locality, Oklahoma, is home to a large assemblage of Early Permian (289 ma) tetrapods. More than 30 described taxa are known from the locality, all of which are considered to be fully terrestrial, leading to the interpretation that this is an upland assemblage, a rarity in the Paleozoic Era. Despite the large body of work devoted to alpha taxonomy at the locality, there has been little integrative work on the geological and paleoecological nature of the locality, its fossiliferous infills, the preservational condition of the fossils, reconstruction of the depositional environment, and possible taphonomic biases. The research presented here uses geological and paleontological samples from both the surrounding limestone and the fossiliferous infills to address some of these issues. Numerous karst structures from the fossiliferous areas of the quarry provide compelling evidence that the so-called fissure fills found at the locality are remnants of a vast vertical cave system. Fossil material obtained from the caves of Richards Spur is usually found in disarticulation, in most cases pristinely preserved in the Early Permian clay infills, but various levels of wear has also been observed, especially when the bones are concentrated in calcite. In contrast, articulated material is relatively rare, and always associated with calcite. We interpret that the fossil material could have come into the caves in three ways. The first involves animals that died outside of the caves, were partly or completely disarticulated, and their remains were washed into the caves. The second involves animals dying outside but quickly being washed in before disarticulation can occur. Lastly, animals could also have fallen into the caves from the surface, as the caves would have acted as passive natural traps. Evidence from geochemical analysis and carefully prepared fossiliferous samples indicate that once introduced into the caves, various levels of reworking of the skeletal materials occurred, a relatively common phenomenon in karst deposits. The overall preservational environment seen at Richards Spur is likely the result of the interplay of complex factors, making it distinct from all other Paleozoic localities, and a unique window into the early stages of terrestrial vertebrate evolution.
An exquisitely preserved, new eucacopine dissorophid (Temnospondyli) from the Carboniferous of Nova Scotia, Canada

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The fossil record from the Carboniferous deposits of Nova Scotia, Canada, has produced key insights into the early evolution of each of the major tetrapod lineages (amphibians, synapsids and reptiles). Despite this, fossil material is rare, and often highly fragmentary. Here we report on a recently discovered, exquisitely preserved skull and articulated, partial post-cranial skeleton recovered from the cliffs near the town of Brule. The specimen was found within the Malagash Formation, Cumberland Group, of Late Carboniferous (Late Westphalian C-D) age. The specimen bears obvious affinities to dissorophid temnospondyls through the presence of such traits as a box-like postorbital region of skull and large posterior temporal embayment, large interpterygoid vacuities on the palate, and dorsal armor. This new taxon, described here for the first time, is distinctive in several regards, including a very high marginal tooth count (40+ in the maxilla), absence of anterior internarial fontanelle, hyper-elongate neural spines in the dorsal region of the vertebral column, and relatively small dorsal armor that drapes over the distal tips of the neural spines. Phylogenetic analysis places the new specimen within eocacopine dissorophids, as the sister taxon to the clade containing Cacops, Kamacops and Zygosaurus. The preserved dorsal armour is highly unusual in its somewhat delicate, drape-like appearance covering the tips of the neural spines. Interestingly, the preserved hyper-elongated neural spines show evidence of fusion between adjacent spines. The ribs are also unusually broad, significantly broader than in Cacops, with large overlapping flanges. The fusion of the spines, the drape-like dorsal armor, and the broad ribs would have certainly reduced or largely eliminated axial mobility, but is matched by elongated propodials, adding a fascinating perspective to the functional interpretations of locomotory mechanics in dissorophids. The occurrence of the new species in the Late Carboniferous pushes the divergence of Eucacopinae from Dissorophinae well into the Carboniferous, and increases the known diversity of Carboniferous tetrapod assemblages at a time when amniotes started to show significant increase in diversity. Finally, as one of the largest known tetrapods from the Carboniferous of Canada, this eucacopine provides new insights into early terrestrial vertebrate ecosystem composition and evolution.
Holotype of the Late Cretaceous dinosaur *Dromiceiomimus brevetertius*, with implications for the utility of distal caudal vertebrae in ornithomimid classification

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*Struthiomimus brevetertius* Parks 1926, type species of *Dromiceiomimus* Russell 1972, was the second Canadian ornithomimid named, and the first to be based on a specimen from the Horseshoe Canyon Formation. The holotype, ROM 797, is a partial skeleton including sacral and caudal vertebrae, most of the pelvis, and both hind limbs. Its diagnostic validity has been questioned, however, and Parks’ work remains the only source for published figures of the holotype. We present new observations to correct and augment the description of this historically and taxonomically important specimen. Of the seven associated distal caudal vertebrae, only the most distal one has ventrally grooved prezygapophyses. A recess was present between the caudal centra and the postzygapophyses. The ilium has an unfused peg-and-socket articulation with the ischium. The incomplete left femur is crushed anteroposteriorly, and was originally mounted and figured upside-down. The eponymous abbreviated third metatarsal could not be confirmed: the preserved anterior surface of the third metatarsal does not disappear in a fine point, and the third metatarsal is visible in posterior view near the proximal end of the metatarsus. The extent of exposure of the third metatarsal in proximal view is obscured by an adhering distal tarsal on the right, and restoration on the left. The third metatarsal is asymmetrical in distal view. The pedal unguals are narrow in ventral view, with constricted waists and a distinct flexor fossa bisected by the flexor tubercle. ROM 797 shares some potentially diagnostic characters with material referred to *Ornithomimus edmontonicus*, including a distal caudal vertebra with ventrally grooved prezygapophyses. However, the absence of this character in other, morphologically similar distal caudals of ROM 797 has implications for the utility of this character in classifying isolated ornithomimid elements. Comparisons to other ornithomimids indicate that the position of the first caudal vertebra with grooved prezygapophyses in ROM 797 is approximately the 23rd (or greater), whereas *Ornithomimus* sp. from the Dinosaur Park Formation was recently reported to have grooved prezygapophyses on the 16th caudal vertebra. This variation may prove to be taxonomically informative, but can presently be assessed in only a small number of ornithomimid specimens.
The benefits of public research sites, an example from Wasson Bluff

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In June and July 2016, the Fundy Geological Museum research staff conducted field work at Wasson Bluff, a site containing Canada’s oldest dinosaurs to collect small reptile and dinosaur material. The McCoy Brook Formation sandstones have become well known for important Early Jurassic vertebrate fossils. The goal of the dig was not only to collect significant specimens but to engage the public in the research process. The dig was publicized through traditional and social media before, throughout and after the dig. The Museum also led four tours to the site during the eleven days of field work. Guests had a chance to interact with researchers and view the fossil material being excavated. Additionally, the researchers did a live broadcast from the field and answered viewers’ questions. The dig was very successful: significant finds such as a theropod premaxilla and mammal-like reptile postcanine tooth were among the over fifty specimens collected. The publicity from the dig also increased visits to the Museum website and social media pages. The experiences from this public dig will be used to help create a “pay to dig” program in the future and to help build our volunteer program. Allowing the public access to research is a unique experience for them but can also be beneficial to increase awareness of the institution.
Anagenesis and cladogenesis in some early Aeronian (early Silurian) species of Demirastrites (Monograptidea, Graptoloidea): evidence from the Prague Basin

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Species of the Demirastrites triangulatus group have particular significance for the definition and global correlation of the lower part of the Aeronian Stage. In 2011, the Subcommission on Silurian Stratigraphy formed a working group to restudy the base of the Aeronian Stage. As part of this restudy, the Hlásná Třebaň section, approximately 25 km SW of Prague, was collected in detail through the much of the Rhuddanian and Aeronian, providing a continuous succession of samples yielding common to abundant specimens of several taxa of the D. triangulatus group, which form the basis of this study. The purpose of our study was to use detailed qualitative, comparative and quantitative morphometric data to help to diagnose the key species of Demirastrites and test previously published hypotheses regarding the evolutionary patterns within these taxa. Species and subspecies of the D. triangulatus group are recognized by a combination of semiquantitative characters (e.g. number and form of isolated proximal thecae) and quantitative characters (e.g. rate of widening, maximum width, thecal spacing). The following species can be recognized within the Hlásná Třebaň succession: Demirastrites triangulatus, D. pectinatus, D. major and D. cf. raitzhaïnensis. The results of our studies to date suggest the following preliminary conclusions. 1) Forms matching the two previously identified subspecies, D. triangulatus triangulatus and D. triangulatus separatus, both occur in our collections, but the two subspecies occur together and they appear to be part of single, variable populations. We, therefore, do not regard these as distinct subspecies. 2) Stratigraphic trends in our morphometric data suggest that several of the species show evidence of gradual anagenetic change through time. 3) D. pectinatus and D. major appear to emerge as a result of an event of cladogenetic divergence from the D. triangulatus lineage. 4) The stratigraphically lowest specimens of D. triangulatus show more axially elongate proximal thecae than is typical of this group, which is consistent with the hypothesis that this lineage was derived from a pernerograptid ancestor. Similarly detailed studies from other regions will be required to determine if these trends and patterns are representative of the overall evolution of these taxa.
A large amniote tooth plate from the Lower Permian Clear Fork Formation of Texas

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Moradisaurine captorhinids are Permian reptiles characterized by the presence of multiple rows of marginal teeth in each jaw. Moradisaurines first appear ca. 280 Ma in the Lower Permian Clear Fork Formation of north-central Texas and coeval rocks of neighbouring Oklahoma, and they make their last appearance in Upper Permian (ca. 257 Ma) rocks of Africa and Asia. In the middle Clear Fork Formation (the former ‘Vale Formation’) they are the most commonly collected reptile fossils, which have been assigned to the species Captorhinikos valensis and Labidosaurikos barkeri. The most readily diagnosable specimens are the tooth plates. Captorhinikos valensis exhibits ca. 20-mm-long tooth plates consisting of rows of conical teeth that radiate posteriorly across the plate (5 rows in the maxillary, or upper tooth plate, and 4 in the dentary, or lower, tooth plate). Those of Labidosaurikos barkeri are similar in size and tooth row numbers, with the holotype featuring a lower tooth plate with subparallel rows of teeth. In the 1950s, Everett C. Olson assigned a large (116-mm-long) tooth-plate fragment from the middle Clear Fork Formation to the synapsid group Edaphosauridae. This taxonomic assignment was unusual because previously the stratigraphically youngest materials of edaphosaurids were known from the lower Clear Fork Formation (the former ‘Arroyo Formation’). Our re-examination of the large tooth plate reveals that it is the greater part of a maxilla and that the teeth are organized into eight rows, an organization consonant with moradisaurine upper tooth plate morphology. This morphology is not congruent with edaphosaurid tooth-plate morphology, in which the upper tooth plate is formed by the palatine, the ectopterygoid, and the pterygoid (i.e., by palatal bones only) and the tooth-plate teeth are randomly-positioned. Accordingly, we re-classify this tooth plate as Moradisaurinae indet. Based on comparisons with the large moradisaurines Labidosaurikos meachami and Moradisaurus grandis, the study specimen represents a moradisaurine captorhinid with an estimated skull length of 35 cm. This large tooth-plate fragment, therefore, represents the largest reptile in the middle Clear Fork Formation.
New data are reported for organic-walled microfossils from coastal sections of the Chapel Island and Random formations on the Burin Peninsula, southeastern Newfoundland, including the Ediacaran–Cambrian boundary stratotype section. Cambrian-type acritarchs were not found in the basal Cambrian Treptichnus pedum Ichnozone. The appearance of Granomarginata approximates the base of the Rusophycus avalonensis Ichnozone. Acanthomorphic acritarchs, represented by small Asteridium and Comasphaeridium, first appear in the middle of the Random Formation, post-dating the appearance of such small shelly fossils as Aldanella attleborensis and Watsonella crosbyi. This interval of the Random Formation also yields small carbonaceous metazoan fossil fragments, which is the first report of this type of fossil in this formation. A more diverse acritarch assemblage, with Skiagia, appears at the top of the Random Formation. The pattern of acritarch diversity in the Chapel Island and Random formations suggests that acritarchs have limited potential for precise global correlation of the Burin Peninsula GSSP. The data support models in which the radiation of metazoans preceded and possibly drove the radiation of phytoplankton.
The placoderm *Titanichthys*: the first massive vertebrate pelagic planktivore?

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The placoderm *Titanichthys* from the Late Devonian (Famennian) is based on incomplete or fragmentary specimens that have complicated the understanding of its cranial anatomy and phylogenetic relationships. A new, nearly complete, articulated specimen (CMNH 50319) from the Upper Devonian Cleveland Shale provides new information about the previously undescribed rostral, postmarginal, postsuborbital, submarginal, posterior superognathal plates, and the nasal capsule. Three new diagnostic characters are proposed including a transversely elliptical rostral plate that does not contact adjacent plates, a reduced posterior superognathal, and a median dorsal plate that inserts into the posterior dorsal lateral plate. The phylogenetic analysis of *Titanichthys* recovers the taxon as a basal aspinothoracid arthrodire, with affinities to the durophagous lineage Mylostomatidae. This may have implications for the traditional interpretation of *Titanichthys* as a planktivore, since durophagous arthrodires show a loss of denticles on the inferognathal that may have facilitated a transition toward planktivory. Although the hypothesis of planktivory remains untested, *Titanichthys* does show several characteristics that are convergent with giant suspension-feeding organisms, including a long and slender lower jaw relative to body length, reduced orbit size, reduction of teeth (denticles in *Titanichthys*), and, large body size. It is possible that *Titanichthys* was the first massive vertebrate pelagic planktivore, with a lifestyle similar to the modern basking, whale, or megamouth sharks.
Using cladistics to study the early evolution of Silurian monograptid graptolites

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Very few studies have ever been published taking a cladistic approach to understanding the early evolution of monograptid graptolites. A number of authors have studied early monograptid evolution without using cladistics and proposed various different hypotheses of their phylogenetic patterns. The only previous studies that used cladistics are Melchin and Koren’ (2001) and the unpublished thesis of Dawson (2007). The current study is based on isolated material from Rhuddanian and Aeronian sections from Arctic Canada and the southern Urals. This material was supplemented with published observations of these same taxa from other parts of the world. The current study is using cladistics to test previously published hypotheses. Preliminary results show that most taxa cluster together in ways that are consistent with their previous generic assignments. More specifically, these results indicate that the some of the more derived forms that diversify and dominate later Silurian faunas (Monograptus, Monoclimacis, Demirastrites, and Pristiograptus) are in a clade separated from the other more typically Rhuddanian and Aeronian genera based largely on the porus type, sicula length, and the presence of a dorsal hood. There is a large clade comprised primarily of taxa from Pribylograptus and Coronograptus that are separated from the more derived monograptids and from the stem taxa (e.g. Atavograptus) by the presence of genicular hoods. Species of Pribylograptus and Coronograptus are in smaller clades separated from each other by the presence of lateral lappets, in Pribylograptus only, and by the high position of the sicular apex and the presence of flared thecal apertures in Coronograptus.

The road to and from extinction

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The Triassic-Jurassic (T-J) boundary is of great paleontological significance because it is based on one of the so-called big five mass extinctions. The subsequent Early and Middle Jurassic epochs are of equal interest, however, because they give us considerable insight into the processes of radiation and recovery. Understanding the dynamics of this requires the careful integration of biochronology and geochronology. Studying the ammonites is particularly instructive because the group almost became extinct at the T-J boundary but went on to recover and become even more successful throughout the rest of the Mesozoic. However, their recovery did suffer a minor setback as a result of a second order extinction during the Pliensbachian-Toarcian (PL-To) interval. In this talk, I will examine the similarities and differences between the T-J and PL-To extinction events. I will finish the talk with some reflections on the subject of paleontology itself and how it might avoid some of the institutional pressures that could lead to ‘academic extinction’.
Trends, tropes and speculation in paleoart

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Paleoart functions as knowledge translation, enhancing paleontologists’ ability to communicate with the public and each other. However, this visual conversion comes with artistic input: paleo-illustrations and models are influenced by tropes and long-lasting trends, resulting in bizarre and beautiful artwork that sometimes flies in the face of scientific understanding, and other times predicts it. An understanding of relevant art movements is necessary for both reducing the sum of information lost in translation, and strengthening its speculative potential, leading to better use of this important communication tool. Supported by visuals, I will outline how each mimetic practice was birthed (through analysis of key paintings, and influential texts such as Predatory Dinosaurs of the World by Greg S. Paul), and why each has persisted despite—or because of—advancing knowledge. In this presentation, I discuss the psychological aspects of art and science and provide four explanations. These include three regressive components: the comfort of incrementalism, the desire to display anatomical knowledge at the expense of likely fat deposits and integument, and cultural and romantic bias. Also included is a potentially progressive component, the lure of speculation, spurred in recent years by the All Yesterdays movement. Visualizations of these overlapping trends will be provided in this presentation through multiple reconstructions of the same animal (Troodon formusus) ‘wearing’ the hallmarks of each era. I argue that the public understanding of paleontology is subtly influenced by art; therefore, to what extent can the art itself be understood, and harnessed?
Paleontology holds the potential to excite the public like no other science. But how can experts communicate their passion for prehistory in an increasingly fragmented media landscape? Are blogs still a thing? Do you have to sign up for Snapchat? How can you make yourself stand out on Twitter? This session will explore the various avenues professionals can use to bring paleontology to the public, concluding with a Q&A.

Brian Switek biography:
A prolific writer, Brian regularly covers the latest prehistoric discoveries on his Scientific American blog Laelaps. His fossil-filled tweets have led Business Insider to call him one of the top "science social media wizards" and HLN to dub him one of "Twitter's 8 coolest geeks", as well, and he has just partnered with Parallax Film to host Dinologue, a new website and videocast all about what's new with the really, really old. And in a childhood dream come true, Brian was also hired to be the "resident paleontologist" for Jurassic World. In between blogs, Brian also freelances for a variety of publications - from National Geographic to io9 - and writes books. His first, Written in Stone, was an exploration about what evolution's great transitions tell us about our place in nature, and his second, My Beloved Brontosaurus, was a critically-acclaimed romp with the new dinosaurs science is bringing to life. He also wrote two new books in 2014 - the National Geographic special issue When Dinosaurs Ruled and the children's book Prehistoric Predators, illustrated by Julius Csotonyi. His next book, due in 2017, is tentatively titled Skeleton Keys and will explore how bones are not so much totems of death as symbols of vitality.
Nonbiomineralized marine macroalgae ("seaweeds") are a major component of the marine ecosystem, yet they are essentially absent from most of the fossil record. The exceptional preservation found within the mid-Silurian Eramosa Lagerstätte of Ontario, Canada, however, has revealed a noncalcified macroalgal flora in remarkable detail. This "algal-Lagerstätte" contains at least four species of macroalgae in association with paired scolecodont elements, orthoconic cephalopods, rhynchonellid brachiopods, high- and low-spired gastropods, and rare eurypterids. Characteristics of the algal material indicate essentially in-situ burial, and the associated sedimentology points to obtrusion during small-scale storm events, the thin layers of entombing carbonate mud perhaps delivered by sediment gravity flows generated along the flanks of nearby bioherms. Collectively, the lack of bioturbation, preservation of nonbiomineralized material, and biotic composition indicate a poorly-oxygenated, low-energy, shallow marine depositional environment, the nearby bioherms perhaps restricting circulation and thereby promoting development of dysoxic bottom waters. The most abundant taxon within the deposit is the dasycladalean alga *Wiartonella nodifera*, the thallus of which comprises a narrow main axis with laterals in distinct whorls. Laterals branch to the second order and show a distinct expansion (node) at the termination of first-order lateral segments. Specimens are preserved in enough detail to allow a unique analysis of its ontogeny and reproductive functional morphology. In particular, morphologic differences between specimens are interpreted as ontogenetic stages similar to those displayed by extant members of this green algal order, including late-stage shedding of higher-order lateral segments, and biophysical modeling indicates that the expanded terminations of the first-order lateral segments probably are not homologous with gametophores, reproduction instead having been either endospore or cladospore, details of the ontogenetic sequence pointing to the latter. Other noncalcified macroalgae include *Palmatophycus kettneri*, otherwise known only from the Silurian of the Czech Republic, and at least one new species. Overall, the dasyclad-dominated nature of the flora is typical of other algal-Lagerstätten documented from the Ordovician and Silurian.
What fossil foraminifera and detrital zircons can teach each other about sampling bias and replication in geochronological studies

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Radiometric geochronology and micropaleontology are complementary fields in many geological applications, particularly in sequence stratigraphy of Mesozoic to Recent basins. However, these fields rarely intersect at the research stages where projects are designed and sampling strategies are chosen. This abstract highlights a number of examples of issues related to sampling, replication, and sample bias that are documented for foraminiferal micropaleontology and radiometric geochronology studies respectively, but are rarely shared outside of those communities. One example is from a study of modern benthic foraminiferal communities in Davis Strait which documents significant variations in distribution of organisms within sampling areas. Foraminiferal populations in these benthic communities vary on centimeter to meter scales on the seafloor as a result of patch structure within communities. Since studies of fossil foraminifera are often designed to sample through stratigraphic cross sections, either in cross section exposure or in core or drill samples, there is significant potential to miss large communities of organisms. The analogous problem in detrital zircon studies is the distribution of heavy minerals (including zircon) on the depositional surface, usually as a function of currents and surface topographic variation. In detrital zircon studies this is usually dealt with by specifically sampling heavy mineral layers if they are visible, or by sampling geological units at varying levels and locations. In both fields of study it may be advantageous to keep in mind that sampling only in cross section can miss significant deposits of detrital grains or benthic communities, and to extend sampling in a three-dimensional pattern to minimize this risk. Another example addresses the issue of replicability of results in detrital zircon geochronology. Studies of inter-laboratory reproducibility using artificial zircon-enriched sands or replicate analyses of identical samples suggest that it is likely that every good laboratory will find the same general age distribution in the same samples, but that the proportion of different populations of grains vary widely. This pattern should be considered carefully when interpreting variation in foraminifera or other organisms on small stratigraphic intervals in micropaleontological studies where variations in proportions of different species are important.
The changing face of palaeontology at the Royal Ontario Museum

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Since opening 100 years ago, the Royal Ontario Museum’s palaeontology galleries have seen many changes, through three major building expansions and at least six significant gallery renovations. New galleries of the Age of Dinosaurs and the Age of Mammals opened in 2007, and an exciting new gallery of the Dawn of Life is currently in preparation. Gallery installations have been driven by collection and research strengths, available space, changing philosophies in exhibit style, and, most recently, by escalating advances in technology. The ROM building underwent major expansion in 1934. Space allotted to palaeontology more than doubled and invertebrate and vertebrate fossils were segregated, an arrangement perpetuated with minor exceptions for 70 years. A series of large murals depicting life through the ages ran around the top of the invertebrate palaeontology galleries. The 1960s saw a sea change in the style of museum galleries. Half of the invertebrate gallery space was given over to the ROM Library. One third of the original space became a sparse didactic display. In 1977, this was replaced with an “interim experimental” gallery, which endured for another twenty years. The two vertebrate galleries underwent similar conversion, including the extremely popular dinosaur dioramas, which opened in 1972 and were finally dismantled in 2004 to make way for the latest round of major expansion and renovation. The philosophy driving the new 21st century galleries of the Age of Dinosaurs (Jurassic and Cretaceous) and the Age of Mammals (Cenozoic) in the Michael Lee-Chin Crystal addition was simple: bring out more real material; reposition dinosaurs in updated postures; increase biodiversity; increase the marine story; combine vertebrates, invertebrates and plants; emphasize Canadian material and ROM strengths; and add new casts where we lack complete skeletons. Complete or near complete skeletons are now accompanied by a diagram indicating which elements are original or cast/reproduction. The Dawn of Life Gallery, in preparation and with a tiny preview gallery open now, will fill in the missing approximately 4.3 billion years, from the Archean to the Triassic and will include newly acquired specimens and innovative technological components to enhance the story.
The future of public outreach: virtual reality apps, drones, and 3D printing. Protecting sensitive field sites and making field trips accessible to everyone.

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Searching online for fossil localities in Ontario, available resources included enthusiast blog posts, localized field trip guidebooks from past geological conferences, and dated research papers that did not reflect current urbanization. After visiting numerous localities, it was discovered that many fossil sites once described are now lost to beachfront and riverside houses. Online searches for fossil localities in Nova Scotia found only Joggins and Parrsboro. Attempts to find the research site that two of my professors had visited on the North Mountain 30-40 years ago were unsuccessful. Paleontological resources that are made available to the public in an online capacity are clearly insufficient given the progress of modern technology. Traditional methods of public outreach leads to the neglect of lesser known sites. Students do not want to hunt an out-of-print book, they utilize internet resources. Although field trips are beneficial to students, these activities can cause substantial damage to sites through trampling of the natural surroundings and removal of specimens by visitors. For many students and enthusiasts, locations are completely inaccessible due to mobility or safety issues. It is becoming increasingly vital to revisit known fossil sites to monitor site stability and damage caused by human interference, and to create detailed digital representations. Science outreach must catch up with the modern methods of data collection and information processing utilized by the new generation of students. The conservation of fossil sites can be achieved while enabling public outreach through advances made in virtual tour software, drones with HD cameras, 3D imaging, and 3D printing. These tools have the potential for presenting hazardous road cuts, hard to reach sites, and ecologically sensitive locations. Virtual reality can create in-depth experiences for students, researchers, and enthusiasts alike. Members of the public could view protected fossil sites, zoom in on geological structures of interest, and even print 3D models of fossils collected from locations in the image. Bringing paleontological research sites directly to the hands of youth to explore will undoubtedly provide the valuable resource and immersive experience needed to engage a new generation while allowing for greater accessibility for everyone.
Two correlated Late Middle Eocene micro-mammal faunas from the Central Rocky Mountains and Gulf Coastal Plain and their paleoecologic implications.

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The WU-26 fossil locality has yielded the first micro-mammal fauna from the late Uintan (Ui3, late middle Eocene), Uinta C Member of the Uinta Formation in the Uinta Basin of northeastern Utah. The formation outcrops comprise the type locality for species which define the Uintan North American Land Mammal Age. Our field crews have processed more than 28 tons of bulk sample from WU-26 and recovered more than 600 micro-mammal specimens identifiable to at least the genus level. The fossil-bearing horizon is a 15 cm thick, green, pond(?) claystone which lies 40 m below the Uinta Formation’s contact with the overlying Duchesne River Formation’s basal Brennan Basin Member. WU-26 provides a unique glimpse into the micro-mammal community which inhabited the Uinta Basin near the end of deposition of the Uinta Formation. The virtual absence of paleobotanical specimens in the Uinta Formation makes paleoclimatic reconstructions problematic. More than 1000 micro-mammal specimens were collected at Texas Memorial Museum locality 42486 from the paralic, late middle Eocene, Laredo Formation, at Laredo, Texas. Micro- and macro-floral remains along with fish and reptilian species indicate the Casa Blanca community lived in a lowland tropical rain forest and coastal mangrove setting, either during or close to the Middle Eocene Climate Optimum. The WU-26 sample size is now large enough to make meaningful comparisons with the Ui3-age Casa Blanca micro-mammal community. Several genera are present in both faunas including Herpetotherium, Mytonius, Epihippus, ?Amynodon, Protoreodon, Mytonomys, Microparamys, and Pauromys; indicating that both environments shared habitats compatible for these taxa. That fact and the presence of crocodilians and the carettochelyid turtle, Pseudanosteira pulchra, along with the tortoise Hadrianus, suggest that the paleoclimatic regime at WU-26 was subtropical or tropical. It is significant that the earliest known North American lagomorph, Mytonolagus petersoni, as well as Janimus, Pareumys, Sciuravis, a primitive Cricetid and Talpavus are present at WU-26, but absent from 42486, indicating that paleoecological differences also existed. Small mammals in the Casa Blanca fauna not yet discovered at WU-26, include Mahgarita, Laredomys and Microeutypomys.
The Willow Creek Formation is a poorly fossiliferous formation in southwestern Alberta that preserves a low end-Cretaceous (upper Maastrichtian) dinosaur diversity compared to many contemporaneous terrestrial deposits in the Western Interior of North America. Although only three dinosaur taxa (Tyrannosaurus rex, Hadrosauridae indet., and Leptoceratopsidae indet.) have been identified in the formation, hundreds of dinosaur eggshells collected at several sites reveal a greater dinosaur diversity than known from skeletal remains. At least seven dinosaur egg taxa (Continuoolithus, Montanoolithus, Porituberoolithus, Prismatoolithus spp., Spheroolithus spp.) are recognized based on morphological and histological analyses, likely referable to at least two ornithopod and five small theropod species, probably representing dromaeosaurids, oviraptorosaurs, and troodontids. The study of eggshells triples the known dinosaur diversity of the Willow Creek Formation when taking into consideration the taxonomic affinity of both the eggshells and the skeletal remains, increasing the number of dinosaur taxa known from three to at least nine species. Most of the eggshells preserved belong to ornithopods, although small theropods were probably an important part of the Willow Creek ecosystem since most egg taxa can be ascribed to these dinosaurs. Eggshells are relatively common in the Willow Creek Formation compared to most other dinosaur-bearing formations in Alberta, while bones are comparatively rare. The caliche-bearing deposits, indicative of arid to semi-arid conditions, typical of the formation were likely conducive to the preservation of calcareous eggshells.
AWARD RECIPIENTS

2003  Jisuo Jin
2004  Jonathan Adrain
2005  Not awarded
2006  Nick Butterfield
2008  Michael W. Caldwell
2010  Jean-Bernard Caron
2012  Howard Falcon-Lang
2014  Not awarded
2016  Marc Laflamme

CITATION FOR MARC LAFLAMME

Dr. Laflamme obtained his PhD at Queen’s University in 2007 on Ediacaran fronds from the world famous Mistaken Point assemblage, Newfoundland. He went on to secure three prestigious post-doctoral fellowships (NSERC, Yale University, and the Smithsonian Institution) before landing a tenure track position at the University of Toronto - Mississauga in January of 2013. Dr. Laflamme has established himself as one of the world’s foremost experts on Ediacaran organisms. This biota characterizes a critical phase in the history of life on Earth with the ascendance of the first large multicellular organisms, some of which might have been precursors to true animals. In addition to undertaking detailed systematic and evolutionary studies, Dr. Laflamme has led pioneering research on the mode of life of Ediacaran organisms using innovative theoretical modelling and functional morphology approaches. He has also published global syntheses relevant to large-scale questions in the Ediacara biota worldwide.

His current research program focuses on developing experimental techniques to better understand the preservation—and, in consequence, the affinities and ecologies—of these often-enigmatic organisms. He has so far co-authored 37 peer-reviewed papers including a number in such prestigious journals as Science, PNAS, and Geology, and has co-edited several books and special volumes. Dr. Laflamme is currently Secretary of the IUGS-ICS Ediacaran Subcommission, Chair of the Geological Society of America Geobiology and Geomicrobiology division, and Associate Editor of Frontiers and Geobiology. In addition to his professional services and editorship activities, he has chaired numerous sessions at international academic meetings. Dr. Laflamme is a well-respected teacher and supervises several graduate students. To sum up, Dr. Laflamme is a very active young Canadian palaeontologist who has already demonstrated an immense potential for ground-breaking research. He brilliantly exemplifies the qualities that the GAC Paleontology Division’s Pikaia Award seeks to recognize.
BILLINGS MEDAL

MEDAL RECIPIENTS

1978  George J. Jeletzky
1980  Hans J. Hofmann
1984  Loris S. Russell
1987  Colin S. Stern
1989  Edward T. Tozer
1991  Robert L. Carroll
1993  Alfred C. Lenz
1995  Gerd E.G. Westermann
1997  Thomas Bolton
1999  Richard C. Fox
2001  Paul Copper
2003  Brian Norford
2005  Christopher R. Barnes
2007  Brian Chatterton
2009  Guy Narbonne
2011  Graham L. Williams
2013  Godfrey Nowlan
2015  Paul L. Smith

CITATION FOR PAUL SMITH

Paul Smith is a native of London, England who came to Canada to study for a PhD at McMaster University under the tutelage of Gerd Westermann. He has been a faculty member at UBC since 1980, becoming a full professor in 1993. Paul served as Head of the Department of Earth and Ocean Sciences from 2000-2009 and Vice Provost and Associate Vice President pro tem (2011-2012).

Paul’s research career has revolved around the Jurassic, a period that excites his interest because the fragmentation of Pangea imposed itself so forcefully on the history of the biosphere. His primary area of paleontological expertise is the ammonites. He has also worked on other groups, particularly bivalves, but also vertebrates and, through others, microfossils. First and foremost he is a field man, but also an excellent mentor to his many (nearly 30!) students.

He has studied the evolution of sedimentary basins, and collected and described faunas from around the north Pacific, but his main love has been the allochthonous terranes of western Canada. He was a pioneer in the application of computers to paleontological data using databases and image analysis. He is renowned for his systematic work on the Jurassic ammonites of western Canada and their application to terrane analysis. On a broader scale, his contributions to paleontology, and through paleontology to geology, have been in three main areas, namely: the interplay of plate tectonics, evolution and biogeography; the establishment and calibration of time scales; and the record, timing and causes of extinction and speciation.
Transportation information:

General information:

- **Foot:** Getting between the Cambridge Suites, the Sunday venue (Doktor Luke’s), Cineplex, and the kitchen party location is easy on foot. Restaurants, pubs, and attractions are available within the downtown core (see map).

- **Bus:** Cape Breton Regional Transit buses are **free** for the month of August and provide easy transportation between downtown Sydney and Cape Breton University—as well as to surrounding areas. Route 1 goes between Sydney and CBU. Maps of additional transit routes and schedules are at: [http://www.cbrm.ns.ca/transit](http://www.cbrm.ns.ca/transit)

- **Taxi:** Taxis are affordable and run mostly on set rates. Fare between downtown Sydney and CBU from most providers is $10. Providers include: Dynasty: 902-562-5777, Plaza: 902-539-8700, and many others.

Parking:

- Parking is available for $1 a day on the CBU campus. Metered and street parking is available in the downtown Sydney area, if it is not included in your hotel.

- The kitchen party is at a private residence with limited street parking. Please plan on walking or taking a taxi.

Day to day transportation:

- **Friday:** Sessions at CBU campus (10 km from downtown). Transportation to campus is up to attendees (bus is recommended and leaves on the hour from downtown: 30 mins travel time to CBU). Transportation away from campus after the reception is provided. Please do not drive if you are planning on drinking at the reception.

- **Saturday:** Sessions at CBU, plus field trip and banquet (Louisburg and other locations). Transportation to campus is provided. Shuttles will leave from the front of the Cambridge Suites at **8:15 am. You must pre-register for a seat by email or at the reception the night before** (otherwise you will be responsible for finding your own transportation to the university). **Please note: the 8 am bus does not run on Saturday. The earliest bus arrives at 9:30 am.** Transportation on the field trip is provided. Buses will depart from the university to the Miner’s Museum at 11:45 am and return to downtown after the banquet (ca. 10:30 pm). As such, guests attending the banquet should not bring their cars to the university in the morning.

- **Sunday:** All events are downtown. Transportation is up to attendees. Events are walkable from downtown hotels. See map.