CODES: UNEARTHING NEW POSSIBILITIES

CODES Director Professor David Cooke takes stock of 2018, which has turned out to be a standout year for CODES, and looks ahead at what’s to come in 2019.

As 2018 draws to a close, CODES staff and students can reflect on a highly productive and successful year. We started several new major research initiatives (including AMIRA P1202, the Northwest Queensland exploration project, and Cerro Negro, Argentina), which led to the recruitment of new staff and students, and new research partnerships (with Monash University, Universidad Austral de Chile and Mineral Mapping among others). Funding has been secured for the 4D geological modelling of the Cowal district project (Evolution Mining), which will commence shortly. An article on AMIRA P1202 appears later in this newsletter.

AMIRA P1153 was brought to a very successful conclusion in mid-2018, with a range of deliverables provided to the sponsor group via sponsors’ research and field meetings. A total of seven PhD theses have been completed so far this year. Ten new PhD students joined or are about to join our existing cohort of students. The Master of Economic Geology program saw the largest ever number of new recruits join the program in 2018 (19 new students plus four lapsed students who have recommenced their degrees). As part of that program, we presented three highly successful short courses, culminating in the very well-received three-day Garry Davidson Symposium (130 attendees), presented as part of the Ore Deposit Models and Exploration Strategies short course in 2018. The special issue of Economic Geology (January 2018) was another major highlight, with many articles written by CODES staff and students.

2018 was a challenging year with regards to teaching Earth Sciences at the University of Tasmania, due to the loss of three profile staff members in 2017. It is important to emphasise the fantastic job that our research staff have done in helping to ensure that Earth Sciences could deliver its full undergraduate degree in 2018.

Continued on p.2.
LIVING ON THE EDGE IN THE RUSSIAN FAR EAST

PHD student Adam Abersteiner standing in the caldera of Kusudach Volcanics (South Kamchatka), holding a piece of basalt dacite.

Between August and October this year, PhD student Adam Abersteiner and Professor Dima Kamenetsky undertook extensive fieldwork in the far east of Russia. Adam was the successful recipient of the Max Banks Research Scholarship in Earth Sciences and a grant from the UTAS Conference & Research Travel Funding Scheme, which assisted in his travels abroad.

During this time in Russia, Adam and Dima explored remote areas of Kamchatka in conjunction with Russian researchers as part of a project to understand the complex active volcanism and subduction processes occurring in this area. This project aims to understand the origin of platinum-group elements and gold in sulphide melts from modern arc basalts. In addition, kimberlite research and sample collection was conducted in Siberia as part of a growing collaboration between UTAS and various Russian universities and geology institutes. And Adam even managed to master the Russian language while on this trip, as Dima will attest!

CODES: UNEARTHING NEW POSSIBILITIES (continued)

Our profile staff numbers in Earth Sciences dipped to their lowest ever number in 2018, and the CODES research team rallied to help our profile staff to ensure that our undergraduate content was delivered in a highly engaging and effective fashion. They also helped enormously with Honour supervisions – the fruits of that labour are profiled in this newsletter’s review of the 2018 Honours candidates.

Looking forward to 2019, it is very pleasing to announce that the University of Tasmania will be appointing two new profile staff members to Earth Sciences and CODES. These new appointments will help us to address our staffing shortfall and will grow our research and supervision capacity. Additional research appointments are being made, so that new staff will join us early in the new year. 2019 is the penultimate year of our Australian Research Council’s Industrial Transformation Research Hub, and we look forward to the TMVC staff and students transferring its major outcomes to our industry partners. There are challenges ahead, but we look forward with optimism to the new opportunities on the horizon.

HONOURS: CLASS OF 2018

This year’s crop of CODES Honours students has been a particularly large and diverse group, proving that an Honours degree in Earth Sciences is a popular choice for the smart-thinking geology student. Some of our mid-year graduates are already working in the industry while others, and those completing by the end of 2018, are keen to find placements. Here we introduce this year’s cohort and their study interests.

Through our Honours program in Earth Sciences at the University of Tasmania (UTAS), we aim to provide the best strategies to prepare our students for careers in industry or academia. The Honours degree in Earth Sciences is a composite course consisting of thesis-based research balanced with a literature review and four weeks of short courses that take place in Tasmania and Victoria. The Honours program has two intakes a year (February and July) and consists of 38 weeks of study, with graduations in December and August. The program is coordinated by Dr Martin Jutzeler.

This year has seen excellent results, with 19 students enrolled at some point during the year, which represent a large proportion of our graduate students. Most of the international students who graduate with a geology major from UTAS are keen to continue into Honours; three students from Malaysia and Indonesia will graduate this year. We also have input from mainland students, with two representatives who graduated from QUT and Monash. Eight Honours students who had started mid-year in 2017 submitted their theses in April and graduated in August 2018. Their research projects were quite diverse, with five projects in economic geology, one in geophysics, one in marine geosciences, and one in environmental geochemistry. In February, nine students started Honours; seven of them carried out projects related to economic geology, and two related to geochemistry. Most of these students recently submitted their theses and will graduate this December. This year, we had two mid-year starter students, and their projects in economic geology and general geology will be completed by May 2019, with their graduation planned for August 2019; one part-time student will finish in late 2019. Our research projects are chiefy in Tasmania (nine) although several are based in other Australian states (seven), in addition to one project based in offshore Tasmania, and one overseas in Inner Mongolia, China.

Many of our students are sponsored by industry and academia throughout their Honours year. We are most grateful to these sponsoring companies and organisations which include the TMVC Research Hub, Mineral Resources Tasmania, the Cocker/Two Scholarship through the UTAS Foundation, the Australian Research Council, AusIMM, Copper Mines of Tasmania, Corona Minerals, CSIRO, Evolution Mining, Forest Practices, the Geological Survey of Western Australia, the Geological Survey of Victoria, the Geological Society of Australia, Heron Resources, the Institute of Mine Seismology, MMG, New South Resources, Newcrest Mining, Perilya, Signature Gold, and Venture Minerals. In addition, a proportion of the project work was supported by internal, university-based funding.
Proterozoic ocean.

district, and ongoing debate about
and variations in pyrite trace element

Tom investigated pyrite paragenesis

fence of five drill holes transecting

involved initial sedimentological

envelope locally includes anomalous

"pyrite envelope") at Rosie Creek has

extent of the pyritic interval (or

north of the world-class McArthur

northern Batten Fault Zone, ~100km

bedded silty dolostones hosted in the

sequence of anomalously pyritic, thinly

focussed on a laterally extensive

Tom’s Honours project was sponsored

northern Australian Proterozoic basins

towards Pb-Zn-Ag mineralization in

current processing protocols for this

determine the gold deportment,

characterise and describe the high

Australasia’s largest and most productive tzn deposit, Renison Bell. Josh’s work is focussed on
defining characteristic features of the
trace element chemistry in cassiterite
from different deposits in both
northeastern and western Tasmania,
and as comparing the ages of
Tasmanian granites to his new U-Pb
cassiterite ages. He has also analysed
topographic map of Tasmanian cassiterite

Stewart Jackson is a geophysics

student from Tasmania specialising in
earby anomalies with seismic waves

tremor. To do this Sarah used a variety of

sites to evaluate their AMD potential

looked at characterising two of these

Tasmania. Josh is the recipient of the
genius of historical slag: Evaluating

GHD as a geochromatist. Her

supervisors during her Honours

research were Dr Anita Parbhakar-Conf,
xRalph Bottrill from Mineral Resources

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Tasmania. Josh is the recipient of the
genius of historical slag: Evaluating

GHD as a geochromatist. Her

supervisors during her Honours

research were Dr Anita Parbhakar-Conf,
Project title: What’s under the Tasmania Basin?

After completing a Bachelor of Marine and Antarctic Science in July of this year, Darcy has now commenced his Bachelor of Science with Honours. Darcy’s project is entitled “What’s under the Tasmania Basin?” and is testing the “Tasmanian Oncline” hypothesis proposed by Dr Ross Cayley which postulates that the Mount Read Volcanics curve around from the west coast of Tasmania through to the area under Hobart. This project will analyse the rocks beneath the Tasmanian Basin, primarily in the lower Midlands, adjacent to the Tamar Fracture System. The methods employed aim to date these rocks (U-Pb), characterise the geology, alteration and mineralisation. He has completed the first detailed documentation and synthesis of the geology, alteration and mineralisation of the Hadamiao Cu ± Au porphyry prospect in Inner Mongolia, China, with an emphasis on the evolution of hydrothermal fluids at the prospect. Ben completed fieldwork in China in July this year, focussing on the collection of samples for their geology, alteration mineralogy and magmatic-hydrothermal transition textures. Hand sample observations, reflected light and transmitted light petrography, and SEM imaging were all used to help determine the paragenesis for the prospect. The project aims to elucidate the conflicting theories of the Cascade Seamount and to investigate its formation and subsidence history. The research incorporated bathymetric data collected from the voyage. The research incorporated a variety of analysis techniques, including Ar-Ar dating, whole-rock geochemistry, petrographic analysis, and a spatial analysis, to understand the formation and subsidence history of the Cascade Seamount and to elucidate the conflicting theories of the region’s geological evolution.
2018 Honours students and their projects

1. **TOMAS ANDREWS**  BORROLOOLA, NT
2. **HANNAH COUPER**  TELFER DOME, WA
3. **HAMISH COWIE**  KALGOORLIE, WA
4. **JOSH DENHOLM**  NORTH-EAST TASMANIA
5. **SARAH GILMOUR**  WESTERN TASMANIA
6. **EMMET O'KEEFE**  NORTH-WEST TASMANIA
7. **MATTHEW VINCENT**  ROCKHAMPTON, QLD
8. **HAMISH COWIE**  KALGOORLIE, WA
9. **BEN KOWALUK**  INNER MONGOLIA, CHINA
10. **DARCY JAMES**  MIDLANDS, TASMANIA
11. **JOSH DENHOLM**  NORTH-EAST TASMANIA
12. **XIN NI SEOW**  WESTERN TASMANIA
13. **BEN RIDGERS**  NORTH-EAST TASMANIA
14. **RYAN McMANN**  KALGOORLIE, WA
15. **SEBASTIEN MEFFRE**  TELFER DOME, WA

**ORE SOLUTIONS > SUMMER 2018**
Supervisors: Riquan Rople was extensively modified during later deformation. Based on the results of his study, Riquan studied the Hill 800 prospect, Victoria. Riquan studied the Hill 800 prospect, Victoria, and highlighted the potential earlier stratigraphic and structural influence. Samples from the Potosi and Silver Peak were also studied, and the Carbonate Ridge intercepts, little subsequent exploration or analysis of the host rocks. However, the deposit was strongly affected by a number of later tectonic events which are recorded by the elongated monazite found in foliation (461 ± 6 Ma) in pyrite and gold-rich samples.

16 Riquan Rople
Completed studies mid-2018
Supervisors: Sebastien Meffre, Jeff Steadman, Rob Duncan (GSSW)
Project title: Age and paragenesis of the Hill 800 prospect, Victoria
Riquan studied the Hill 800 prospect, a Au-Cu prospect located 145km east-north-east of Melbourne, Victoria. The study confirmed the Cambrian age of the host breccia showing that these formed in a proximal-to-emergent oceanic island arc volcano. U-Pb dating of hydrothermal apatite (498 ± 12 Ma) in pyrite and gold-rich samples showed that the deposit was formed close to the age of formation of the host rocks. However, the deposit was strongly affected by a number of later tectonic events which are recorded by the elongated monazite found in foliation (461 ± 6, 408 ± 6.7 and 344 ± 8.6 Ma). Pyrite imaging provided evidence of trace element migration during deformation. Based on the results of his and previous studies, Riquan showed that the early mineralisation at Hill 800 formed as a hybrid with characteristics resembling both VHMS and Porphyry-Cu deposit. This early mineralisation was extensively modified during later deformation and metamorphism.

17 Mark Sinfield
Completed studies mid-2018
Supervisors: Rob Scott, Tony Webster
Project title: Litho-structural control and origin of mineralisation at Carbonate Ridge – Broken Hill, NSW
Mark Sinfield’s Honours study investigated the characteristics and stratigraphic position of base metal mineralised intercepts in deep drilling at Carbonate Ridge approximately 6km NE of Broken Hill. Mark studied drill core that was acquired in the 1970s, as part of brownfields exploration on the Northern Leases, searching for continuations to the Broken Hill main line of lode. At the time, base metal intercepts in two deep holes drilled at Carbonate Ridge were interpreted to be hosted in Freyers Metasediments, rather than the stratigraphically overlying Hores Gneiss, which hosts the Broken Hill orebody. Given the depth (>1km) and perceived unfavourable stratigraphic position of the Carbonate Ridge intercepts, little subsequent exploration or analysis of the prospect was undertaken. However, following the re-discovery/discovery and mining of the Potosi/Potosi extended orebody (hosted in Freyers Metasediments) and Silver Peak (hosted in Hores Gneiss) at the NE end of the main line of lode, there has been renewed interest in the previous mineralised intercepts at Carbonate Ridge.

Mark’s study, which was sponsored by Penilla Limited, involved detailed logging, sampling, whole rock geochemistry, thin section petrography and SEM investigation of drill cores from the Carbonate Ridge area, as well as the study of comparative ore samples from the Potosi and Silver Peak deposits. His work confirmed earlier stratigraphic and structural interpretations for the Carbonate Ridge area, and highlighted the potential for further extensions to the Potosi orebody, in the area between the Potosi mine and Carbonate Ridge.

18 Matthew Vincent
Current student, completing end 2018
Supervisors: Lejun Zhang, Mike Baker
Project title: The application of visible near infrared (vis-NIR) and short wavelength infrared (SWIR) spectral analysis in exploration for the Morgans deposit, western Australia
Matthew’s Masters Program Co-ordinator Dr Rob Scott describes the recent Garry Davidson Symposium and related Masters short course that followed it.
This October, the biennial two-week Master of Economic Geology short course Ore Deposit Models and Exploration Strategies began with a very special event to commemorate the career contribution of our much-loved and highly respected colleague, Garry Davidson, who passed away in April 2017. Garry was remembered as a dedicated teacher and an innovative, insightful researcher who had an insatiable curiosity and infectious passion for the earth sciences. In keeping with the objectives of the Masters short course, the Garry Davidson Symposium addressed the genesis of, and exploration for, the ore deposit types that Garry had devoted so much of his working life to characterising and understanding; namely IOCG, uranium, sediment-hosted Pb-Zn and copper, Broken Hill type, volcanic-hosted massive sulfide and orogenic gold deposits. A total of 28 different speakers, including many of Garry’s friends, colleagues, former students and collaborators, presented talks at the symposium. It was a great success, and very well received by all 130 people who attended.

A TRIBUTE TO GARRY DAVIDSON

After the symposium, 28 Masters students and 18 other participants stayed on for the remaining nine days of the short course, presented by CODES staff and invited lecturers Professors Zhashan Chang and Noel White. Entire days were devoted to skarns, granite-related Sn-W deposits and Tasmanian ore deposits, porphyry Cu-Au-Mo deposits, high-sulfidation epithermal deposits and lithocaps, low- and intermediate-sulfidation epithermal deposits and Carlin-type gold deposits.

A highlight of the short course was a one-day fieldtrip to the Freycinet Peninsula led by David Cooke and Evan Orovan, during which participants examined spectacularly exposed features formed in the Devonian granites during the migmatic-hydrothermal transition. On the final day of the course, teaching staff handed over to the Masters students who, working in groups of three, presented a series of talks they had prepared on ore deposit types that had not previously been covered during the short course.
TAKING CENTRE STAGE

The GRS was attended by 57 people from 10 countries, and provided a unique forum for graduate students and early-career researchers to exchange new data and cutting-edge ideas with not only their peers, but industry and academic leaders. Former CODES graduate Dr Tim Iredale of First Quantum Minerals provided the opening keynote address, and probed the audience to consider how well geochemistry is currently being integrated into resource exploration. Over the course of two days, oral presentation and scientific poster topics covered by students and early-career researchers ranged from the formation of nanoparticle gold colloids inbonanza grade orogenic gold systems to the role of the subcontinental mantle lithosphere in ore-formations. At the end of the seminar, Dr Larry Meintert, editor of Economic Geology, provided a mentoring session on how to write a successful academic article.

The next Gordon Research Seminar will be held alongside the Gordon Research Conference on the Geochemistry of Mineral Deposits in 2020.

AMIRA P1202: DIGGING DEEP TO DEVELOP COST-EFFECTIVE EXPLORATION PROGRAMS

A new area of research for P1202 will be a focus on the porphyry transition zone, where alteration overprints pose challenges to both explorers and miners. Researchers aim to develop new vectoring and fertility tools to assist exploration in complex and variable geological settings, tackling the challenges of grade additive versus grade destructive alteration. A major project theme is also the development of best-practice workflows for deposit characterisation. The team will take novel approaches to integrate multiple datasets (including geochemistry and hyperspectral imagery) at multiple scales in order to extract deposit knowledge for geometallurgical applications.

Over the first four months of the project, the P1202 research team members have completed initial field campaigns at Yerington, Nevada; Christmas, Arizona; Laver and Attk, Sweden; Tujuh Bukit, Indonesia; and Pemberton Hills and Mines Gaspe, Canada. Samples were also collected from greenstones of Vermont, USA.

During this period industry workshops and planning meetings were held in the USA, Canada, Sweden, the UK, Indonesia, Australia and Chile. Further field campaigns will be conducted over the coming months. The project will run until June 2021, and is still open for sponsorship – please contact Adele Seymon (AMIRA International) for further details adele.seymon@amirainternational.com

The AMIRA P1202 project, Far-field and near-mine footprints – finding and defining the next generation of Tier 1 ore deposits, commenced on 1 July 2018, following the successful completion of the AMIRA P1153 project in June 2018. The project is led by Professors David Cooke and Leonid Danyushhevsky, Associate Professor Shaun Barker, Doctors Mike Baker, Lejun Zhang and Angela Escolme, and includes a team of researchers from CODES, Lakehead University, Monash University, Universidad Austral de Chile and Mineral Mapping.

The P1202 project seeks to develop new tools that facilitate cost-effective exploration programs and resource assessments for porphyry, epithermal, skarn and other ore deposit types at the regional, district and near-mine scales. The project builds on fourteen years of cutting-edge research into the use of mineral chemistry for vectoring and fertility assessment. Researchers also seek to refine existing geochemical and geological tools for fertility assessment to enable explorers to assess whether tenements are likely to contain significant mineral resource and to ensure that deposits are discovered more quickly and at less cost.

The project has four research modules involving; green rocks (module 1), lithocaps (module 2), magmatic minerals (module 3), and the transition zone (module 4). The project currently has twelve sponsors of modules 1–3 (Anglo American, BHP, Boliden, Codelco, FMG, Freeport, Glencore, Merdeka, Newmont, Newcrest, Rio Tinto and Teck), four of which also sponsor module 4 (BHP, FMG, Merdeka and Newcrest). Module 4 is a new research initiative involving both near-mine exploration vectoring and geometallurgical assessments of the transition zone, where clay and mica alteration overprints early-formed potassic alteration. The research team are working closely with Corescan at Module 4 sites to optimise mineralogical characterisation of the transition zone for exploration, evaluation and mining. Kyle Eastman (CODES), Angela Rodriguez (Monash), Andrew Jedermann and Patrick Hamilton (Lakehead) and Camilla Arcos (Austral) joined Emily Smyk and Yi Sun as full-time students on the project during 2018, with several more students to join the team shortly.
Associate Professor Ron Berry pays tribute to his friend and colleague Professor Pat Quilty, who passed away in August 2018.

Pat was born and grew up in country WA, and obtained his BSc (Hons) from the University of Western Australia in 1963. He came to the University of Tasmania (1962–1969) for a junior lecturer position and to produce a two-volume PhD (800 pages) on Tertiary Foraminifera. During this period, he had his first visit to Antarctica as a field palaeontologist with a party organised by the University of Wisconsin (1965/66). In 1968 he made a quick visit to Macquarie Island with Ric Varne and Dennis Gee, and they identified the island as a piece of Pliocene ocean crust. After Tasmania, Pat worked for six years as an oil industry palaeontologist with the West Australian Petroleum Company (WAPET). This was followed by five years lecturing at Macquarie University. From 1981 to 1999, Pat was Chief Scientist for the Australian Antarctic Division and ANARE. This was a serious love affair with the geology of Antarctica and especially fossil whales and dolphins from the Vestfold Hills. He served as the Australian delegate to the Scientific Committee on Antarctic Research (SCAR) for many years, including a term as Vice President from 1994 to 1998.

Professor Quilty was awarded the US Antarctic Services Medal (1974), Royal Society of Tasmania Medal (1996), Membership of the Order of Australia (1997), Distinguished Alumnus of the University of Tasmania (1997) and Phillip Law Medal (2016). He had five fossil species named after him as well as the Quilty Nunataks, and Quilty Bay in the Larsenman Hills.

From 2000 to 2018, Pat spent his retirement as an Honorary Research Professor at the School of Earth Sciences, UTAS. He taught large blocks of palaeontology to the undergraduates from 2000 until 2010 and supervised six PhD students. He convened the 17th Australian Geological Convention in Hobart (February 2004), and was an editor of the 2014 volume called Geological Evolution of Tasmania. During these retirement years he published 56 papers and was very active in outreach to the community. Mostly I remember him for his enthusiasm, for many animated discussions in the tearoom and for his willingness to always say “yes” when something needed doing. We miss him.

Professor Pat Quilty was the Chief structural geologist at Gold Fields, based in Perth, WA. PhD: Geology and geochemistry of caprocks above VHMS deposits, Myra Falls, B.C. – completed November 2001.

Sarah Jones, who gained her Masters from the University of Otago in 1995 and then her PhD from CODES nearly 20 years ago, has seen a lot of changes in the industry since she first began work at the Institute of Geological and Nuclear Sciences in New Zealand doing mapping.

Sarah has worked in her current role at Gold Fields, one of the world’s largest gold producers, for around two and half years. She describes herself as being “like an internal consultant”: “I go around helping out with structural geology issues at all of our sites; I do a lot of training and mentoring. But pretty much all of my job is pulling apart ore bodies and structural problems, trying to work out how they were formed”.

She is very clear that the thing she enjoys most about her work is the autonomy that she has to do geology: “I don’t have budgets, nobody answers to me, so I just get to do pure geology – it’s a purely technical role, which is awesome.”

Sarah has found that technical roles are often hard to get into, but credits her PhD from CODES as enabling her to get her subsequent role with the Geological Survey of Western Australia where she undertook regional mapping. “It was from there, and having written a couple of papers that were structurally oriented, that I started working as a consultant in 2006. I’ve been a consultant structural geologist ever since. I always wanted to be a structural geologist – I did my Masters in that and half of my (PhD) thesis was structural.”

Work practices have changed since the mid-1990s when she was out on the drilling rigs working at Darlot Gold Mine before doing her PhD: “You had to provide your own clothes then and I used to go to St Vinnies and buy a whole lot of old clothes as no uniforms were provided.” When she began her PhD and was going underground in Canada she was virtually the only woman...but says there were always fewer women underground over there than here in Australia.

The high point of her working life happened only a few weeks ago when she was awarded the Geological Society of Australia’s A.B. Edwards Medal for the best economic geology paper in the Australian Journal of Earth Sciences for 2017 (https://doi.org/10.1080/08120992.2017.1272492). For Sarah, this medal was certainly worth its weight in gold.

Sarah sees the future of her line of geology as evolving gradually into one where much more work is carried out remotely, and notes that BHP already has some pits where no humans go into. “There are advantages but in some ways it worries me because we are getting further and further away from the actual rocks. We are losing our structural geology because that requires hands on rocks.” Yet, she says if she were to move back to her home country of New Zealand the advantage would be that she could work remotely by computer. She has some words of wisdom for young geologists starting out on their careers: “Right from the start identify what you really like doing – in geology there are so many different fields – and start doing it early. Don’t leave it for five years. Make it your passion and follow your gut instincts. If you look ahead at your boss and you don’t like what they’re doing, if you can see what their day is, it doesn’t get any better. Make those decisions... If you want to follow a technical route – because it’s way more fun – you really have to push to follow that path.”

Sometimes Sarah has moved sideways and jumped ship at times to avoid the management roles because she’s wanted to stay in a technical role: “You get sucked in... they want to make you a boss...!”

As to life outside the workplace, Sarah emphasises that she likes a quiet life, walking her two dogs – and doing mosaics. She explains: “I used to collect china from the old goldfields when I was working on mapping – there were lots of bags of old china from the old tips and bottle dumps...my sister’s an artist and my father was an artist. I think that’s why I went into structural geology because it’s very visual. Most of the time during my working day I end up drawing cartoons!”
CODES PHD COHORT INCREASES WITH NEW ARRIVALS

During the past five months a further five PhD students have joined CODES, bringing the total number of PhD students working with us to 47. These students continue to play a vital role in the operation of CODES by carrying out important research within our six programs and the TMVC.

**PHD STUDENT** | **START DATE** | **PROGRAM** | **PROJECT TOPIC**
--- | --- | --- | ---
Paulina Dobrowolska | July 2018 | Program 2 (CRC ORE), working with Mike Roach, Steve Walters and Ron Berry | ‘Mineralogical and textural controls on grade-by-size fractionation in porphyry copper deposits’; Paulina has worked for geological public sector organisations in Spain and Ireland.

Kyle Eastman | September 2018 | TMVC, Module 4 research team, working with Angela Escolme and Leyun Zhang | ‘Geological and geometallurgical characterisation of porphyry deposit alteration overprints’; Kyle recently completed a Masters at Montana Tech and brings to CODES significant experience in mineral identification, mapping and sampling.

Colin Jones | November 2018 | TMVC, working with Evan Orovian and David Cooke | ‘An integrated study on the geology, geochronology and genesis of the Devonian granites of eastern Tasmania.’ This study will examine the relationships between compositional zoning, magma mingling, and the magmatic to hydrothermal transition.

Javier Merrill | November 2018 | TMVC (Module 4), and Programs 2 and 6, working with Anita Farshbaker-Fox, Angela Escolme, Michael Roach and Matt Cracknell | ‘Identification and characterisation of geological domains for geometallurgical and geoenvironmental modelling’. Javier brings with him significant experience from CSIRO Chile in mining engineering, extractive metallurgy and geology.

Peter Berger | November 2018 | Program 1, working with Shaun Barker and David Cooke | ‘Understanding and predicting hypogene and supergene footprints of Carlin-type gold deposits using a hydrochemical modelling approach.’

New standout shirts for CODES students and staff

Staff and students from CODES will now be ‘highly visible’, whilst out and about doing their fieldwork in their new CODES branded, mine site-compliant work shirts! The cotton shirts, available in both ladies and men’s fit, have vents for hard geology in hot places, and are also personalised with an embroidered name. Look out for future mailouts if you’d like one yourself – very ‘on-trend’ in industry!

| Image 1024x768 to 1176x1313 |

Participating of the AMIRA P1153 Yerington field trip meeting: (L–R) Back row: Wolfram Schuh (Freeport), Debora Passos de Araujo (Rio Tinto), Richard Paterson (Rio Tinto), Mike Baker, Leyun Zhang, Radoslav Kehayov (Rio Tinto); Middle row: Aysha Ahmed, Paul Aignone (Rio Tinto), Angela Morais Rodrigues (Monash), Marisa Yabuki (NGM), Kyle Eastman, David Cooke, Ingenia Athabasca (Freeport), Kyle Lewis (Freeport); Front: Tim Ireland (First Quantum) behind grass, Emily Smyk.

Partnership with CODES – the world leaders in minerals geoscience research and training – in 2019 to add value to your company’s research dollar.

CODES’ collaborations with mining companies have increased substantially since our inception in 1989, during which time we have successfully built a team of world-class researchers with a wealth of knowledge and experience, and a focus on end-user driven outcomes.

Our improved package of partnership opportunities, introduced in 2017 and proving highly successful, has a variety of entry options that cater for the research and training needs of all levels of mining operations – from small to medium enterprises (SMEs) through to the major multinationals.

There are three basic options, starting at an affordable $26k per annum for the Silver Level, and rising to $54k and $60k respectively for the Gold and Platinum Levels, with benefits increasing in accordance with the level of investment. In addition, partnership opportunities for SMEs can be discussed on a case-by-case basis.

Many organisations have gained great benefit from tapping into this resource, and see significant value in CODES’ ability to tailor research projects to meet their individual requirements. Major benefits of an alliance with CODES include:

- Opportunities to focus research activities where they will have maximum impact for your organisation.
- Early-mover advantage when implementing research outcomes to enhance discovery potential and optimise existing reserves.
- One-on-one research projects tailored to company requirements.
- Access to world-class geoanalytical facilities.
- Facilitated engagement with our top geoscience graduates.
- Access to a comprehensive range of industry-focussed training courses – tailored to your requirements.

Download a copy of our Industry Partnership Program brochure at: http://www.utas.edu.au/codes/about-us/industry-partnership-program

or contact Professor David Cooke
+61 3 6226 7605 or DCooke@utas.edu.au

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CODES PhD students (L–R): Shawn Hood, Aysha Ahmed and Josh Phillips wearing the new custom-made CODES work shirts.

SOLUTIONS IN THE FIELD

| Image 1024x768 to 1176x1313 |

Geological and Metamorphic Research Centre (Geomarc) at CODES.

Graduates.

‘Ore-forming processes at high pressures and low temperatures: their implications for the genesis of high-grade ore deposits’; Javier brings with him significant experience from CSIRO Chile in mining engineering, extractive metallurgy and geology.

‘Identification and characterisation of geological domains for geometallurgical and geoenvironmental modelling’. Javier brings with him significant experience from CSIRO Chile in mining engineering, extractive metallurgy and geology.

‘Understanding and predicting hypogene and supergene footprints of Carlin-type gold deposits using a hydrochemical modelling approach.’

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OPEN DAY SUCCESS AGAIN!

Once again the UTAS Open Day in August proved a success with around 2,000 people visiting the Sandy Bay campus to check out what we do here. Earth Sciences and CODES staff played a big role in making the day one to remember, as you can see.

HADDOX FORRESTER KING MEDAL PRESENTATION

Professor David Cooke, Director of CODES, was presented with the Haddon Forrester King Medal in a ceremony at the Australian Academy of Science's Shine Dome in Canberra on 21 September 2018. The medal is awarded for life-long achievement and outstanding contribution to science. The event was attended by the Academy’s Chief Executive Anna-Maria Arabia, the Director of International Programs and Awards Nancy Pritchard, family and friends of Haddon Forrester King, and other esteemed members of the Academy. Also in attendance were several staff and students from CODES, and other friends, colleagues and family members of David Cooke. The medal was presented by Emeritus Professor Jim Williams (Academy Secretary, Physical Sciences). Paul Agnew from Rio Tinto spoke on behalf of the minerals industry.

The evening’s proceedings included a technical presentation by the awardee on ‘New advances in geochemical exploration—detecting the subtle, but giant, geochemical footprints of porphyry copper and gold deposits using mineral chemistry’. As part of the award, David Cooke has also conducted a speaking tour of Australia, including presentations in Melbourne (July), Canberra (September and November), Perth, Darwin, Townsville, Parkes and Brisbane (November).

From director to president...

Former CODES director Professor Bruce Gennell is the 2018 President of the Society of Economic Geologists. At the SEG's annual conference in Keystone, Colorado, held in September, Bruce gave his Presidential Address entitled ‘Discovery of metals: minerals geoscience in our society’. This presentation emphasised the need to incorporate minerals geoscience throughout the mining value chain and how important mineral resources are to our present society and into the future.

Jing on the red carpet!

CODES PhD candidate Jing Chen (fourth from left) pictured after receiving her prize for the best student talk on porphyry-skarn-epithermal deposits at the 14th National Conference on Mineral Resources of China, held in Dejiajuanghi, Hebei Province, China, during October. Jing received 1,000 Chinese Yuan as her prize; she was also asked to give a keynote speech at the conference. She has recently submitted her PhD thesis, which was entitled ‘The geology, mineralisation, alteration and structural evolution of Zijinshan ore field, Fujian Province, China’.

Women geologists come of age

The WIMNet event held at CODES on 24 October 2018 was highly successful with 55 people turning out to listen to the panel discussion. The panel was moderated by Hannah Couper (a former CODES Honours student). Panelists were Kathy Ehrg (BHP), Penny Sinclair (Vimy Resources), Mary Hewke (Hrazia Geoscience) and Shawn Hood (TMVC PhD student). The event was sponsored by AusIMM, UTAS and the SEG Student Chapter. PhD student Ayesha Ahmed, who took the photo, said it was the best discussion she had ever been part of, and it ran way over time!
Following the success of the Ores in Magmatic Arcs – Indonesia short course in 2017, CODES is again offering this highly popular two-week course for our Master of Economic Geology students and other interested industry participants.

With the growing importance of the western Pacific for exploration, mining, and research, and revival of the mining and exploration industries, there is a need for relevant training on research and exploration skills in the magmatic arc environment. The only comprehensive training currently available is in the USA. To fill this gap in the western Pacific, and to address the differences in geological and environmental conditions in this region, we have designed our course on this important suite of deposits.

The course – which will visit Sumbawa, Lombok and East Java – has a strong focus on field observations and hands-on practical skills, supported by an understanding of theoretical aspects. The full spectrum of deposits in magmatic arc settings will be covered, thus addressing the need for familiarity with the diversity of mineralisation encountered in this setting. The course presenters have detailed familiarity with the deposits as both explorers and researchers, and are uniquely equipped to deliver the skills and insights needed by participants.

COURSE PRESENTERS

David Cooke: Director of CODES, Director of the TMVC, and Professor of Geochemistry at CODES
Adi Maryono: Vice President of Exploration at J Resources, based in Indonesia, and a senior adjunct researcher at CODES
Noel White: a professor at Hefei University of Technology in China, and adjunct professor at CODES and at James Cook University, who has worked in industry for over 40 years
Lejun Zhang: Research Fellow at CODES, specialising in the application of alteration mineral chemistry
Rachel Harrison: an independent consultant exploration geologist, based for the past decade in Indonesia and who recently completed a PhD at CODES
Iryanto Rompo: a field-based geologist with more than seven years’ experience exploring in the lithocap environment on the island of Lombok, Indonesia

• The pre-field workshop, which is optional for CODES Masters students, will be held at Gadjah Mada University, Yogyakarta, Indonesia.
• The field-based short course will require students to arrive in Lombok, Indonesia, on Thursday 7 March, with the course beginning the following day.

A detailed flyer covering the itinerary, costs and payment options will be available very soon on the CODES website: www.utas.edu.au/codes

For further information, please email:
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OR
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Lejun.Zhang@utas.edu.au