

ORE SOLUTIONS

NEWSLETTER OF **CODES** CENTRE FOR ORE DEPOSIT AND EARTH SCIENCES

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CODES/AMIRA RESEARCH OUTCOMES BENEFIT INDUSTRY



The CODES research trip to the Yerington porphyry copper mining district in Nevada in May led by Professor David Cooke, Associate Professor Lejun Zhang and Dr Mike Baker incorporated an extended field trip for P1249 sponsor representatives. This photo was taken on Day 3 of the field trip: Dr Lejun Zhang (left) is talking to participants about the lithocap environment exposed in the Buckskin Range.

In early May, Professor David Cooke, Dr Lejun Zhang and Dr Mike Baker travelled to Reno, Nevada, in the USA, to host the eighth Amira Global P1249 Sponsors' Review Meeting. The research meeting was followed by a four-day field trip led by the three CODES researchers to the world-renowned Yerington porphyry copper mining district in northern Nevada, where P1249 sponsor representatives were shown how the research outcomes

of prior CODES-led Amira footprints projects can be implemented for the benefit of field-based exploration activities.

Following the P1249 Sponsors' Review Meeting held in Reno on 12 May, Professor Cooke, Dr Zhang and Dr Baker had the opportunity to revisit the Yerington porphyry copper mining district in northern Nevada, as part of a CODES researcher-led technology transfer field trip with several P1249 sponsor company representatives.

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FROM THE DIRECTOR

Professor David Cooke outlines some of the exciting upcoming projects that CODES is about to embark upon – including Dr Sheree Armistead's sediment-hosted Cu project and her DECRA, and Rebecca Carey's Future Fellowship, as well as planned industry collaborations.

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CODES CONTACTS

CODES DIRECTOR

David Cooke

Ph: +61 3 6226 7605

d.cooke@utas.edu.au

MANAGER, CODES Analytical Laboratories

Jeffrey Oalman

Ph: +61 6226 1775

Jeffrey.Oalman@utas.edu.au

CODES Analytical Laboratories:

CODES.Labs@utas.edu.au

LEADERS, PROGRAM 1

Ore Deposits and Mineral Exploration

Mike Baker and Lejun Zhang

Ph: +61 3 6226 7210/7211

Michael.Baker@utas.edu.au

Lejun.Zhang@utas.edu.au

LEADERS, PROGRAM 2

Geometallurgy and Geoenvironment

Angela Escolme and Owen Missen

Ph: +61 3 6226 2664/7620

angela.escolme@utas.edu.au

Owen.Missen@utas.edu.au

LEADERS, PROGRAM 3

Sedimentation, Tectonics and Earth Evolution

Robert Scott and Jeff Steadman

Ph: +61 3 6226 2786/5554

Robert.Scott@utas.edu.au

Jeffrey.Steadman@utas.edu.au

LEADERS, PROGRAM 4

Magmatic and Volcanic Processes

Rebecca Carey and Martin Jutzeler

Ph: +61 3 6226 2987/2406

Rebecca.Carey@utas.edu.au

Martin.Jutzeler@utas.edu.au

LEADERS, PROGRAM 5

Analytical Research

Ivan Belousov and Jeffrey Oalman

Ph: +61 3 6226 7489/1775

Ivan.Belousov@utas.edu.au

Jeffrey.Oalman@utas.edu.au

LEADERS, PROGRAM 6

Geophysics and Computational Geosciences

Matt Cracknell and Paula Montoya

Ph: +61 3 6226 2481/0491 978 404

M.J.Cracknell@utas.edu.au

Paula.MontoyaLopera@utas.edu.au

NEWSLETTER EDITOR

Caroline Mordaunt

caroline.mordaunt@utas.edu.au

CODES – Centre for Ore Deposit
and Earth Sciences

University of Tasmania

PO Box 807, Sandy Bay,
Tasmania 7006, Australia

Ph: +61 3 6226 2472

utas.edu.au/codes

CODES.info@utas.edu.au

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Professor David Cooke (left) presenting an overview of the Yerington district from the Yerington porphyry copper deposit open pit overlook on Day 1 of the Nevada field trip organised by CODES for Amira and industry representatives.

The Yerington district has been the site of significant research and exploration since the beginning of the twentieth century and is a geologically significant mining region known for its well-preserved porphyry copper systems and extensive magmatic-hydrothermal history. It hosts several major copper deposits, including the Yerington, Ann Mason and Bear deposits, which formed during the Middle to Late Jurassic as a result of subduction-related magmatism.

The district is notable for its exceptional exposure of the deep roots of a porphyry system due to Miocene-age tilting and unroofing, offering rare insights into the vertical architecture of porphyry copper deposits from the plutonic roots to the epithermal environment. Additionally, the district has substantial economic potential, with the Ann Mason porphyry copper deposit considered one of the largest undeveloped copper resources in North America and making it a focus for ongoing research as part of the Amira P1249 footprints project.

FOUR-DAY FIELD TRIP TO YERINGTON

The four-day field trip included members of the P1249 research team (three from CODES plus Lakehead University Masters student, Chase Turner) and 14 other participants from Amira International and P1249 sponsors companies, including

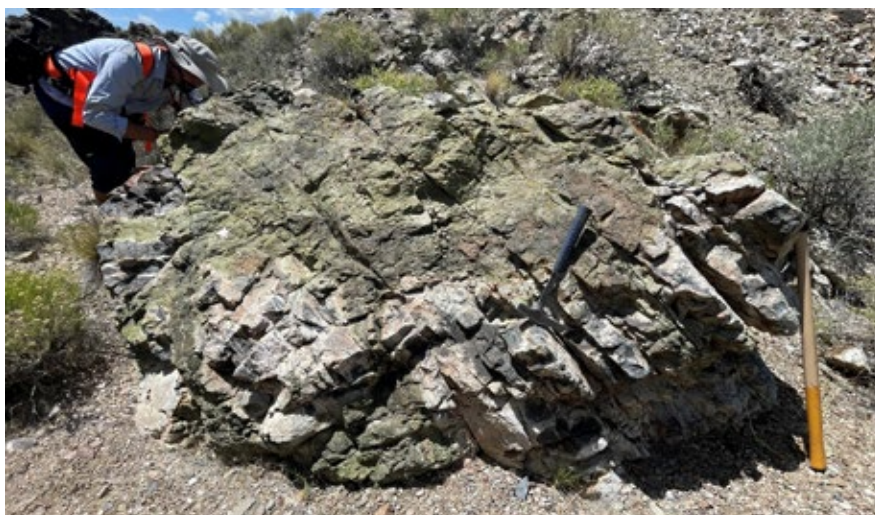
representatives from AngloGold Ashanti, Newmont and Rio Tinto.

Day 1 included an overview of the Yerington district geology and mining history, conveniently viewed from the overlook to the Yerington open pit, before encroaching thunderstorms chased the group from the field and back to Yerington for some hastily arranged presentations on skarn and epithermal alteration and mineralisation.

On **Day 2**, field trip participants were taken on a transect through the Ann Mason porphyry deposit, viewing deep exposures of sodic-calcic alteration through to shallower exposures of propylitic and phyllic alteration in the Singatse Range. This was followed by a visit to Southwest Critical Materials' (SCM) Pumpkin Hollow IOCG deposit, where participants were able to view drillcore and sample some take-home examples of IOCG mineralisation with the blessing of SCM mine staff.

Day 3 of the field trip involved a tour through the upflow zone of an exposed lithocap in the Buckskin Range, believed to represent the uppermost portion of the Yerington porphyry district based on prior research conducted by the Amira footprints project research team.

The **final day** of the field trip involved a visit to outcrops associated with the Casting Copper skarn deposit and endoskarn associated with the unmineralised Shamrock batholith.



Epidote-rich endoskarn in Shamrock monzonite, Singatse Range.



Example of epidote-albite alteration in the McLeod Hill monzodiorite near the Ann Mason porphyry copper deposit, Singatse Range.

Feedback from industry participants was overwhelmingly positive, while this field trip also provided CODES researchers with the opportunity to discuss further collaboration on P1249 study sites.

Dr Mike Baker said of the trip to Nevada:

"Our recent P1249 field trip to the Yerington district was a great success! It provided a unique opportunity for us to share research findings from our Amira footprints projects directly in the field, and to engage with our industry sponsors over the geology and evolution of this world-class porphyry system. The collaborative discussions in front of the rocks helped strengthen our research-industry links and sparked some valuable new ideas."

AMIRA GLOBAL P1249 EXPLAINED

The five-year Amira Global P1249 project 'Exploring, characterising, and optimising exploring complex orebodies – Upscaling orebody knowledge to add value across the mining value chain' entered its fourth year in 2025.

The project provides sponsors with new tools for recognising proximity to high-grade ore, and new tools, methods and workflows for translating and upscaling mineralogical, geochemical and hyperspectral data into quantitative mineralogy for complex orebodies of copper, gold and other critical metals.

P1249 is focussed on transition zones – the alteration domains that extend from the orebody into the surrounding unmineralised rocks. Although the primary focus of the project is on porphyry, epithermal, carbonate replacement and skarn deposits, the project also has active sub-projects studying Mt Isa-style Cu, IOCG, orogenic Au, Ni-Cu-PGE and VHMS deposits.



Amira P1249 Yerington field trip participants on the final day of the trip pictured at the Macarthur porphyry copper deposit, Singatse Range. (Photo courtesy Trevor Burr, AngloGold Ashanti)

MEET THE NEWEST ADDITIONS TO THE CODES PHD COHORT!

Here we introduce five of our most recent PhD students and their projects, which range from volcanology puzzles in Iceland and the Kermadec Arc/Rangitāhua to IOCG research in Sweden and everything in between.



JESSICA ASKEW

Supervisors: Sebastien Meffre, David Cooke, Yamila Cajal, Tristan Wells (Fortescue)

Project title: *Genesis, characterisation, and geochronology of the Cargo deposit, NSW, Australia*

Funding: Waratah Minerals Ltd, UTAS, Department of Education

Jessica's PhD project focuses on the Cargo Cu-Au-Mo prospect in central New South Wales, Australia, located within the highly endowed Macquarie Arc. The project aims to constrain the timing and controls on mineralisation at Cargo by integrating detailed paragenetic, petrological, and geochronological data.



Jessica Askew joined CODES to do her PhD at the start of 2025 and is undertaking a study of the Cargo deposit in New South Wales.



CODES PhD Catherine Brown in Iceland undertaking fieldwork; she's investigating the eruption dynamics of the 871 CE Landnámsslag (Settlement Layer) from Torfajökull.

Despite a long history of exploration, the genetic model and resource potential at Cargo remain poorly constrained. This study seeks to resolve key ambiguities by linking mineralisation with intrusive phases and alteration events, with broader implications for exploration targeting across the Molong Volcanic Belt. Work to date has included relogging of legacy core, detailed petrography of mineralised and unmineralised lithologies, and generation of a U-Pb age dataset from monazite, apatite and zircon. Cargo's complex volcanic-intrusive stratigraphy, overprinting alteration, and breccia development make it a unique and underexplored test case for porphyry-epithermal transitions within the arc.

"This project has pushed me to think deeper, work smarter, and chase questions that don't have easy answers. It's a privilege to explore the Cargo system and contribute to unravelling one of the Macquarie Arc's most enigmatic prospects."



CATHERINE BROWN

Supervisors: Rebecca Carey, Jeff Oalmann, Jess Trofimovs (QUT)

Project title: *Volcanic rock properties*

Funding: UTAS

Catherine's PhD research investigates the eruption dynamics of the 871 CE Landnámsslag (Settlement Layer) from Torfajökull, Iceland. Her project zeroes in on the silicic portion of this culturally significant eruption, which coincided with the Norse settlement of Iceland. Catherine is on a mission to unravel the eruption dynamics preserved in the deposit which includes investigating any explosive-effusive hybrid activity that could link the widespread tephra deposit to the associated obsidian lava flow.

In her first 10 months, Catherine has braved two field seasons in Iceland, racking up three months of battling sideways sleet, digging through frozen pumice, and pleading with medial and distal deposits to give up their secrets. This season, she's turning her focus to the near-vent region, where she's conducting detailed stratigraphic mapping to decipher how the eruption unfolded. Early results hint at complex, multiple eruptive phases – and just enough hybrid activity to keep things spicy. Through a mix of stubborn fieldwork in the mud and rain, lab analysis and geological sleuthing, Catherine is piecing together a historical volcanological puzzle. She recently shared her initial findings at the IAVCEI scientific assembly in Geneva – where the volcanic research was just as hot as the unexpected heatwave.

"Fieldwork in Iceland has been a dream. I've loved the challenge of navigating frozen lava fields, collaborating with a brilliant team, and exploring such a culturally and scientifically rich eruption. Working from Brisbane, with my university in Tasmania and a field site in Iceland definitely has its logistical challenges, but UTAS has offered me incredible opportunities."



FRANCISCO CUADRA AMARO

Supervisors: Mike Baker, Matt Cracknell, Julie Hunt

Project title: Nautanen IOCG deposit: Geometallurgical program

Funding: UTAS, Boliden Mineral AB, Amira P1249

Francisco joined CODES in late 2024 as part of the Amira P1249 project to develop a geometallurgical program for the Nautanen North IOCG deposit in northern Sweden, currently owned by Boliden and at the feasibility stage. This study falls within Module 2 of the Amira P1249 project, which aims



CODES PhD student Francisco Cuadra Amaro entering the Arctic Circle to visit mines in northern Sweden and Finland during a field trip while studying for his EMerald Masters in Europe.

to develop methods and workflows for upscaling and combining textural, mineralogical and mineral chemistry data for complex orebody characterisation and domaining.

The first part of his research begins by constructing a mineralogical model that integrates whole-rock assays with up-to-date geological and alteration logging and mapping. After analysing the preliminary model and site data, he will aim to develop an efficient workflow. Within this framework, samples will be selected based on end members, which are distinct ore-type examples at the extremes of deposit variability in lithology, texture and mineralogy, ensuring that characterisation targets the most representative material.

Once end members are defined and characterised, the second phase of the research involves selecting representative samples for targeted metallurgical testing. All resulting data will be compiled into a geometallurgical matrix that links deposit variability to processing performance and guides the optimisation of extraction and processing strategies, enhancing resource recovery and supporting the sustainable development of Nautanen North.

"It has been a great experience at CODES so far, with many networking opportunities and a hardworking team that has allowed me to explore new ideas, advance my research, and grow as a professional every day, for which I am very grateful."



CATHERINE LIT

Supervisors: Martin Jutzeler, Rebecca Carey, Ivan Belousov

Project title: *Regional tephra geochemical fingerprinting and volcanic facies analysis in the Kermadec Arc/Rangitāhua*

Funding: ARC Discovery, UTAS

Submarine volcanic eruptions are usually not observed and are often difficult to study because they are underwater. Unlike volcanoes on land which are more easily accessible, observable and generally well-studied, submarine volcanoes are influenced by the surrounding water mass. The pressure from the overlying water column significantly affects their eruptions, while oceanographic processes influence the transport and deposition of their products.

The key focus of Cat's research project is to contribute to the better understanding of submarine volcanoes. Specifically, she is investigating a chain of submarine volcanoes in the ocean north of New Zealand called the Kermadec Arc. Her goal is to study the characteristics and properties of tiny tephra (fragmented

volcanic products) particles from marine sediment layers located 100 km from the volcanoes.

Cat's approach involves the use of geochemistry and radiogenic C-14 dating to match the tephra with the known volcanoes of the Kermadec Arc. This will contribute to the volcanic history and tephrochronology of the region. In addition, she also aims to study the sedimentary facies and stratigraphic relationships of these tephra layers to determine how these volcanic products were transported away from the volcano within the marine environment.

Finally, she will study the morphology of the tephra particles to investigate the possible eruption mechanisms that produced these tephra fragments.

"I am very grateful to have this opportunity to be able to study at CODES and do research on a topic that I am very interested in – volcanoes!"



SHOUCHUN YU

Supervisors: Sebastien Meffre, Jeff Steadman, Matt Cracknell

Project title: *Mineral geochemistry of IOCG deposits*

Funding: UTAS, IOCG³

Shouchun's project examines mineral geochemistry in Australian IOCG deposits, including the Arthur Metamorphic Complex (Alpine prospect, Tasmania), Gawler Craton (Hillside, Prominent Hill, Con Ryan, South Australia) and Cloncurry District (Ernest Henry, E1, Queensland).

Part of the IOCG³ project led by Dr Jeff Steadman, it aims to identify trace element signatures in pyrite, magnetite, hematite, epidote, and carbonate minerals for orebody vectoring, fertility prediction and genetic model refinement.



PhD student Shouchun Yu at the Rock Pond Graphite open pit deposit at Adirondacks Mountains Region, New York, USA, during his Masters project in 2023.

Shouchun employs petrography, SEM-based automated mineralogy and LA-ICP-MS. LA-ICP-MS maps reveal elemental zoning in pyrite, reflecting temperature and chemical variability during crystal growth. Unsupervised machine learning clusters these maps to assess compositional complexity across deposits. Preliminary results show clusters correlating with orebody proximity at Ernest Henry, Hillside and Prominent Hill. Some clusters are deposit-specific, while others appear across multiple sites. Similar clusters in Hillside/Prominent Hill and Ernest Henry/E1 suggest shared geological and fluid compositions. This research enhances the understanding of IOCG deposit formation and aids exploration targeting. Further analysis will refine these models, improving predictive capabilities for mineralisation.

"I'm honoured to pursue my PhD at CODES with such an inspiring team of supervisors, staff and peers. Beyond research, the opportunities for specialised courses and field trips enrich my learning, providing unique experiences and collaborations. This supportive environment fuels my growth, and I'm grateful to contribute to and learn from this dynamic community."



Catherine Lit on a field trip to the Reventador volcano, Ecuador, prior to starting her PhD at CODES.

INDUSTRY AND ACADEMIC VISITS

STRATEGIC ENERGY RESOURCES (SER) VISITS CODES TO DISCUSS FUTURE STRATEGIES

Dr Jeff Steadman (centre) examines drill core samples from the Isa North project area with Neil Chalmers (left, SER Exploration Manager) and David DeTata (SER Managing Director).

Mr Chalmers and Mr DeTata visited CODES on 7–8 May as part of a project sponsor meeting to review work completed and discuss future research strategies. Results to date have confirmed the presence of Cu mineralisation in the project area and identified alteration assemblages that are consistent with iron oxide copper-gold (IOCG) deposit models, including high-temperature Ca-Fe mineralogy (e.g., diopside with actinolite overgrowths) and subsequent lower-temperature alteration (e.g., actinolite



replaced by chlorite in veins hosting copper sulfides). Magnetite is locally abundant in the project area, together with minor to moderate pyrite.

This work is part of the new 'Mineral chemistry of the Isa North project' in Queensland led by Dr Jeff Steadman.

EXPERT INVITED SPEAKERS FOR CODES SHORT COURSE

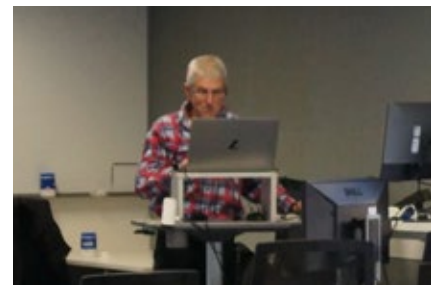
Speakers for the CODES Ore Deposit Geochemistry, Hydrology and Geochronology Masters short course, which ran in June and July, included visitors from several outside organisations. CODES was delighted to host these highly regarded geologists on the Sandy Bay campus:



Professor Lesley Wyborn (ANU) talks about Proterozoic granites during the first week of the Ore Deposit Geochemistry short course.



Dr Phil Blevin (Chief Geoscientist and Head of the Geological Survey of NSW), presenting on mineral deposits associated with granites during the first week of the course.



Dr Scott Halley (Mineral Mapping) talks about classifying rock compositions during the fourth day of the two-week course.



Professor Nick Oliver (HCOVGlobal) speaks about fluid flow and mineralisation location in hydrothermal systems during the second week of the course.



Dr Justin Milliard (AngloGold Ashanti) also spoke during the second week of the course on the topic of 'Structural controls on epithermal and Carlin systems'.

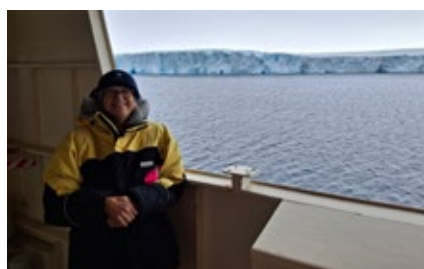


Dr John Walshe (Honorary Research Fellow, CSIRO Mineral Resources) spoke on the penultimate day of the course and talked about 'Mapping S & C isotopic gradients in Late Archean Au deposits'.

TESTING TIMES FOR THE *NUYINA* IN ANTARCTICA



The big picture: science crew on the helideck of the RSV *Nuyina* amongst the ice during the Denman Glacier Voyage to Antarctica in March and April 2025. Karin Orth is standing at front left, wearing gloves that incorporate fluoro pink (Photo: Pete Harmsen/AAD)



Dr Karin Orth onboard the RSV *Nuyina* at the edge of the Denman Glacier (Photo: Christian Pagal). The proximity to the glacier results in the seas being calmer than further out to sea.

Dr Karin Orth (CODES/ES Adjunct researcher) was part of the Denman Glacier Voyage to Antarctica during March and April 2025 onboard the RSV *Nuyina*, Australia's new icebreaker.

The voyage was the first science-only voyage undertaken by the *Nuyina* and the first to the Denman Glacier area for 10 years. It was part of the AAPP with scientists from AAD, ACEAS and SAEF. The voyage tested the ship's state-of-the-art laboratories and capabilities to the full extent, investigating atmosphere, water, sediment, rocks and biota in the Denman Glacier and Shackleton Iceshelf areas of Eastern Antarctica. Karin's main role was to identify dredged and sampled rocks as part of the ACEAS (University of Tasmania) team.



Karin, with Jim Trihey (left) and Neve Clippendale (right), both students from the University of Tasmania, sorting glacially deposited rocks scooped from the seafloor as bycatch from benthic trawls. (Photo: Katharina Hochmuth)

KNOW YOUR ACRONYMS:

AAD = Australian Antarctic Division

AAPP = Australian Antarctic Program Partnership

ACEAS = Australian Centre for Excellence in Antarctic Science

SAEF = Securing Antarctica's Environmental Future

MORE GRANT SUCCESS FOR CODES PHDS!

FUSEINI ATANGA

Project title: *Deposit characterisation and exploration vectors for the Akyem orogenic gold deposit, Ghana*

Grant: SEG Student Research Grant – Hugh E. McKinstry Fund

Amount: USD \$2,500

"I am grateful to the SEG for awarding me this grant. The funding will support in-situ sulfur isotope analysis using the Sensitive High-Resolution Ion Microprobe (SHRIMP) at the Australian National University (ANU). This analysis aims to determine the origin of the main ore-hosting mineral

(pyrite) at the Akyem deposit, and to investigate the role of organic matter in the formation of hydrothermal orogenic gold deposits in the region.

"Carbonaceous matter plays a key role in such systems by facilitating gold concentration through bacterial process, enabling gold solubilisation as hydrocarbon phase metal, and promoting gold precipitation. I am excited to uncover the insights this analysis will provide and to compare the results with those from other known deposits in similar terranes in southern Ghana."



CODES PhD student Fuseini Atanga examining drill core during his second fieldwork trip to the Akyem facility in Ghana.

EMRECAN YURDAKUL

Project title: *Orebody knowledge of the Western Tharsis Cu-Au deposit, Tasmania: implications for ore processing and mineral exploration*

Grant: SEG Student Research Grant – Hugo T. Dummett Fund

Amount: USD \$5,000

"I am pleased to have received an SEG Student Research Grant from the Hugo T. Dummett Fund for 2025. This is a significant achievement for my ongoing PhD study within the CODES Regional Research Collaboration Project, and will provide funding for

high-precision dating of mineralisation at the Western Tharsis deposit within the Mount Lyell district, western Tasmania. The complex deformation history of the district makes it almost impossible to yield high-precision ages



CODES PhD student Emrekan Yurdakul mapping on yet another rainy day in the Mount Lyell district, western Tasmania, in 2024.

with typical mineral dating techniques. In the grant application, we proposed Re-Os dating of molybdenite separated from phyllic-altered copper mineralised rocks at Western Tharsis. The Re-Os isotopic system in molybdenite is resistant to chemical resetting by high-temperature alteration and metamorphism and may provide us with an accurate age for mineralisation.

"I, together with my supervisors Dr Robert Scott, Dr Lejun Zhang and Dr Mike Baker, worked hard to secure this grant, and we thank the SEG Foundation for this funding and the research opportunity it provides."

SYNCHROTRON: The proof is in the picture

In the last issue we brought you news of CODES' success in securing an in-kind grant from ANSTO (the Australian Nuclear Science and Technology Organisation) worth \$131,136. In early April 2025, CODES PhD student Angela Costa, along with three CODES researchers, travelled to Clayton in Victoria to the Australian Synchrotron to undertake research at the research facility's XFM beamline. The work focused on characterising trace element zoning and Eu oxidation states in scheelite crystals from the Dolphin Tungsten skarn deposit.



L-R: Wei Li (Monash University visiting researcher), Dr Owen Missen, Joel Brugger (Monash University), Angela Costa, Dr Yamila Cajal and Dr Carlos Carrasco Godoy at the ANSTO Australian Synchrotron during April 2025.

FURTHER SYNCHROTRON SUCCESS

We have recently heard that Dr Yamila Cajal has been successful in her application for beamtime at the Australian Synchrotron, and will be taking up this opportunity in coming months. Her time at the synchrotron will be used to map zircons in order to understand ore-forming processes.

AN UNCONVENTIONAL ACADEMIC AT CODES

Dr Angela Escolme has travelled full circle and now teaches the course that inspired her to undertake a PhD at CODES back in 2013...she describes herself as an unconventional academic as she's very much into applied research and spent several years working FIFO for AngloGold Ashanti at Sunrise Dam before making the move to a university life.

I'd been working in industry for almost four years and was thinking about returning to academia to study a PhD when, in 2012, a mentor suggested that I should try and get down to Hobart for a geometallurgy short course and check CODES out: 'go down to Tassie and work with the best', he urged. Fast forward 15 years, including a three-year break for parental leave, and I'm now preparing to deliver that same geometallurgy course in my position here as Senior Lecturer in Economic Geology and Geometallurgy.

My academic journey in geology began with a Master of Earth Sciences (with Hons) at the University of Manchester, during which time I also completed an overseas exchange to the University of Toronto, Canada. It was in Canada that my eyes were opened to the opportunities in the minerals industry for a geologist with a travel bug.

Since childhood I've been inexplicably drawn to Australia, perhaps watching too many repeats of *Crocodile Dundee*. So, following graduation, I backpacked the long way round to Perth for an internship with the CSIRO Minerals & Mining Division. This experience was another significant influence where I was exposed to the possibilities of numerical modelling, cutting-edge technology and applied research. Like anyone in their mid-twenties with a student debt, I jumped at the chance for FIFO work in WA. I'd spend the next four years working with AngloGold Ashanti at their Sunrise Dam operation on regional, brownfields and underground exploration.



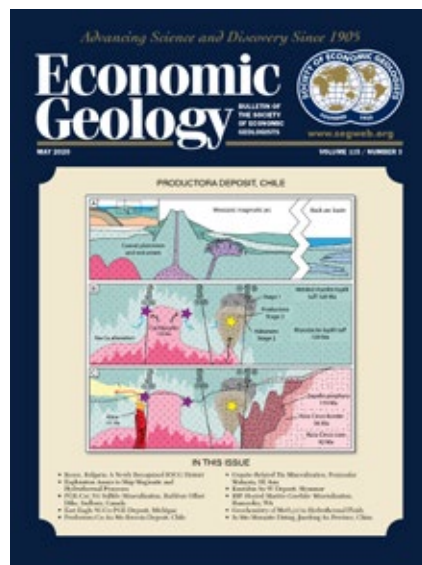
THE MOVE TO TASMANIA

Itchy feet and a hungry mind had me relocate to Tasmania in 2013 where I undertook a PhD titled 'Geology, geochemistry and geometallurgy of the Productora Cu-Au-Mo deposit, Chile' supervised by Professor David Cooke, Associate Professor Ron Berry and Dr Julie Hunt. Working closely with Hot Chili Ltd, the project explored the enigmatic deposit and its genetic origins as well as developed novel techniques to calculate mineralogy from geochemistry – an approach now being applied much more widely. I believe this combination of traditional economic geology studies and application to orebody knowledge is a good model for applied postgraduate research. I set myself a goal to get a publication figure onto the cover of the journal *Economic Geology* – having two papers from the project published, both with cover figures, was very rewarding after the hard yards.

Like many a geologist before us, my partner Josh and I came to Tassie to study and stayed for the lifestyle, which for us looks like a small beef farm and a yacht – neither of which we really have time for! Following my PhD, I took a postdoc position within

the Transforming the Mining Value Chain research hub as deputy lead for Theme 2: Optimising geometallurgical prediction. Despite considering myself an unconventional academic with my propensity for applied research, I jumped at the opportunity for a staff position with Earth Sciences/CODES.

It's fair to say that working within the TMVC, and, in particular, leading a module of the Amira P1202 Project



Angela was thrilled to have figures from her research chosen for the cover of *Economic Geology* in 2019 and 2020. This one is from May 2020.



Angela and Dr Mike Baker doing fieldwork in 2019 at BHP's Spence copper mine in Chile as part of the Amira P1202 Module 4 project.

(Far-field and near-mine footprints: finding and defining the next generation of Tier 1 ore deposits – Module 4: The Transition Zone), has been a career highlight.

During that project I had the privilege of working with some stellar students at both Honours and PhD level who made remarkable contributions to our understanding of porphyry transition zones (that's the region between a deep potassic core and shallow epithermal environment; Erik Fabreschi, Rhiannon Jones, Yi Sun, Jaime Osorio, Takeshy Coaquira) and how we can better characterise the texture and mineralogy of the rocks (Javier Merrill, Angela Rodrigues).

The project was also formative for me personally in terms of developing research project design and management skills, as well as advancing my expertise and experience in economic geology and orebody knowledge through working on world-class deposits – not to mention keeping that travel bug happy!

CODES: PART TWO

Coming back in 2025 in a part-time capacity with two small children at home has been the start of a new chapter with new expectations and ambitions. I've been focused on getting up to speed with all the exciting projects that have taken off during my absence and planning the 2025 delivery of the Economic Geology Masters Short Course, KEA711 Geometallurgy. I'm really excited about the course this year as we aim to keep pace with the rapidly developing field of geometallurgy – which has become far more mainstream within industry since the course's inception in 2012. The course has always had a strong foundation of teaching introductory metallurgy and statistics for geologists and exploring characterisation techniques.

This year we will expand our content on geometallurgy program design, mineralogy prediction (something close to my heart!) and critical metals with a combination of lectures,

practicals and panel discussions. It will be a valuable course for anyone in the resources value chain!

It's great to see many more geometallurgy and orebody knowledge-flavoured projects on the books at CODES that are also very diverse in their objectives – I think this is a great reflection of the value that our industry research partners see in developing workflows and techniques in this field. Looking forward, I'll be working closely with the CODES team and industry to develop impactful solutions to help resolve the ever-present challenge of geological uncertainty in resources. I often lament that for a minerals industry, we could do a lot better at understanding deposit-wide mineralogy! My research continues to be focused on how we can improve predictions of mineralogy, and with so many tools and techniques available, how we extract knowledge from those datasets to reveal more about rock behaviour and properties in the mining value chain.

WHERE ARE THEY NOW?

With experience across exploration, mining and research, Dr Ayesha Ahmed has built up a huge amount of experience – from early exploration feasibility studies to the thrill of gold discovery – and has recently set up her own independent geosciences consultancy, based in Vancouver.

SOLVING CRITICAL EXPLORATION AND MINING CHALLENGES MOTIVATES AYESHA



DR AYESHA AHMED

**Regeneration Enterprises Inc.
Director – Site Evaluations
and Advancement**

**Independent consultant,
Envision Geoscience Inc.**

PhD completed at CODES in August 2019, titled 'Epidote and chlorite mineral chemistry from the Yerington porphyry copper district, USA – genetic and exploration implications' (supervised by Professor David Cooke, Dr Michael Baker and Dr Evan Orován)

What is your current job/employment and your work responsibilities?

I joined Regeneration Enterprises Inc. in mid-July. My role is focused on evaluating mine waste reprocessing and restoration opportunities across the globe – from stakeholder engagement, to economic evaluation, site characterisation and into feasibility. It's a dynamic and exciting role that blends geology, geometallurgy, environment, policy and community dialogue.

Alongside this, I run Envision Geoscience Inc. (consulting@envisiongeoscience.com), providing geology and applied geochemistry expertise to mining companies and service providers.

Previously I worked for six years at Teck Resources Limited, most recently as the *Manager Geoscience – Orebody Knowledge* based in Vancouver. In that role, I led a multidisciplinary team of experts including chemists, geologists and database specialists, to develop innovative geoscience solutions for Teck's advanced projects and operations. Our work spanned geochemical method selection, data QAQC, database management, development of predictive machine learning models, 3D geological modelling, automated logging and technology trials.

Beyond delivering technical solutions, my team played a pivotal role in

shaping geoscience and geochemistry best practices across the company, ensuring geoscientists had the knowledge and tools needed for effective targeting, core logging, sampling and data analysis.

I thrived on the breadth of work and the collaboration with experts across multiple disciplines. I had the privilege of working across various deposit types – including porphyry, sediment-hosted massive sulfide, steel-making coal and magmatic-Ni – while supporting projects at every stage, from early exploration to feasibility studies and production. Beyond geology, I collaborated with specialists in metallurgy, environmental science, geotechnical engineering, and community engagement, as well as external service providers, to develop integrated solutions for the company and its projects.



Ayesha reviewing drill core at the Schaft Creek deposit, British Columbia, with bear dog Odin. They are called bear dogs because they are trained to protect the camp and alert camp residents to bears.



Time out: Ayesha Ahmed, her husband Shawn, and their son Jibreel at a waterfall near Mendenhall Glacier, Juneau, Alaska, June 2024.

One of the aspects of the role I valued most was leading a portfolio of innovation initiatives. My team continuously sought ways to reduce costs, improve workflows and minimise technical risks by integrating new methodologies and technologies.

As an independent consultant, I'm energised by the opportunity to tackle diverse projects, and help companies solve critical challenges in exploration and mining. The variety keeps every day dynamic, offering fresh perspectives and exciting problem-solving opportunities.

How did you get there/your past roles and how they shaped your path?

My path has been shaped by years of diverse experiences across exploration, mining and research. It all started with my BSc at the University of British Columbia (UBC) in 2007, where I spent every summer in the field – first as a soil sampler, then as a logging geologist. Those early roles provided hands-on industry exposure, helped build my professional network and, of course, kept my pockets full of cash for beer and chicken wings (proven brain food).

Seeking deeper expertise, I pursued a Masters degree at UBC's Mineral Deposits Research Unit, focusing on

hydrothermal alteration in Carlin-type gold deposits. This research introduced me to the vast world of clay minerals and the field-portable tools used to analyse them – knowledge that would become invaluable throughout my career.

After my Masters, I took a contract position as a production geologist at the Minto Cu-Au-Ag Mine in Canada's Yukon Territory. While I knew production geology wasn't my long-term goal, the experience helped me connect exploration to orebody modelling and mining, and understand the urgency of grade control and the production environment.

In 2010 I moved to Western Australia, taking on a project generation role at Gold Fields' St Ives gold camp. Living in the outback and working alongside world-renowned greenstone gold experts was a defining chapter. Five years of exploration and (successful) discovery left me with more questions than answers about ore deposit exploration, so I returned to academia in 2016, joining CODES to collaborate with Professor Dave Cooke on the Amira P1153 Green Rocks project and undertake a PhD.

My time at CODES proved instrumental in shaping my next steps. Through the Amira project, I engaged with sponsor

companies via meetings, site visits and field trips, allowing me to learn from industry experts, but also showcase my skills directly to future employers. One of the sponsor companies was Teck Resources, and following my PhD I took a position with them based in Vancouver as a Senior Project Geochemist.

Your career highpoint/greatest achievement to date/source of greatest satisfaction as a geologist?

One of the most thrilling milestones in my career has been contributing to the discovery of the Invincible deposit in the Gold Fields' St Ives gold camp in Western Australia. As part of the team that drilled the first holes into this >4 MOz blind deposit beneath a salt lake, I experienced firsthand the exhilaration of uncovering something truly significant. Staying with the project for years afterwards, I had the unique opportunity to develop its conceptual and 3D geological model – an experience that deepened my understanding of deposit formation and refined my approach to geoscience. Few moments compare to the excitement of watching a driller pull core from the tube and seeing sunlight glint off visible gold: a tangible sign of success after months of analysis and anticipation.

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Running is one of Ayesha's passions; here she's pictured with her dog Demi on Vancouver's Sunshine Coast, an area where she often undertakes mountain trail runs.

Beyond discovery, my greatest source of satisfaction comes from sharing knowledge and mentoring the next generation of geoscientists. Seeing geologists take the initiative, apply new tools and push technological boundaries to solve industry challenges is immensely rewarding.

What did you specialise in at CODES and how did CODES help you to get where you are? What did you enjoy most about CODES?

As part of the Amira P1153 project, I specialised in using epidote, chlorite, tourmaline and zircon mineral chemistry for porphyry fertility assessments, vectoring and targeting. We also focused on developing rapid, field-ready tools to support porphyry exploration. This work deepened my understanding of the key factors in porphyry formation and their field expressions, equipping me with a strong skill set to visually identify and quantify porphyry characteristics.

What I loved most about CODES was the direct relationship of project research to industry applications. I always knew I wanted to go back to industry after my PhD, and it was critical that whatever research

I did had a direct link back to the exploration and mining industry. CODES allowed me to do a deep dive into a specific topic while ensuring that the outcomes were applicable to my future career direction.

How has the industry changed since you were at CODES? And how do you see it developing in the future?

Today's professionals are expected to wear many hats, not just in technical domains like data analysis and deposit modelling, but also in project management, budgeting, health and safety, and community engagement. This is a marked shift from the more narrowly defined geoscience roles that were common prior to the 2000s. For those just entering the field, it can be challenging to know where to invest their time and how to build a meaningful career path.

A prime example of this shift is the growing influence of machine learning and AI. While these technologies were only beginning to gain traction when I left CODES in 2019, they've since become integral to how we approach geoscience problems. This is particularly true in predictive modelling, where small datasets

are extrapolated to inform broader decision-making. Geoscientists don't need to be data scientists, but understanding how these tools fit into exploration and production is becoming essential.

That said, there's still a gap in how we adopt these technologies. While machine learning is increasingly acknowledged as valuable, there remains hesitation when it comes to investing in workflow development and implementation. Training around where and how value is created is lacking, and that is exactly where institutions like CODES play a vital role. By strengthening the bridge between academia and industry, they can help the next generation of geoscientists unlock the full potential of these emerging tools.

Words of wisdom for up-and-coming geologists graduating from CODES?

My advice is to get as much practical experience as possible across the mining value chain in as many deposits and deposit types as possible. My career has benefited from understanding the broader context of industry challenges. Working in production and orebody knowledge environments helped me grasp the ultimate goal of generative exploration, while the agility, creativity and optimism required in exploration allowed me to approach operational challenges with a fresh perspective.

Having prior industry experience made my PhD at CODES far more impactful, providing purpose, context and a clear understanding of how academic research translates into real-world applications.

Little-known facts about you?

During my PhD, some friends and I took up running as a way to manage stress, eventually training for several half marathons – including the Point to Pinnacle, a gruelling 21-km climb to the top of Mount Wellington in Tasmania! Running remains a passion (not that I've gotten any better or faster). These days, I often hit the North Shore mountains of Vancouver for mountain trail runs with my dog, Demi.

NEW LASER EQUIPMENT RESTORES CODES ANALYTICAL LABS TO FULL CAPACITY

Lead Laboratory Analyst Dr Carlos Carrasco Godoy gives an update on the newly installed laser at CODES.

The lab team is excited to announce that the new Coherent COMPex excimer laser has been successfully installed in Lab D of the CODES Analytical Laboratories and has been performing exceptionally since its commissioning last month. This state-of-the-art equipment replaces our previous excimer laser, which served the laboratory faithfully for nearly a decade before experiencing technical issues.

The new laser represents a significant upgrade for our laser ablation ICP-MS capabilities, particularly enhancing our sulphide analysis work. With improved beam stability and energy output, researchers can now achieve better analytical results with increased confidence in their data quality.

Staff and students are already taking full advantage of having the laboratory operational again, with several projects that were previously on hold now moving forward. The enhanced



Moving the new laser from its pallet onto the forklift jack after having refitted the old base onto the new equipment proved easier said than done. L-R: Phil Hortin (CSL) pulls while Carlos Carrasco Godoy and Sean Sarikas (CSL) push. The laser was made in Germany and weighs over 300 kg.

capabilities open new possibilities for detailed mineral characterisation, trace element determination, elemental mapping and lead isotopes in sulphide ores, supporting both fundamental research, and industry and government collaborations.

This investment reinforces CODES' commitment to maintaining cutting-edge analytical facilities and ensures

our research community has access to high-quality instrumentation for world-class research in economic geology and mineral exploration.

Please reach out to Dr Ivan Belousov or Dr Alice MacDonald if you have any projects involving sulphide analysis!

Email: ivan.belousov@utas.edu.au
or alice.macdonald@utas.edu.au

BOOK PROPOSAL SIGNED AND SEALED BY SPRINGER NATURE!!

A publishing deal has been signed for the upcoming book *Tasmanian aquatic plants: emerging roles in mining practices*. This book, by Dr Tatiana Lobato de Magalhães (Universidad Autónoma de Querétaro, UAQ), Dr Paula Montoya (CODES), Dr Owen

Missen (CODES/ES), Dr Mohammad Fathi (CODES) and Melanie Becerril Bartolo (UAQ), has been approved for publication in the Springer Nature book series **Wetlands: Ecology, Conservation and Management**. Dr Lobato de Magalhães has been an editorial board member of this book series since 2020.

The book will fill a gap in the scientific knowledge about the potential use of aquatic plants as a tool in mining activities – providing the dual benefits of environmental remediation and potential metal extraction – facing current challenges around the increased demand for critical minerals, climate change and environmental issues. It will comprise a compendium of Tasmanian aquatic plants found in



Eleocharis sphacelata R. Br. (Cyperaceae) with *Baloskion tetraphyllum* (Labill.) B.G. Briggs & L.A.S. Johnso (Restionaceae) in a natural wetland. (Photos: Tatiana Lobato de Magalhães)



Eleocharis sphacelata R. Br. (Cyperaceae) and *Typha orientalis* C. Presl (Typhaceae) observed in a mine pond associated with tailings.

inland freshwater systems, highlighting aspects of their ecology such as endemism, rarity, endangered status, occurrence, cytotype, species age, and use of each species. Additionally, it will provide a literature review on the remediation uses and chemistry signatures of target species collected in western Tasmania's natural wetlands and mining sites. Publication is due in late 2026 or early 2027.

FIELDWORK CONTINUES ACROSS THE CONTINENT – AND BEYOND

Important fieldwork has been carried out within Australia during the past few months as has a familiarisation trip for undergraduates to New Caledonia. Senior researchers also visited Nevada in May (see the article on page 1 about this trip).

PAJINGO, QUEENSLAND

April 2025

In April, Honours student Anthony Tai travelled to central Queensland as part of his research project about carbonate species in and around low sulfidation epithermal veins at Pajingo deposit. He was accompanied by some of his supervisors – Lejun Zhang, Noel White and Paul Cromie (Pajingo).

The two-week trip began with an overview of the exploration activities at Pajingo, followed by a workshop on epithermal deposits, covering the genesis, characteristics and exploration techniques. The group also compared Pajingo's drill cores to samples from worldwide deposits.



CODES Honours student Anthony Tai undertaking research in April at the Pajingo Mine core facility for his Honours project.

After the workshop concluded, Anthony began his core logging in earnest. The working days started early at 4:50am and ended at 5:00pm. The friendly crew at Pajingo gave plenty of technical assistance and guidance, while mochaccino, hand lens, tropical insects, frogs and a very vocal crow became his daily company.

Anthony's Honours project is expected to complete by January 2026.

KING ISLAND, TASMANIA

5–6 June 2025

A new journey in scheelite/tungsten processing: Dr Mohammad Fathi and CODES PhD student Angela Costa recently visited the Dolphin Tungsten Mine and its processing facilities on King Island. The field trip provided valuable insights into current operations and opened up discussions around innovative processing approaches and potential research collaborations.

WESTERN TASMANIA

12–17 June 2025

As part of the 'Tasmanian aquatic plants as a new critical mineral tool' project, Dr Tatiana Lobato de Magalhães (visiting researcher from Mexico) and Dr Paula Montoya undertook a field trip to western Tasmania in mid-June. This fieldwork aimed to identify mine sites where aquatic plants spontaneously colonise tailings and species growing in constructed wetlands related to mining operations as well as in natural wetlands within the West Coast Range landscape.

They visited the Hellyer, Henty, Mt Lyell, Renison and Rosebery mine sites, alongside natural wetlands such



Dr Mohammad Fathi (left) with CODES PhD student Angela Costa pictured during fieldwork to the Dolphin Tungsten Mine on King Island in June.

as Lake Langdon, Lake Selina and the King River Delta. They collected 202 samples, including water, sediment, plant parts (above- and below-ground tissues), and botanical specimens to screen metal concentrations in the environment and plant tissues, followed by phytoremediation indices calculation.

During the fieldwork, the upcoming book *Tasmanian aquatic plants: emerging roles in mining practices* was introduced to the managers and environmental representatives who hosted our visit, and all of them received it very well. We observed several aquatic plant species, particularly from the Cyperaceae, Haloragaceae, Juncaceae, Plantaginaceae, Poaceae, Restiaceae and Typhaceae families, thriving in harsh environments with pH levels ranging from 2 to 12. Botanical vouchers were collected for species-level identification and will be herborised and deposited at the Tasmanian Herbarium (Authority



Plant collection out west: L-R: Dr Paula Montoya (CODES), Carol Steyn and Danica Lockett (both from MMG) visiting mine tailing ponds in western Tasmania. In the background are *Typha orientalis* C. Presl (Typhaceae), *Juncus pallidus* R. Br. (Juncaceae), and other aquatic plant species. (Photo: T. Lobato de Magalhães)

FL 25091, Department of Natural Resources and Environment). A follow-up trip is planned for November 2025 to revisit sites, collect samples for chemical analysis and reproductive plant parts (flowers, fruits or seeds) to support species identification and present preliminary results of

phytoremediation and biodiversity outcomes to the mining companies.

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This project is led by Dr Paula Montoya, Dr Tatiana Lobato de Magalhães (visiting researcher) and Dr Owen Missen as part of the Regional Research Collaboration (RRC).

ISLAND PARADISE: NEW CALEDONIA FIELD TRIP



The field trip group is pictured here with Lena Payandi from Fond Nickel (right) teaching students about rehabilitation and revegetation work at an abandoned Ni mine on Mt Dore, south of Noumea. (Photo courtesy Yael Guyomard from Service Géologique de la Nouvelle Calédonie)

NEW CALEDONIA

26 June–4 July

A group of second- and third-year Earth Sciences students plus one Honours student travelled to New Caledonia in late June for a much-anticipated two-week field trip accompanied by ES/CODES staff members Professor Sebastien Meffre and Dr Sheree Armistead. Their visit

encompassed visits to mine sites, geological formations, DIMENC (the government agency that covers mining activity) and the Université de la Nouvelle Calédonie.

The highlights of the trip were the interactions between our students and local geoscientists, including university postgraduate students and staff from the university,

government and other non-government organisations. These increased the students' awareness of diverse viewpoints related to geosciences including mining and mineral exploration, environmental sustainability, geological hazards and broader cultural traditions.

ANOTHER BUSY CONFERENCE SCHEDULE FOR CODES

CODES researchers and students made tracks to China and four countries in Europe in the past three months to attend conferences. Professor David Cooke notes the vast numbers of online attendees (up to 25,000 at one time) for sessions of the conference in China, which he and other CODES staff and industry speakers attended. There is huge interest out there in the work that CODES is doing.

AGES 2025

8–9 April 2025, Alice Springs

The AGES (Annual Geoscience Exploration Seminar) conference is the NT's premier annual geology conference, featuring presentations from the NT Geological Survey, its partners, and the exploration industry on new geoscience research and outcomes of ongoing or completed projects. PhD student Damian Braize presented the results of new geochronology showing that Cu-Au ore in the Warrego deposit (> 1 million ounces Au produced, largest known deposit in the Tennant Creek Mineral Field) contained monazite and xenotime (rare earth phosphates) that formed during two different periods (1820–1840 Ma and 1710–1720 Ma). This reinforces other dating results from earlier studies that suggest a multistage formation for the gold and copper ores at Tennant Creek and has major implications for mineral exploration in the area.

Another interesting result from Damian's work is that the younger of the two periods overlaps with the



Dr Anthony Harris (Newmont) addresses the floor at the MLYB conference in Hefei, China. The event was attended by around 200 participants in person with thousands more online.

crystallisation age of the Warrego Granite, which intrudes the orebody at depth and is part of a larger suite of felsic intrusions that are present throughout the Tennant Creek area. These may be prospective for Cu-Au mineralisation elsewhere in the region.

INTERNATIONAL CONFERENCE ON METALLOGENY OF THE MIDDLE AND LOWER YANGTZE METALLOGENIC BELT

20–22 June 2025, Hefei, China

In June 2025, staff and adjuncts from CODES participated in the two-day International Conference on Metallogeny of the Middle and Lower Yangtze metallogenic belt (MLYB), held in Hefei, China. Presentations were given by globally renowned Chinese academics, including Jingwen Mao, Zengqian Hou, Meifu Zhou and Huayong Chen, along with rising stars of the Chinese economic geology community. CODES staff Professor David Cooke and Associate Professor Lejun Zhang, CODES adjunct Professor Noel White, along with industry speakers Adi Maryono and Dr Anthony Harris, and Zhaoshan Chang (Charles F. Fogarty Endowed Chair and Professor in Economic Geology at Colorado School of Mines, and former CODES staff member) were the invited international guest speakers. The conference was organised and convened by Professors Taofa Zhou and Yu Fan from Hefei

University of Technology, and involved approximately 200 participants who attended in-person, and up to 25,000 participants attending virtually for any given talk. Artificial Intelligence was used to provide direct translation of presentations, with some amusing mistranslations of geological jargon demonstrating that we are still in the early days of this application of AI (e.g., lithocap was translated to 'NASA cap'; 'APS minerals' to 'APS marinas').

The conference was held prior to the start of the two-week SEG student chapters field trip to the MLYB, which involved members of the CODES, Colorado School of Mines and Hefei University of Technology student chapters, along with industry sponsors, and academics from CODES and Hefei. This trip was ably led by Associate Professor Xin Xiao and Professor Yu Fan, and involved visits to a spectacular array of skarn deposits (Fe, Cu, Au, Zn-Pb-Ag), porphyry Cu-Au and IOA deposits, together with memorable cultural experiences and impressive visits to geological tourist parks. The conference provided all participants with an excellent introduction to the diversity and complexity of mineral deposits of the MLYB. All the international participants were impressed with the sustainability aspects of the mining operations, where we visited several sites where mining had been completed and the land returned to higher-value use by the local community as museums,



Associate Professor Lejun Zhang giving a talk at the well-attended conference in Hefei.

tourist parks, agricultural usage and urban development. I'd like to offer a huge thank you to our hosts Professors Taofa Zhou, Fan Yu, and Xiao Xin for all their hard efforts in organising and coordinating the conference and field excursion, and to the SEG student chapters at CODES, CSM and HFUT for their excellent collaborative efforts in organising such an inspiring, educational and enjoyable field trip.

IAVCEI 2025

29 June–4 July 2025, Geneva, Switzerland

Dr Yamila Cajal and Dr Martin Jutzeler both attended the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) conference in July 2025 in Geneva. They strengthened their networks and presented their research amongst a heat wave, chocolate and molten cheese. Yamila presented a poster on magma fertility in porphyries in central Chile, and Martin presented image analysis results from the ARC Linkage Project in western Tasmania, and geochemistry and GIS results on the Discovery Project in the Kermadec Arc. Martin also delivered a talk on pumice rafts identification at a pre-conference workshop on remote sensing.

ECROFI 2025

27 June–4 July 2025, Turin, Italy

Dr Ivan Belousov participated in the biennial ECROFI conference (European Current Research on Fluid and Melt



Dr Ivan Belousov pictured outside the ECROFI conference venue in Turin, northern Italy, in early July. He gave a talk titled 'Melt embayments in olivine – determination of magma ascent rates and tracing magma mixing processes'.



Dr Yamila Cajal and Dr Martin Jutzeler standing in the entrance to the 2025 IAVCEI conference, which was held in Geneva, Switzerland.

Inclusions) in Turin, northern Italy, from 27 June–4 July. Before the conference he attended a pre-conference workshop titled 'Fluid Inclusion Study: Principles and Application'. At the conference he gave a talk: 'Melt embayments in olivine – determination of magma ascent rates and tracing magma mixing processes'.

11TH INTERNATIONAL SUMMER SCHOOL OF SEDIMENTOLOGY 2025

4–12 July 2025, Bangor, Wales

CODES PhD student Shannon Frey recently attended the 11th IAS International Summer School in northwest Wales. Twenty sedimentology PhD students from institutions worldwide were selected to participate in the summer school, led by Drs Jaco Bass and Megan Baker. Seven days of fieldwork and classroom sessions, with additional discussions on renewable energy and critical metals, were provided by guest lecturers. The geology of northwest Wales is complex and varied, offering students a chance to observe nearly 700 Ma of geologic history in roughly 800 km². Students were exposed to classic glacial, fluvial, turbidite, and carbonate deposits, with additional focus on the complex sedimentology of hybrid event beds at the Aberystwyth Grits Group. The summer school offered an excellent opportunity to gain firsthand knowledge from two of the world's leading sedimentologists, as well as the opportunity to engage with peers from a wide variety of sedimentological backgrounds. The students also



Shannon Frey (left) sketches an outcrop at the Mynydd Parys copper mine during the recent IAS International Summer School in northwest Wales.

benefited from excellent weather and managed to avoid rain for the entire seven-day session.

GOLDSCHMIDT 2025

6–11 July, Prague 2025, Czech Republic

Goldschmidt is the world's premier conference in geochemistry, and this year three members from CODES attended: Dr Yamila Cajal, Dr Carlos Carrasco-Godoy and Dr Ivan Belousov, who all presented at the 'New advances in metallogenesis from magmatic-hydrothermal to basinal environments and their applications to exploration and metal recovery' session. Yamila presented some of her work on porphyry copper magma fertility; Carlos showed his research on porphyry copper prospectivity using detrital zircons, and Ivan presented his work on the use of micro-inclusions in exploration. They all received very good feedback from the other attendees. The conference was a great opportunity not only to showcase their work, but also to catch up with old collaborators and build new connections.



Dr Carlos Carrasco-Godoy and Dr Yamila Cajal at the Goldschmidt conference in Prague.

SEG STUDENT CHAPTER VISIT TO CHINA

CODES PhD student Poliana Salgado provides a summary of the recent SEG Student Chapter field trip to the Luzong, Edong, Tongling and Ningwu metallogenic districts in China, and thanks the many sponsors for facilitating this fascinating educational experience.

In late June, students and staff from CODES, the Colorado School of Mines (USA), and Hefei University of Technology (China) came together for a unique academic and cultural experience in one of the world's most significant metallogenic regions: the Middle and Lower Yangtze River Metallogenic Belt (MLYB) in China.

The trip began in Hefei with two days of technical talks during the International Conference on Metallogeny of the Middle and Lower Yangtze Metallogenic Belt. This provided participants with an overview of the region's geology and mineral systems, as well as a platform to exchange research and foster international collaboration.

Following the conference, the group embarked on a two-week field trip across the provinces of Anhui and Hubei, visiting the Luzong, Edong, Tongling and Ningwu metallogenic districts. The itinerary included a diverse array of mineralisation styles in porphyry to skarn systems, rich in copper, gold, tungsten, iron, and many more base and critical elements. These site visits offered invaluable opportunities to observe ore-forming processes up close and to discuss exploration strategies and geological challenges in different deposit types.

Beyond the geology, the visit also highlighted China's approach to mine development and sustainability. Visits to geological parks and mining museums illustrated the country's efforts in environmental rehabilitation and showcased the historical evolution of mining practices.

The group also immersed themselves in Chinese culture. A memorable highlight was the hike and overnight



Participants in the SEG Student Chapter field trip to China pictured on a visit to the touristic route of the Daye underground iron mine in the Huangshi National Mine Park, Tieshan district, China.



Group discussion with the field trip leaders Professor David Cooke and Associate Professor Xin Xiao about the drill core of the skarn zonation of the Yaojialing Zn-Au skarn-porphyry deposit, Tongling district, China.

stay on the iconic Yellow Mountain (Huangshan), famous for its granite peaks, ancient pines and breathtaking landscapes – an experience that beautifully blended geological wonder with cultural heritage.

The CODES, Colorado School of Mines and Hefei University of Technology SEG student chapters extend their sincere gratitude to sponsors Newmont, Rio Tinto, GRD Erdene, private sponsors, and the Society

of Economic Geologists for their generous financial support. Thanks to their contributions, more than 20 students were able to participate in this international visit to China, gaining valuable academic and cultural experiences. The initiative has, once more, helped strengthen global connections within the economic geology community and provided a unique platform for students to broaden their perspectives and build lasting professional relationships.

FAREWELL TO A TREASURED COLLEAGUE

Karen Huizing recently retired, and a morning tea was held on 29 May to acknowledge her many years of service and her unfailing ability to 'get things done' for the CODES/ES team. Karen started at CODES in 2009 and moved through a number of administrative roles before she became CODES' Administrative Support Officer in 2017 (reclassified to Executive Officer in January 2023).

In that position she played a key role in organising extensive and often highly complicated overseas travel for staff and students, welcoming new HRD students, sorting rooms and rock trays, travel expenses and catering. Often staying late to ensure that travel itineraries were locked in before deadlines and that CODES geologists would not be stranded without assistance in a remote location, she went above and beyond in all aspects of her job. In 2019, Karen was caught up in triaging the impact of civil unrest in South America, when she was overseas assisting with the CODES booth at the SEG Conference in Santiago that year. With only three days, and dodgy internet, Karen was able to help reschedule the first week of the Ores in Magmatic Arcs field short course from Ecuador to Peru for the 20 participants, book new ground transport and accommodation, and ensure that all participants had an



PhD student Angela Costa presents Karen with a selection of gifts from the PhD cohort.



The many gifts, cards and notes of appreciation from staff and students arrayed in Karen Huizing's office after her retirement morning tea function at CODES!

enjoyable, safe and memorable education experience during that time of escalating conflict.

David Cooke said: "Karen was a very popular and highly valued member of our team, beloved by staff, students and adjuncts alike. She is a problem-solver who gets things done professionally, efficiently, effectively and rapidly. Karen has always been a joy to work with, bringing kindness and support through some particularly challenging times, and always providing a smiling face to our students and staff as she helped them with their administrative needs.

"During the COVID lockdown, Karen took on the responsibility of checking in with our vulnerable and large cohort of international students on a weekly basis, which was a huge comfort and support for them – this is one of many demonstrations of her compassion and care for our students and broader team.

"Everyone at CODES is better off for having worked with Karen. We thank Karen enormously for everything she has done. We will miss her deeply, but fully understand that this is the right



Karen pictured with CODES Director Professor David Cooke holding a piece of breccia that was gifted to her by the CODES staff – and which will take pride of place in her home once it has been placed on a stand.

time for her and her partner to move on to an exciting and rewarding new time in their personal journey."

We wish Karen well in her retirement, which features many travel plans, plenty of gardening and spending time with her grandchildren. Thank you, Karen!

THE CODES PhD COHORT

ERIC THOMAS GALLEY MUSEUM OPEN DAY

17 APRIL 2025, QUEENSTOWN, WESTERN TASMANIA

CODES PhD student Emrecan Yurdakul writes:

"The Galley Museum at Queenstown is one of the learning destinations for the Children's University Tasmania and hosts an annual open event for children and their families. This year, I attended the event and shared my knowledge about the geology of western Tasmania using rocks and drill-rig equipment carefully selected by the CODES rock curator Izzy von Lichtan, with input from Dr Owen Missen. The visitors to our stand had a chance to see a simple model of a volcano, use geologic hand lenses to see ore minerals, and hear a brief geologic history of western Tasmania in an online presentation. The CODES/ES stand not only attracted children and their families, but also tourists of all ages who enjoyed exploring the museum during their Queenstown visit."



CODES PhD student Emrecan Yurdakul at the Galley Museum Open Day in Queenstown: he is pictured at the start of the day awaiting visitors to the event.



ANOTHER CODES PhD IS CROWNED!

Hannah Moore graduated in April 2025 and is pictured here with one of her supervisors, Dr Martin Jutzeler. Her thesis was titled 'Reconstructing eruption and transport processes of the 1886 basaltic Plinian eruption at Tarawera volcano, New Zealand'.

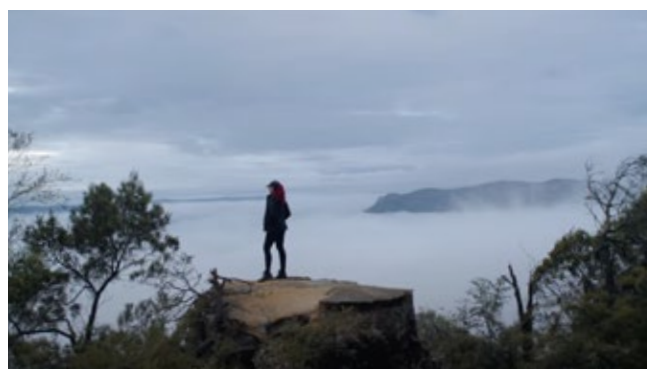
Hannah is now working in Western Australia as an educator with Australian Earth Science Education (AusEarthEd), designing and delivering hands-on Earth Science programs to schools across the state and helping inspire the next generation of scientists.

CODES PhD DREAMS BIG

Jessica Askew started her PhD at CODES – 'The characterisation and genesis of the Cargo deposit, NSW, Australia' – in January this year and so far she's loving it all.

She recently made an online ad for the outdoor retailer Mountain Designs. In it she paints an inspiring picture of what it's like to be a geologist and what motivates her to get out into the bush and look for that next big ore deposit. It's definitely worth taking a look – you can almost envisage the CODES logo as part of the finished video:

<https://www.youtube.com/watch?v=hL5IFNIlb6I>



A still from a Mountain Designs video ad featuring CODES PhD student Jessica Askew. The video was shot in New South Wales. (Photo: Matt Horspool, Vagary Studio)

CHANGING FACES

No new PhD students have started since January...but we have farewelled two of our hardworking professional staff – and taken on a replacement for one of them, with another to follow in coming weeks.

ARRIVALS



Olivia Parker joined the CODES team as Executive Officer and took up her role on 23 June, having previously worked in administrative roles within UTAS since November 2023. She has experience across a broad range of university departments including Chemistry, Maths and Physics, IMAS and GPSS. She prefers to be known as 'Parker', so that's what we will call her!

VISITORS



Assistant Professor Devsamridhi Arora is a visiting researcher from the University of Allahabad in India. She gave a talk in the CODES Autumn Seminar series titled 'What lies beneath the ice: Peeking into the hidden geological framework of the Amery Sector', and is collaborating with Dr Jodi Fox and Dr Jacqui Halpin, who are both former CODES/ES researchers now working at IMAS.

Please also see page 7 for visiting speakers who presented at the Geochemistry short course.

DEPARTURES



Karen Huizing retired from her position as Executive Officer at CODES at the end of May and is now pursuing her travel interests and enjoying time with her grandchildren. Karen has worked at UTAS/CODES since 2009; her ability to 'get stuff done', especially tricky overseas travel arrangements, was legendary.



Jonathon Traynor, who started at CODES/ES as Senior Technical Officer in March 2023, left his role in early June and has gone on to work as a Technical Officer at the UTAS College of Health and Medicine in the Medical Science Precinct in central Hobart.

BUILDING BLOCKS FOR EARTH SCIENCES

We are changing the way we teach Earth Sciences in the Bachelor of Science. The changes will increase hands-on and field-based activities and make the degree more accessible to students who are already employed or living in regional areas.

From February 2026, we will be teaching our second year units as three-week blocks in February and November. In 2027, we plan to change our third-year units. This will



Izzy von Lichten teaching a first-year unit to students at the Waterworks Reserve in Hobart during May this year.

enable people working in the minerals industry or in regional Australia to complete a BSc in Earth Sciences.

If you know someone who would like to enrol, please contact us. We are also seeking employers who would like to support this initiative, either through

professional development for employees or through targeted scholarships for regional students.

Please contact Professor Sebastien Meffre (sebastien.meffre@utas.edu.au) for enrolment or employer support enquiries.



**A MESSAGE
FROM THE
CODES
DIRECTOR,
PROFESSOR
DAVID COOKE**

Our team have been very busy over the past few months in the research space, progressing our existing projects and developing exciting new research initiatives. Dr Sheree Armistead is leading our new three-year sediment-hosted Cu research project and has been doing a great job in securing industry funding. We anticipate that this project will be starting in the new year and are currently welcoming additional sponsors.

Dr Paula Montoya has developed the Laramide exploration initiative with Amira (LAXI) and will be taking it to an Amira Roundtable session next month to further socialise the project proposal, and to seek input, collaborators and funding. Professor

Sebastien Meffre is leading the CODES contribution to the Earthbank project and is currently recruiting a research fellow to be part of that team. Several of our team are in the process of preparing Future Fellow, Discovery and DECRA applications for the upcoming final rounds of the Australia Research Council schemes.

Our ARC grant winners from 2024 (Associate Professor Rebecca Carey and Dr Sheree Armistead) are currently kicking off their Future Fellowship and DECRA projects. We also have new one-on-one industry collaborations commencing with Rio Tinto on zircon geochemistry, and with Right Resources on Cu-Au prospectivity. There are a couple of international research collaborations we have been invited to participate in, which makes this quite an exciting time as we initiate the next round of CODES research projects. We are always available to discuss research opportunities with industry and government partners across all aspects of the mining value chain, and also in

the fundamental research space, so please don't hesitate to reach out at any time to discuss research problems of mutual interest.

As noted elsewhere in this newsletter, Karen Huizing retired in late May. We commemorated Karen Huizing's amazing contributions to CODES at a very well-attended retirement celebration where there was an outpouring of appreciation and affection for Karen. I'd like to personally thank Karen for everything she has done for all of us, and for her friendship, kindness, support and advice throughout her time at CODES. Our staff and students are very sad that it's time for her to move on to the next phase of her life, but we are all thrilled that Karen and her partner Roly are having great fun on their travels as they start retirement. Karen's replacement, Olivia Parker, has now joined us and is doing a fantastic job at stepping into Karen's role – welcome to the team, Parker!

David Cooke

UPCOMING SHORT COURSES

GEODATA ANALYTICS (KEA713)

PART 1: 4 AUG–12 SEPT 2025;
PART 2 (INTENSIVE): 15–19 SEPT 2025;
PART 3: 22 SEPT–31 OCT 2025

This unit will provide industry-based geoscientists with an understanding of the fundamental concepts of database handling and manipulation, statistical analyses, pattern recognition and machine learning for the processing, analysis and modelling of large volumes of multivariate geoscience data. This unit will focus on rigorous approaches of the above methods for extracting and visualising meaningful information from geochemical, geophysical and geological information with applications for mineral exploration, ore extraction and processing, and waste management.

This unit is divided into three parts delivered online and in succession.

Unit leader: Dr Matt Cracknell

Delivery mode/location:

Online, delivered via a combination of pre-recorded content, 'live' lectures and discussion 'forums'

ORES IN MAGMATIC ARCS (KEA707)

11–25 OCTOBER 2025
(CHILE AND PERU)

A field-based unit which includes visits to world-class deposits, studies of the regional and local geology, and detailed evaluations of ore deposit characteristics, mineralisation styles and genetic models. Exploration techniques are discussed and evaluated.

Unit leaders: Professor David Cooke, Dr Yamila Cajal and Dr Mike Baker

Delivery mode/location:

Face-to-face, Chile and Peru

GEOMETALLURGY (KEA711)

27 OCT–1 NOV AND 24–28 NOV 2025

Geometallurgy involves a quantified and comprehensive approach to ore characterisation in terms of critical processing attributes: including blasting, crushing, grinding, liberation, recovery and environmental management. Key outcomes of improved geometallurgical

knowledge are improved forecasting, reduced technical risk, enhanced economic optimization of mineral production, and improved sustainability.

The unit introduces a range of techniques that will enhance the information that geologists produce in the mine environment that are relevant to mining engineers and metallurgists.

Unit leaders: Dr Angela Escolme, Dr Julie Hunt

Delivery mode/location:

Online

For more details about these courses see the course flyers at: www.utas.edu.au/codes/masters-short-courses

For further information about short courses in general, please email:
CODES.Info@utas.edu.au
OR Master of Economic Geology Program Co-ordinator, Dr Robert Scott:
Robert.Scott@utas.edu.au