Dear Members and Friends of the CET,

What's happening at the Centre for Exploration Targeting...

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DIRECTOR'S REPORT
Welcome to the winter/spring 2019 CET newsletter. The momentum at the start of the year has picked up as witnessed by the articles and announcements in this newsletter. Many new Ph.D. students have arrived and they bring new energy and excitement. It is a great blend of old and new faces. Several new visiting scientists also highlight the international collaborations at the heart of the School of Earth Sciences. This issue coincides with a big presence at the Society for Geology Applied to Mineral Deposits (SGA) 2019 conference in Glasgow, which kicks off a series of high-profile global and local conferences over the next few months. In Perth we have the 2nd Australian Exploration Geoscience Conference (AEGC), the World Gold Conference, our own CET Member’s Day, and the Geological Society of Australia’s (GSA) Earth Science Student Symposium (GESSS). Last year the GESSS was hosted by UWA and it was a great success. It is at Curtin University this year and we encourage CET members to attend and support the next generation of geoscientists. Also on the horizon is a revived CET “Recent Advances in Economic Geology Symposium” that will be held at UWA from February 17th - 20th 2020.

We also provide updates on the MRIWA Yilgarn 2020 project and the AMIRA South American Exploration Initiative (SAXI). These CET-led projects are large, multi-year, collaborative research efforts that are now ramping up. We are all very busy!

A big thanks to Corinne, Liam and Keng Chai and the entire SES admin staff for all their hard work in making everything work so well. It has been a hectic few months! Lastly, I thank our CET corporate, individual and in-kind sponsors for their continued support and for everyone that has renewed membership for 2019/2020. We could not do many of the activities without your commitment.

Best regards,

Steve Rowins
**PROJECT UPDATE: YILGARN 2020**

**PhD Project - Evaluation of the Camp scale architecture controlling komatiite emplacement in the Leinster Willuna camp and metalogenic implication.**

PhD candidate: Anne Brandt Virnes

Supervisors: M. Fiorentini, P. Hayman, N. Thébaud, Q. Masurel

Anne conducted a Master's research project in 2015 investigating a mafic intrusion and related Ni-Cu-Co-PGE (NCCP) mineralisation in Greenland.

This sparked her great interest for the formation of NCCP ore deposits, culminating in a thorough research thesis. After finishing her Masters, Anne decided to gain industry experience in Sweden before undertaking post-graduate studies. Anne has since been working for Boliden. This experience has greatly helped fuel her passion for ore geology.

Anne's personal aim with undertaking this PhD project is to become an expert on orthomagmatic Ni-mineral systems and utilise that knowledge to further the development of new exploration targeting systems. (Starting date September)

**PHD Project - 4D evolution of gold mineralization in the Yamarna greenstone belt with special reference to the Guyere gold deposit.**

PhD candidate: Ravi Schreefeli

Supervisors: S. Hagemann, T. Kemp, N. Thébaud, M. Fiorentini, S. Rowins
Ravi is a graduate from VU University in Amsterdam with core interest in economic geology, magmatic-metamorphic geology and geochemistry. Ravi has conducted field work in a Cenozoic magmatic province in Turkey and conducted an exchange semester at ETH Zürich. For his Masters, Ravi conducted research on the Rosbel mining district in Suriname and studied the ore mineralogy associated with the Overman deposit. (Starting date September)

Field Trip

Quentin Masurel and Nicolas Thebaud headed into the field in early August to conduct regional mapping traverses in order to test different tectono-stratigraphic scenarios for the Agnew-Leinster domain. Quentin Masurel will follow up with the investigation of diamond drill core and sampling for geochronology-geochemistry.

PROJECT UPDATE: SAXI II

SAXI project moving to Stage II

A proposal for a new 3-year collaborative research program has been developed, to continue the South American Exploration Initiative (SAXI).

The SAXI Stage 1 project was developed at industry request to enhance the exploration potential of the Guiana Shield and neighboring terranes through an integrated program of research and data gathering into its 'anatomy'. The initiative considered the whole of the Guiana Shield, which spans the following countries: Brazil, French Guiana, Suriname, Guyana, and Venezuela. Additional neighboring regions such as the Borborema Province in NE-Brazil were included based on sponsor support. Key motivations for undertaking this
initiative were to assist exploration companies in focusing their activities in areas of maximum prospectivity and to help the local Geological Surveys in the region to build capacity and enhance their capability in their role of providing pre-competitive data and information. An additional aim of the project is to build a matching knowledge base that can be combined with the WAXI database to produce a seamless coverage for the two regions.

**Stage 2** builds upon the successes of the Stage 1 project to provide a once in a generation opportunity to tackle some of the major outstanding questions related to the tectonics and metallogenesis of the region. The project is a collaborative effort led by Mark Jessell from CET UWA, with 15 research partners from Brazil, Canada, France, French Guiana, Guyana, the Netherlands, and Suriname.

This initiative offers a special opportunity for companies to cooperate in funding a project that will ultimately provide not only new geological information but also a new geological framework and exploration insights. These will assist sponsors in exploring a highly-prospective region extending across several countries. Each of these countries uses a different administrative language, which has historically made it difficult for most companies to acquire and compile exploration of relevant data and information to enable them to develop knowledge-based terrane selection strategies.

**For more information please contact:**
Adele Seymon, Program Director at AMIRA International at adele.seymon@amirainternational.com, or Professor Mark Jessell at UWA / CET at mark.jessell@uwa.edu.au
[L] MSc Student **Sasha Ignatieva** (UWA) at the Grant's Patch area with **Steve Rowins** - looking at RC chips north of Scottish Archer in the Mungari Gold Camp.

[R] **Sasha** logging Scottish Archer core at the Frog's Leg mine site (Evolution Mining).

[L] **Ben Peni** (UWA) and **Wade Johnson** (Lefroy Exploration Ltd) with RC chips at the Lucky Strike project, Mt Monger area, WA Goldfields.

[R] **Steve Rowins** and **Wade** with RC chips at the Lucky Strike project.
The CET in the School of Earth Sciences is pleased to support the Students & Young Professionals Initiatives at the Australasian Exploration Geoscience Conference 2019 (AEGC2019). The AEGC2019 is Australasia's largest petroleum and mineral geoscience conference and is jointly hosted by the Australian Institute of Geoscientists (AIG), Australian Society of Exploration Geophysicists (ASEG), and Petroleum Exploration Society of Australia (PESA). Over 1,000 delegates are confirmed to attend the proceedings, which include 280 oral presentations, 80 posters, 20 workshops and 90 exhibitors.

An important and continuing focus of the AEGC2019 is to foster student and young professional participation and showcase the geoscience community. A high school student day and university student day are planned for the 4th and 5th of September, respectively. Registration to the university student day is proving to be very popular, especially with UWA students. Over half of the 30 sponsored student workshop-placements are from UWA! Several networking opportunities are planned at the AEGC2019, including the highly anticipated Fortescue Metals Group Early Career Geoscientist Networking Evening (2nd of September) – 160 people are confirmed to attend what is now Perth's largest young professional geoscience networking event for 2019.

We hope to see you at the AEGC2019 and we encourage you to strike up a conversation with students and staff from UWA. Further information can be found at https://2019.aegc.com.au/

Cameron Adams
AEGC2019 Student and Young Professional Chair

Welcome to Kavitha Madaiah who is working as a programmer on the MinEx/Loop project at CET with Mark Jessell & Mark Lindsay.

Welcome to Clément Barrière, who is a visiting Masters intern working on the MinEx/Loop project at CET, throughout July & August with Mark Jessell, Mark Lindsay and Jeremie Giraud.
CET MEMBERS' DAY

The **2019 CET Members' Day Symposium** will be held on Wednesday 27th of November in the Wesfarmers Lecture Theatre at the UWA Business School.

All of our Corporate and Individual Members are invited to attend this symposium to learn about the innovative work of CET-affiliated staff and postgraduate students in the School of Earth Sciences. It is a great way to interact with our dynamic team of research staff and postgraduates.

Further information including the Schedule, Registration details and the announcement of this year's Keynote Speaker will be available on the [CET website](http://cet.uwa.edu.au) in the next few weeks.

**Wednesday 27th November, 2019**

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**RECENT ADVANCES IN ECONOMIC GEOLOGY SYMPOSIUM**

Welcome to Becki Montsion from Laurentian University, Canada who is spending the next few months with the CET as part of her cotutelle with UWA (she will get a double PhD from the two unis). Becki will be working with Mark Jessell and Mark Lindsay on a mineral system analysis of the western Wabigoon subprovince of the Superior Craton.

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Welcome to Professor Jiateng Guo from Northeastern University, China, who is visiting the CET for 1 year to work with Mark Jessell on developing a database of 3D geological models with associated geophysical responses as training sets for machine learning, feature extraction and geophysical inversion platforms.
The Centre for Exploration Targeting and the School of Earth Sciences are pleased to announce the "Recent Advances in Economic Geology Symposium" which will be held from 17th - 20th of February 2020, at The University of Western Australia. This has been a very successful event in the past and 2020 is a timely renewal of the symposium.

The 4 day symposium will showcase some of our most recent research advances. Below is a brief overview. The program, pricing and registration information will be available closer to the date.

17th - 20th February, 2020

**DAY 1: Gold Systems - Western Australia**
led by Professors Steffen Hagemann & Nicolas Thebaud

**DAY 2: Gold Systems - Americas, Africa and Europe**
led by Professors Steffen Hagemann & Nicolas Thebaud

**DAY 3: Iron, Base Metal and Nickel Systems**
led by Professors EJ Holden, Mark Jessell & Marco Fiorentini

**DAY 4: Mineral Systems Research and the Business of Exploration**
led by Professors Steve Rowins & Mike Dentith

Welcome to Mahtab Rashidifard who has joined the Loop/Minex group as a new PhD student, and will be working with Jeremie Giraud, Mark Jessell and Mark Lindsay on geophysical inversion techniques.

CONGRATULATIONS to Adjunct Research Fellow Professor Alan Jones on being elected a Fellow of the American Geophysical Union
Leigh completed his PhD at UWA in 1976, examining the geochemistry of granitoid rocks in the Yilgarn. After consulting through the gold boom of the 1980’s, he joined BHP as a geochemist then moved to MIM to take the position of Chief Geochemist, where he was involved in exploration for base metals and gold in 9 different countries. Subsequently he became Chief Geologist at Homestake Australia and later at Sipa Resources. In 2009 he was involved in successfully floating a new uranium explorer Energia Minerals Ltd. As Energia’s Director of Exploration and Development he led the technical team responsible for defining a significant new resource of uranium oxide at Carley Bore in the Carnarvon Basin. He left Energia in 2013 and is now involved in research and part-time consulting. Leigh has also made a major contribution to teaching in the Exploration Targeting course at the School of Earth Sciences.

Research Interests:

- Primary and secondary geochemical dispersion around mineral deposits
- Metal speciation in soils
Compania Minera San Ignacio de Morococha SAA (SIMSA) is a Peru-based company, which is primarily engaged in the mining sector. The Company’s activities include exploration, exploitation and concentration of zinc and lead. Compania Minera San Ignacio de Morococha SAA operates the San Vicente Mining Unit, which is located in the province of Chanchamayo, department of Junin. In addition, SIMSA is engaged in the electric power generation.
On Friday 9th August, the UWA Woolnough Society, School of Earth Sciences, and the Geoscience Foundation held a very successful 'Future of Work in Geoscience' Dinner at the UWA University Club.

The evening included a panel discussion on the future of work theme, as well as a silent mineral auction (featuring a variety of exotic mineral specimens) with proceeds going to the Edward de Courcy Clarke Earth Science Museum.

This event expanded upon the Woolnough Society’s popular Wine and Cheese Night and brought UWA Earth Science students and staff, Alumni and Industry together for a memorable and informative social evening.
In situ trace element and Sm-Nd isotope analysis of accessory minerals in an Eoarchean tonalitic gneiss from Greenland: Implications for Hf and Nd isotope decoupling in Earth’s ancient rocks

The Eburnean magmatic evolution across the Baoulé-Mossi domain: Geodynamic implications for the West African Craton

Hf isotopic fingerprinting of geodynamic settings: Integrating isotopes and numerical models
Kohanpour, F., Kirkland, C. L., Gorczyk, W., Occhipinti, S., Lindsay, M. D., Mole, D. & Le Vaillant, M., 1 Sep 2019, In : Gondwana Research. 73, p. 190-199 10 p.

Time-space evolution of an Archean craton: A Hf-isotope window into continent formation

Protracted evolution of the Marañón Valley Au Belt magmatic complex in the Peruvian Andes using zircon oxygen isotopes, Lu-Hf and U-Pb analyses

Supergene modification of magnetite and hematite shear zones in banded iron-formation at Mt Richardson, Yilgarn Craton, Western Australia

GeoDocA – Fast analysis of geological content in mineral exploration reports: A text mining approach

Closure to “Analytical Solution for Dissolution-Timescale Reactive
Transport in Fluid-Saturated Porous Rocks”
by Chongbin Zhao, B. E. Hobbs, and A. Ord

Paleoproterozoic volcano-sedimentary series in the ca. 2.27–1.96 Ga Birimian Orogen of the southeastern West African Craton

The provision and utility of earth science to decision-makers: synthesis and key findings

Sensitivity of constrained joint inversions to geological and petrophysical input data uncertainties with posterior geological analysis

Precambrian Hongqipingzi Complex at the northern margin of the North China Craton: Its zircon U-Pb-Hf systematics, geochemistry and constraints on crustal evolution

An interface-condition substitution strategy for theoretical study of dissolution-timescale reactive infiltration instability in fluid-saturated porous rocks

Comparing different real option valuation approaches as applied to a copper mine

2020
ICGMES 2020:
International Conference on Geological Modelling and Earth Science
13 – 14 Jan, 2020 | Location: Zurich, Switzerland

Mining Indaba 2020
03 – 06 Feb, 2020 | Location: Capetown, South Africa

CET Recent Advances in Economic Geology Symposium
17 – 20 Feb, 2020 | Location: UWA, Perth, Australia

PDAC 2020
01 – 04 Mar, 2020 | Location: Toronto, Canada
Supergene remobilization of Au in Au-bearing regolith related to orogenic deposits: A case study from Kazakhstan

The exhumation along the Kenyase and Ketesso shear zones in the Sefwi terrane, West African Craton: a numerical study

Microchemical and sulfur isotope constraints on the magmatic and hydrothermal evolution of the Black Swan Succession, Western Australia

Transient-state instability analysis of dissolution-timescale reactive infiltration in fluid-saturated porous rocks: Purely mathematical approach

Widespread occurrences of variably crystalline C-13-depleted graphitic carbon in banded iron formations

Geochronological constrains on the timing of magmatism, deformation and mineralization at the Karouni orogenic gold deposit: Guyana, South America

Applying spatial prospectivity mapping to exploration targeting: Fundamental practical issues and suggested solutions for the future
Redox-controlled generation of the giant porphyry Cu–Au deposit at Pulang, southwest China
Li, W., Yang, Z., Cao, K., Lu, Y. & Sun, M., 1 Feb 2019, In : Contributions to Mineralogy and Petrology. 174, 2, 12.

https://doi.org/10.1016/j.precamres.2019.03.010

Response to the reply by Warchola et al. on the discussion by D.F. Lascelles. Precambrian Research
Lascelles. D.F. 2019
https://doi.org/10.1016/j.precamres.2019.105373

BECOME A CET MEMBER

The CET, within the School of Earth Sciences at UWA, is built on a foundation of active and direct engagement with the exploration and mining industries, with Corporate and Individual Membership representing a gateway for interested organisations and individuals into our dynamic portfolio of research activities and knowledge.

As a CET Corporate or Individual member, you are supporting research excellence, innovation and education for a more successful and dynamic mineral exploration industry. As a CET Member you will also have the opportunity to access a variety of member-exclusive resources and benefits.

Visit our website to learn more about the benefits of membership and to find out about payment options.

Contact the CET for more information about Corporate or Individual Membership.
If you have any content you would like to include in future newsletters please email Liam.Casey@uwa.edu.au

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