

THE VICTORIAN GEOLOGIST



Geological Society of Australia
Victoria Division
Selwyn Lecture

Monday 30th September at 6:15 p.m.

Fritz Lowe Theatre, School of Earth Sciences, University of Melbourne

Talk will be preceded by drinks from 5:30 pm in the 4th floor tearoom, cost \$2.

Earth's history and the search for life in our Universe

Assistant Professor Noah Planavsky
Yale Geology and Geophysics

How has Earth remained persistently inhabited through most of its dynamic history? A history marked by dramatic changes in tectonic processes, a cooling interior and warming sun, and the continuous evolution of life that marched in step with billions of years of environmental change. Through it all, Earth's surface remained amenable to life, with the sum of all the physical, chemical, and biological processes on and within the planet reflected in its dynamic atmosphere. In this talk I will highlight work we—the Alternative Earths Astrobiology Institute—have been doing to deconstruct how tectonic and biotic processes shaped Earth's atmosphere through time, with an

emphasis on understanding stabilizing feedbacks, tracking the distributions of bioessential nutrients, and reconstructing the first-order tectonic processes that drive recycling of nutrients and fluxes of volatiles from Earth's interior—perhaps the single most important factor in sustaining continuous planetary inhabitation. Ultimately, we want to exploit the surface features of these 'Alternative Earths' as remotely detectable biosignatures. More correctly, each atmosphere and surface can be thought of as an integrated product of life-sustaining biogeoplanetary processes and as a calibrated target for fingerprinting habitability elsewhere. Over the past few years our Alternative Earths team has been characterizing Earth's early atmospheric evolution and the coupled drivers and consequence of this record, from the earliest traces of oxygenesis to the paleoenvironmental gateway that opened to the rise of animals. I will highlight two key findings from our team: 1) a new view of the factors controlling the size of the 'Habitable Zone' and that 2) terrestrial planets can stabilize in low atmospheric oxygen states. Both of these topics build directly from observations on Earth's sedimentary record but will directly inform the future of space-based telescope missions.

Speaker bio...

Dr. Noah Planavsky is an Assistant Professor of Geology and Geophysics at Yale University and a member of the Alternative Earths Team of the NASA Astrobiology Institute. Prior to this, Noah completed his PhD at U.C. Riverside with Tim Lyons and worked at the California Institute of Technology as a postdoctoral researcher with Woodward Fischer. Noah studies the connections between the evolution of Earth-system processes, biological innovation, and ecosystem change—foremost in Earth's early history. His research integrates field, petrographic, and geochemical work. The protracted rise of oxygen over several billion years dramatically changed Earth's surface environments. However, our current picture of Earth's redox evolution is still painted with only broad strokes. A central theme of his research



has been trying to piece together the history and effects of Earth's oxygenation. With that end goal in mind, Dr. Planavsky is currently working on coupling paleoredox proxies in Precambrian sedimentary rocks, calibrating novel metal isotopes systems in modern aqueous systems, and untangling the distribution and diagenetic history of trace metals in sedimentary rocks. Still an early career researcher, Noah has over 120 published papers, including a significant amount of Nature and Science publication as well as award winning contributions. He received the S. George Pemberton award for significant achievements in geobiology in 2019 and the F. W. Clarke Medal in 2018, in recognition for an outstanding contribution to geochemistry or cosmochemistry for a early-career scientist. Noah was also awarded the prestigious Packard Fellowship for Science and Engineering and a Alfred P. Sloan Fellowship in Ocean Sciences in 2016.

Selwyn Symposium 2019

The co-evolution of life and Precambrian environments

*****ALMOST SOLD OUT*****

If you plan to attend the Selwyn Dinner at Trotters Restaurant, Lygon St, ensure you register soon.

30th September

Details: <https://www.gsavic.org/selwyn-symp-2019.html>

We have a great line up of speakers, who will be talking about a range of diverse topics including: new theories on the origins of life on Earth, the evolution of animals, ancient ocean habitats, extreme Neoproterozoic climate change and Precambrian environmental analogues for other planets. Our Selwyn Speaker will be Noah Planavsky from Yale, who will be presenting a public lecture in the evening on "Earth's history and the search for life in our Universe".

We encourage everyone who is interested to attend, and we also have poster presentations available (students and ECR's especially welcome!) Registration is half price for students and includes all food and beverages for the day. Please see the attached flyer, or the website below for more information and registration.

The co-evolution of life and Precambrian environments

Australia has a rich record of Precambrian sediments which have led to many significant insights into Earth's early evolutionary history. From the origin of life and land in the early Earth, to extreme climate change and biotic diversification in the terminal Proterozoic, the Precambrian showcases vast transitions in the Earth's climate systems, ocean-atmosphere composition and biosphere. In this symposium, leading researchers in diverse fields will examine our understanding of the evolution of Earth's surface environments through the Precambrian. Questions around the link between environmental conditions and biological innovation will form a large part of the discussion: how and why did life evolve on Earth and how has Earth remained habitable for billions of years?

The symposium speakers will focus on integrated geobiological, stratigraphic, sedimentological and geochemical research on Earth's surface evolution to bring new complexity to our understanding of Precambrian habitats.

Speakers

The early Earth:

Martin Van Kranendonk (UNSW)

Balz Kamber (QUT)

David Flannery (QUT)

Erica Barlow (UNSW)

Juraj Farkaš (U. Adelaide)

Georgia Soares (UNSW)

Indrani Mukherjee (UTas)

The end of an Eon

Adam Nordsvan (Curtin)

Mary Droser (UC Riverside)

Malcolm Wallace (UoM)

Pat Rich (Monash, Swinburne)

Ilya Bobrovskiy (ANU)

Lidya Tarhan (Yale)

Selwyn Speaker Noah Planavsky (Yale)

The 2019 Selwyn Medallist

The Victorian Division of the Geological Society of Australia established the Selwyn Medal in honour of Sir Alfred Selwyn, the eminent Victorian pioneering geologist and founder of the Geological Survey of Victoria.



The award recognizes significant ongoing or former contributions of high calibre to any field of Victorian geology.

The Awards Committee is delighted to present this year's winner of the 2019 Selwyn Medal.

Neville John Rosengren



Nominated by:

DR S. WHITE
Environmental Geoscience
Pty Ltd
School of Life Sciences
La Trobe University
Vic. 3086

Seconded by:

DR FIONA GLOVER
Compass Environmental

6/5 Rose St,
Hawthorn East
Vic. 3123

We believe that Neville has made substantial contributions to Victorian geology through his geomorphological work over many decades, especially in the areas of geological/ geomorphological heritage and sites of scientific interest and coastal surface geology and is a worthy candidate for the Selwyn Medal.

Citation for Neville Rosengren

Neville Rosengren is a geomorphologist of international renown with over 50

years experience in research, teaching and consultancy in Australia, New Zealand, Indonesia, India, China, UK and USA. He graduated from RMIT majoring in geology and has also completed B. Com (Melb), T.S.T.C (Secondary Teacher's College) and MA (Hons) (Melb). He has been engaged as a consultant by Victorian and Commonwealth Government agencies, by major private sector environmental consulting firms and for several years was senior environmental consultant to the United Nations University program on coastal resources management in Indonesia. He is an Honorary Associate at La Trobe University and has been a member of the Geological Society of Australia since 1974.

Neville has been a principal or sole investigator for a large number of studies of features of Geological and Geomorphological Significance as well as for geological matters in various planning disputes. These studies have covered most areas of Victoria. He is, in particular, regarded as a specialist in the geomorphology of the coastal landscapes in Victoria, as well as the eastern uplands, western uplands and the Western District volcanic plains.

Neville has made a significant contribution to the understanding of Victorian geology, especially surficial geology and geomorphology. He has contributed to text books, consultants' reports, research papers, field workshops on Victorian landforms, and has mapped and listed important geological heritage sites in the State for their conservation. Many of the sites in the GSA (Vic) geological heritage sites database were documented by him.

His publications on Victorian geomorphology are numerous and diverse covering aspects of volcanic landscapes (eruption points), coastal morphology, alpine ecology and geomorphology, and sites of geomorphological significance. In particular he has written numerous reports detailing the geology and geomorphology of much of Victoria for government departments, nongovernment organisations and consulting companies.

He has long had an active interest in the conservation of geological sites and has published major inventories of sites on a regional (e.g. catchment of the Gippsland Lakes), and thematic (e.g. Box-Ironbark Special Investigation, Newer Volcanic eruption points) scale.

Neville is an inspiring teacher who has exposed a large number of students

over many decades to the joys of geology, especially geomorphology in several tertiary institutions in both geography and geology departments. The importance of geomorphology is sometimes ignored in earth science teaching and Neville's work has helped address this. He has been very generous with his time in running field workshops and courses to a wide range of groups: academic/educational, industry and community. His highly successful Coastal Environmental Geomorphology VIEPS field course has exposed students to Victoria's coastal geology for over 20 years.

Neville is a quiet achiever: working away, recording, watching the science in his area of interest develop, handing on his specialist knowledge to the next generation while enjoying the excitement of the experience. He has mentored many and has generously given his time to many others. He is still working busily at understanding the surficial geology of Victoria, even though he is over retiring age!

This nomination seeks to recognize him for his over 50 years of teaching, mentoring and advocacy of the values of the geology/geomorphology of Victoria.

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Neville in the field talking to a landcare group somewhere in the great Victorian outback.

Invitation to 'The Murchison Meteorite – a Scientific Treasure Trove'

Philipp Heck, Field Museum of Natural History and The University of Chicago

Wed 25 September 2019, 6:00 pm – 7:30 pm

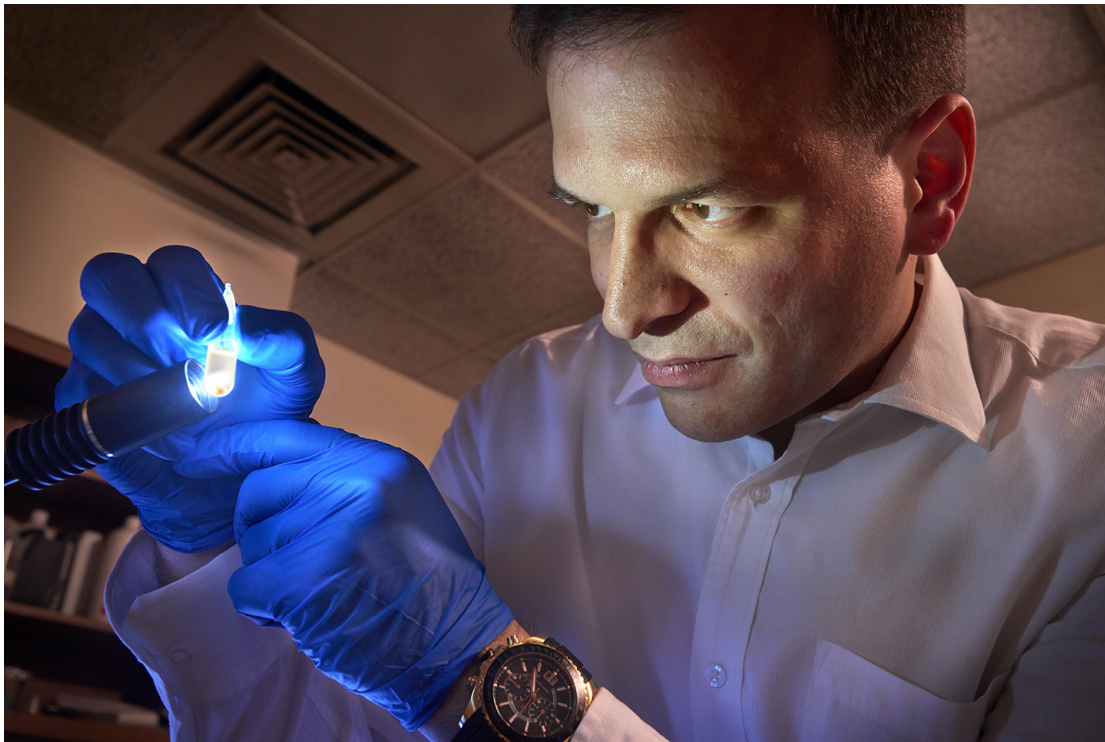
Details and Registration: <https://www.eventbrite.com.au/e/the-murchison-meteorite-a-scientific-treasure-trove-tickets-70849860841>

An invitation is extended to the GSA Vic Division by Melbourne University School of Earth Sciences and AIG to a free public lecture on the 50th anniversary of the fall of the Murchison meteorite, one of the most important meteorites to science.

Abstract

This September we are celebrating the 50th anniversary of the fall of the Murchison meteorite, one of the most important meteorites to science. Since its fall near Murchison, Victoria in September 1969, the Murchison meteorite has been the source of numerous spectacular discoveries. Thanks to the large amount recovered, about 100 kg comprising of a large number of specimens, and its availability to the scientific community, the Murchison meteorite is one of the most studied carbonaceous chondrites. The main fraction of Murchison was acquired by the Field Museum of Natural History in Chicago and since has been curated there. I will give an overview of Murchison curation and highlight some of the most important discoveries made by studying Murchison in the last 50 years. This includes the discovery of presolar stardust grains, solid samples of our parent stars more than 4.6 billion years old, which gave rise to a new subdiscipline within cosmochemistry. Other remarkable findings include the detection of a large variety of extraterrestrial organic matter incl. sugars, amino acids and urea, and the results obtained from studying refractory inclusions, which are among the first solids that formed in the solar system and are essentially time

capsules from that time period. Murchison also served as an analog sample for the carbonaceous asteroid Bennu to test instruments of the OSIRIS-REx spacecraft. OSIRIS-Rex is scheduled to return to Earth with a sample of Bennu in 2023. In my talk I will also present highlights of my own research efforts on the Murchison meteorite, which started on my first day of graduate school and are still ongoing. The knowledge gained by studying Murchison significantly advanced our scientific understanding of the formation of our solar system 4.6 billion years ago. Analyses of presolar grains enable us to glimpse back in time even further and let us learn more about our parent stars – the “element factories” that produced most chemical elements we and our world are made of.



Bio

Philipp is the Robert A. Pritzker Associate Curator of Meteoritics and Polar Studies at the Field Museum of Natural History in Chicago, IL in the Science & Education division. He is also an Associate Professor (part time) at the University of Chicago's Department of the Geophysical Sciences and the College and a member of the Chicago Center for Cosmochemistry.

Dr. Heck directs the research program in meteoritics at the Field Museum currently focuses on presolar grains to understand our parent stars and the

history of our Galaxy, early solar system materials and on the delivery history of extraterrestrial matter to Earth.

Dr. Philipp R. Heck came to the Field Museum in March 2010 from the University of Chicago, where he was a postdoctoral scholar working on new analytical techniques for presolar grains. He obtained his M.Sc. and Ph.D. degrees at ETH Zurich in Switzerland in geo- and cosmochemistry. He then worked as a postdoctoral fellow at the Max-Planck-Institute for Chemistry where he studied the first comet dust brought back from Comet Wild-2 by NASA's Stardust Mission and at the University of Wisconsin-Madison where he worked mainly on fossil meteorites and banded iron formations from around the world. For his studies he uses specialized analytical techniques such as secondary ion mass spectrometry (NanoSIMS, IMS-1280 and TOF-SIMS), noble gas mass spectrometry, atom probe tomography, scanning electron microscopy and electron microprobe analysis. Sample preparation for atom-probe work is performed with focused ion beam workstations.

Nature Stewards - #Scicomm this Spring



Keen to support your local communities to connect with nature? To help them get enthusiastic about the local geology, as well as flora and fauna? Why not become a Nature Stewards presenter this Spring?

Nature Stewards is a 10-week program for anyone over 18 years, keen to learn more about their local environment, meet others, and find out how and where to get active for nature locally through environmental volunteering actions.

Nature Stewards are seeking guest class presenters to come and chat with the class groups, introducing Victorian and local geology, and how rocks fit in the larger picture of local ecosystems. They are also seeking a few guest field

presenters to run two of our field sessions around Melton and Warrandyte, following on with the introduction to geology to experience it face to face. Both these roles are paid.

For information on the program see <https://outdoorsvictoria.org.au/nature-stewards/> or contact Maddy naturestewards@outdoorsvictoria.org.au

Forthcoming events

Unless otherwise noted, all 2018 talks will be held at the Fritz Loewe Theatre or the Gregory Room, School of Earth Sciences, University of Melbourne.

September 25th 2019: You are invited to a lecture at the University of Melbourne, **Assistant Prof Philipp Heck (Head of the Robert A. Pritzker Center of Meteoritics and Polar Studies, University of Chicago)** Details and

Registration: <https://www.eventbrite.com.au/e/the-murchison-meteorite-a-scientific-treasure-trove-tickets-70849860841>

September 30th 2019:

Selwyn Conference and Public Lecture: *Earth's history and the search for life in our Universe*, **Assistant Prof Noah Planavksy (Yale)** . More information and booking <https://www.gsavic.org/selwyn-symp-2019.html>

October 31st 2019:

Student Night: Hayden Dalton, Mathew Wood, Casey Blundell, Christopher Voisey, Campbell Van Praagh

November 10th 2019:

Geotrail Fieldtrip: TBC

February 27th 2020

TBC

March 26th 2020

Dr Mark McLean (University of Melbourne) who will present on recent interpretation of the Full Spectrum gravity/gravity gradiometry survey over the

Otway Basin.

Student Scholarships

The GSAV are pleased to offer scholarships for honours and postgraduate students in geological sciences for assistance with travel costs associated with attending conferences (fieldwork excluded). The number and value of the scholarships awarded each year is made at the discretion of the GSA Victoria committee. Up to \$500 for travel within Australia and between Australia and New Zealand and \$700 for travel elsewhere is available, paid half before and half after the conference. More information, including the eligibility criteria and application form, is available at <http://www.gsavic.org/scholarship.html>.

Contributions to The Victorian Geologist

If there are any events, happenings, news, or views that would be of interest to the membership, please send your details and information to the secretary at gsavictoria@gmail.com.

Newsletter deadline: First Friday of the month, except for December and January.

Contribute to TAG

It is member contributions which make TAG (The Australian Geologist) a member magazine – please keep the contributions coming and assist with informing all of the membership (not just your Division) about your activities.

Please send your news to: tag@gsa.org.au

About the GSA Victoria Division

General information about the Geological Society of Australia and GSA Victoria Division can be found at www.gsa.org.au and www.gsavic.org.

Contact details for the GSAV Committee can be found at www.gsavic.org/committee.html.

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