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Annual Report 2025

ACKNOWLEDGEMENT OF COUNTRY

Aligned with the principles of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), we affirm our unwavering commitment to the rights and values of indigenous communities where mining activities are undertaken. This entails respecting their inherent right to self-determination, ensuring that their free, prior, and informed consent is obtained, preserving their cultural heritage, and guaranteeing redress and sustainable practices. We recognize the indispensable role of indigenous voices in these endeavors and pledge to uphold a transparent, inclusive, and mutually beneficial relationship in all mining engagements.

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MESSAGE FROM THE CHAIRMAN

MR. RAJ MATHIRAVEDU

CHAIR AMIRA GLOBAL

Dear Amira Members,

As Chairman of Amira Global, I am honoured to address you at the start of FY2026. Our journey since 1959 has been defined by collaboration, innovation, and a shared commitment to advancing the mineral industry.

Our Purpose and Values

At Amira Global, our purpose is clear: to enable the mineral industry to prosper by advancing knowledge, developing people, and delivering innovation. Integrity, collaboration, and innovation are at the heart of everything we do. By bringing together industry, academia, and government, we solve common problems and create lasting value for our members and stakeholders.

FY2025: Achievements and Impact

The past year marked a period of consolidation and growth. We refined our five discipline frameworks—Geoscience, Mining, Mineral Processing, Sustainability, and Innovation—ensuring they remain dynamic and responsive to industry needs. Our successful Exploration Managers' Conference (EMC 2025) was a testament to the power of our global network and active collaboration.

Looking Ahead: A Call to Action

As we enter FY2026, I invite each of you to actively shape our research agenda, champion innovation, and collaborate across borders. Your membership unlocks access to world-class research, global expertise, and a trusted network—empowering you to stay ahead in a rapidly changing industry.

Gratitude and Engagement

None of our achievements would be possible without your commitment, trust, and confidence. I am continually inspired by the dedication of our members and research teams. Special thanks to Vaughan Chamberlain, our CEO, whose leadership and passion have guided us through this year of consolidation, and to our management team and Board for their unwavering support. I encourage you to reach out directly with your ideas, questions, or concerns. Your feedback and active participation are vital as we set new standards for excellence and shape the future of our industry.

Closing

Thank you for your unwavering support and partnership. Together, we will not only meet the challenges ahead—we will define the future of the mineral industry.

Yours sincerely,

Mr. Raj Mathiravedu

Chairman of Amira Global Board

MESSAGE FROM THE CEO

MR VAUGHAN CHAMBERLAIN

AMIRA GLOBAL CEO

Dear Amira Members,

The 2024/25 year was a year of consolidation as we continued to develop our discipline frameworks. We expanded our thought leadership and worked with our members to understand their research needs and business prerogatives. The frameworks we developed last year remained live documents and continue to be adapted to reflect the drivers and needs of industry. The five frameworks, developed to date, are explored in more detail later in this report as are the multidisciplinary projects that bring together aspect of all five frameworks.

On a personal note, I extended my contract with Amira as I continued to relish the opportunity to work with the Amira team, our engaging members and cohort of researchers. The year saw several changes in the team with Anil Subramanya retiring and being persuaded to stay on in a strategic consulting role. The open GM Finance role was filled by Sean Robson, who rapidly became an integral member of the team. We expanded the program manager pool and were joined on contract by Tim Cross, a geoscientist with a wealth of operational experience. At the beginning of the year, in recognition of their contributions to the team we promoted Silvia Black and Hayley McGillivray to Senior Program managers.

In the geoscience's portfolio, highlights of the year saw P934C WAXI nearing its close, while the next iteration of SAXI was developed. We also saw P1335 GAXI continuing during the year. Meanwhile a series of round tables helped define P1332 East African Exploration Initiative (EAXI) and it is now ready for sponsorship. Several exciting projects have been added to the framework pipeline and will be ready for sponsorship in the new year.

Work continued on the Mining framework. The Mineral Processing framework saw significant efforts to further integrate research work and supplement the work done in P420. The Mineral Processing framework was presented to members and other stakeholders in July 2024 and P1345 Integrated Digital Modelling of Mineral Processing Circuit's is being developed for sponsorship in the new year. Amira is developing and launching a broad range of training modules for all disciplines. The first operational metallurgical training will take place in the second half of 2025.

This year also saw the conclusion of P1324 Circular Mine and P1288 Predicting Liquefaction continued as part of the sustainability framework. Other projects being developed under the sustainability framework include P1367 ESG reporting and P1374 Minerals Industrial Symbiosis Program – A Kalgoorlie Regional Case Study.

We are actively managing our project pipeline and the next fiscal year will see many programs and projects brought forward as they are developed via our very successful model. The model sees the Amira team leading the collaboration process which needs the active involvement of members and global research teams to define industry relevant programs supported by well-defined and executed projects.

Yours sincerely,
Mr Vaughan Chamberlain
Amira Global CEO

Who We Are

Amira is an independent global not-for-profit organisation representing members from the Mineral Resource industry. We seek to enhance, sustain and deliver transformational research and development, innovation and implementation to the benefit of society.

Identifying, recruiting and including globally leading solution providers (Mining Equipment Technology Services companies and research organisations) in collaborations to solve industry's challenges set by industry collaborations

We lead global collaborations leveraging on large scale research & innovation and de-fragmentation of research.

Our Purpose

Build Collaborations to …

ENHANCE

enhance standing of the Mineral Resource Industries amongst stakeholders locally and globally

SUSTAIN

sustainable development of the Mineral Resource Industries that is acceptable to society

DELIVER

delivery of new data, knowledge, technologies, products and services in order to help Members

Amira Global Values

GOVERNANCE

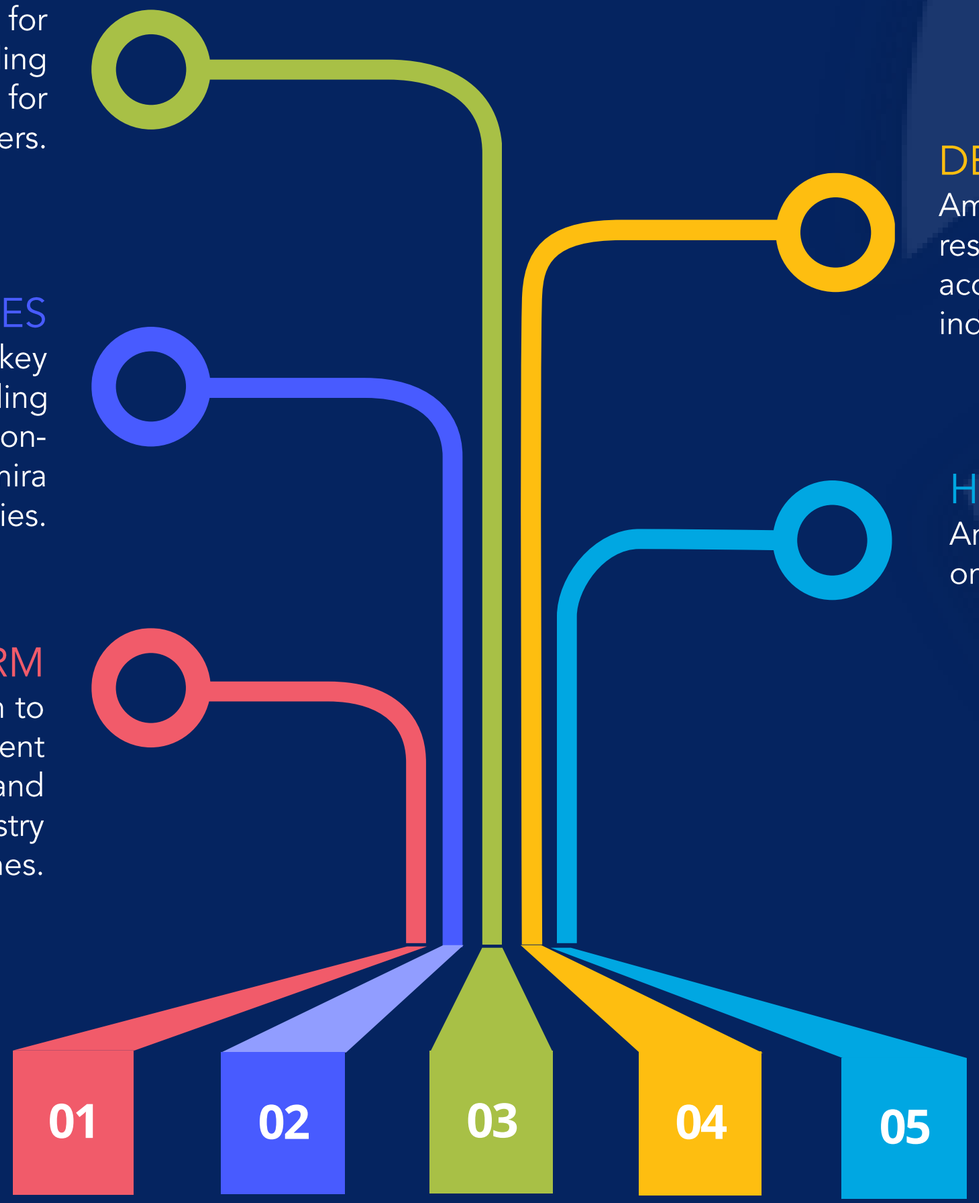
Amira has delivered a trusted platform for collaborative R&D for over 60 years including financial stewardship and transparency for funders.

GLOBAL ALLIANCES

Amira has provided a platform for key stakeholder alliance across the globe including research institutions, governmental and non-governmental interest groups, and Amira member producing and supply companies.

KNOWLEDGE PLATFORM

Amira is developing a knowledge platform to provide industry decision makers with efficient access to trusted, validated, verified, and aggregated outcomes from global industry R&D outcomes.



DEFRAGMENTED R&D+Innovation

Amira delivers a coordinated R&D+Innovation response to industry challenges, which accelerates dissemination and deployment into industry.

HIGH ROI ON R&D INVESTMENT

Amira's model provides a 15x to 20x multiplier on a company's investment in R&D+Innovatiion.

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Our highlights

Amira became an Affiliated Partner of the International Lithium Association (ILiA)

- Amira Global became an Affiliate Partner of the International Lithium Association (ILiA), further strengthening our global collaborations in the critical minerals sector. This partnership enhances Amira's engagement across the lithium value chain, supporting our mission to advance sustainable innovation and industry leadership.

MOU with Future Battery Industries CRC (FBI CRC)

- During the year, Amira Global formalised a Memorandum of Understanding with the Future Battery Industries CRC, reinforcing our commitment to advancing Australia's clean-energy and battery-mineral capabilities. This collaboration strengthens our role in the battery-value-chain ecosystem, supports our lithium and critical-minerals agenda, and delivers enhanced value for our members through shared innovation and strategic industry alignment

MOU with the Critical Minerals Association Australia (CMAA)

- Amira Global formalised a Memorandum of Understanding with the Critical Minerals Association Australia (CMAA), strengthening our strategic collaboration in the critical-minerals sector. This partnership will enhance joint advocacy, accelerate value-chain integration in Australia and beyond, and provide our members with expanded access to networks, policy-insight, and thought-leadership across the critical-minerals ecosystem

MOU with Kwame Nkrumah University of Technology KNUST

- Amira Global entered into a Memorandum of Agreement with KNUST on 8 January 2025, formalising our collaboration to advance mining-industry research, innovation and training across West Africa. The partnership will support the establishment of the Amira African Centre of Excellence at KNUST and enable the transfer of technology, skills development and joint research initiatives in sustainable mining practices and critical-minerals value chains

Amira Metallurgical Training Program and skills transfer at the AGA – Siguiri Mine Site , Guinea

- Amira Global, through the Amira Africa Center of Excellence (AACoE), has commenced a Metallurgical Training and Skills Transfer Program at the AGA–Siguiri Mine in Guinea. This initiative aims to deliver practical, competence-based training to enhance the technical capacity of the Siguiri processing plant team—an Amira member company. The program bridges the gap between academic research and real-world application, ensuring participants gain hands-on expertise aligned with the latest industry best practices. The initial phase focuses on Milling and Classification, Gravity Operations, and CIP/CIL Carbon Management. Under Amira's management, KNUST and JetRom are conducting a gap analysis and delivering targeted training to strengthen operational performance and industry readiness.

Amira Practical Mining And Engineering Skills Transfer – Flotation Training

- The recent five-day AMIRA flotation training workshop provided mining and metallurgical professionals with a practical, collaborative forum to enhance their understanding of flotation processes. This hybrid training workshop was held in-person at the Gallagher Convention Center, Gauteng, South Africa and online attendance, recorded ~300 participants from ~84 different institutions. Organized by AMIRA, a non-profit global catalyst bringing together researchers, practitioners, and suppliers, the training was structured to translate global best practices into industry application, specifically targeting professionals involved in flotation across the mining sector.

Our People

Introducing The Amira Team

AMIRA GLOBAL BOARD

Rajkumar Mathiravedu, B.Eng. Mechanical Engineering
M.S. Mechanical Engineering, MBA General Management
Group Executive and President Asia, Orica Digital Solutions

Mr Mathiravedu joined AMIRA International Limited as a non-executive Director in July 2022
He was appointed Chair of the Amira Global board in 2023

Rajkumar Mathiravedu

Mr Vaughan Chamberlain Master of Science in Engineering MEng; BSc Hons (Geology)
Founder, VG Advisory, Amira Global CEO

Mr Chamberlain joined AMIRA International as a non-executive Director in March 2023 and rejoined the board as an executive director in June 2025.

Vaughan Chamberlain

Kwasi Ampofo PhD Mineral Economics
Head of Metals and Mining, BloombergNEF

Dr Ampofo joined AMIRA International Limited as a non-executive Director in February 2022.

Kwasi Ampofo

Mr Mac Canby, BSc Geological Engineering, MSc Geology
Senior VP Exploration, Freeport-Mc-Mo-Ran Inc.

Mr Canby joined AMIRA International Limited as a non-executive Director in November 2019

Mac Canby

Dr Ronel Kappes BSc Engineering, PhD Metallurgical
Directory, Advisory to the CTO, Newmont Corporation

Dr Kappes joined AMIRA International Limited as a non-executive Director in June 2018. She is a member of Finance & Audit Committee. She is also Member of the nominations committee for AMIRA.

Dr Ronel Kappes

AMIRA GLOBAL BOARD

Dr Rikard Maki, PhD Mechanical Engineering, Head of Electrification and Automation, Boliden

Dr Maki joined AMIRA International Limited as a non-executive Director in May 2020

Dr Rikard Maki

Dr Jared Osborne PhD Chemical Engineering, Head of Technical Delivery, Rio Tinto Innovation

Dr Osborne joined AMIRA International Limited as a non-executive Director in November 2020

Dr Jared Osborne

Michael Ravella BSc Geology, Executive Vice President Innovation and Co-Founder, Veracio

Mr Ravella joined AMIRA International Limited as a non-executive Director in April 2021. He is a member of the Finance and Audit Committe

Michael Ravella

AMIRA AFRICA BOARD

Kwasi Ampofo PhD Mineral Economics
Head of Metals and Mining, BloombergNEF

Dr Ampofo joined AMIRA International Limited as a non-executive Director in February 2022.

Kwasi Ampofo

Mr Vaughan Chamberlain Master of Science in Engineering MEng; BSc Hons (Geology)
Founder, VG Advisory, Amira Global CEO

Mr Chamberlain joined AMIRA International as a non-executive Director in March 2023.

Vaughan Chamberlain

Helen Brume, Director & Global Head Project and Asset Based Finance African Export Import Bank

Mrs Brume joined AMIRA International Limited as a non-executive Director in February 2025.

Helen Brume

Eric Asubonteng, Accomplished Mining Executive with over eighteen years experience in Senior Management and Executive roles in the resources sector

Mr Asubonteng joined AMIRA International Limited as a non-executive Director in February 2025.

Eric Asubonteng

THE EXCUTIVE TEAM

Tony Anyimadu, GM Africa | VP Mineral Processings

Describe your role: Operationalize the Africa Board Strategy. Current Focus is to re-organize Amira Global Mineral Processing into 4 programs to include Energy, critical mineral processing, unit processing models extension (old p9), and Extractive Metallurgy; and (ii) embed P-ADI and ACoE to meet the needs of members.

Brief career biography: Tony graduated as a Metallurgical Engineer in 1993 and is an experienced Process Engineer with Anglo and AGA, spanning plat design, production, combined assurance and due diligence, operations and research management. He's been on advisory boards for institutions like UCT Chemical Engineering and SAMMRI and is dedicated to enhancing Africa's mineral value chain.

Country of origin: Ghana

Patricio Pastorelli, GM LATAM | Head of Global Alliances

Describe your role: Lead the strategic growth of Amira Global in the LATAM region, as well as the development of the global network of allies and partners to support collaboration for Amira Members.

Brief career biography: Patricio is a business leader with an extensive experience in innovation, sustainable business and ecosystem development within the minerals and metals industry. Prior to Amira, Patricio held managing roles in the Australian Trade and Investment Commission and Fundación Chile developing projects and business across the region.

Country of origin: Chile

Sean Robson, GM Australia | VP Finance

Describe your role: As Chief Financial Officer and General Manager Australasia at Amira Global, Sean oversees the organisation's financial strategy, performance, and governance to ensure sustainable growth and fiscal integrity. He also leads strategic growth initiatives across the Australasia region, supporting Amira's mission to advance collaborative innovation in the resources sector.

Brief career biography: With more than a decade of experience in research finance and leadership, Sean has held senior positions at Curtin University and the CSIRO. He is deeply committed to fostering environments that strengthen collaboration between industry, academia, and government. A Chartered Accountant, Sean also holds an MBA from Curtin University and a Bachelor of Commerce from the University of Western Australia.

Country of origin: Australia

PROGRAM MANAGERS

Dr Silvia Black, Senior Program Manager

Describe your role: Leading strategic initiatives by identifying emerging opportunities, fostering collaboration, developing and managing a diverse portfolio of global projects, programs and strategic collaborative initiatives, with Research & Innovation focusing on long-term sustainability across the mineral industry value chain. Currently Silvia is leading the strategic development of Amira Global's Sustainability framework.

Brief career biography: Silvia has a BSc (App. Chem.) degree from Curtin University, a Grad. Dip. (Food and Drug Analysis) from University of NSW and a PhD (Extractive Metallurgy) from Murdoch University. She has scientific, analytical and innovation expertise spanning over 35 years in the fields of mining, food, water, education, racing, and forensic and environmental science. With a large portion of her career leading minerals industry innovation teams, she has long lasting relationships fostering collaboration with government agencies, funding bodies, researchers, industry and industry bodies.

Country of origin: Argentina

Hayley McGillivray, Senior Program Manager

Describe your role: My role is to support Amira members to address complex challenges that no organisation can handle alone. With a particular passion for the Geoscience area, I enjoy managing the WAXI initiative and working on structures and strategies for new programs.

Brief career biography: Hayley has a background of ten years working as a Geologist in the Mining Industry. During this time, one of her focuses was managing research and development partnerships with research organisations and operational implementation of outcomes.
Over the last decade, Hayley has worked with small businesses and Research organisations, facilitating research knowledge transfer into industry. Hayley spent three years delivering the Federal Government Entrepreneurs Program- Innovation Connections. Hayley has extensive experience of research collaborations from Industry, Research and Program delivery perspectives and has built strong operational experience in Innovation, R&D and Commercialisation. Hayley is studying for her PhD in Industry-Research Collaborations.

Country of origin: England

PROGRAM MANAGERS

Bright Foli, Program Manager

Describe your role: Developing and managing projects/program through engagement with academia, industry and allied stakeholders. I support ongoing collaborative R&D projects globally, and I drive emerging programs in Africa.

Brief Career Biography: Bright holds a BSc Chemistry degree from the Kwame Nkrumah University of Science and Technology, Ghana, MSc. Oil and Gas Chemistry from the University of Aberdeen, UK and a Project Management Professional (PMP) certification. In the past 10years, he has worked on offshore oil production chemistry projects and implemented downstream fuel integrity programs for governments across the West and Central Africa regions.

Country of Origin: Ghana

Redeemina Comfort Bonnah, Program Manager

Describe your role: I oversee a global project portfolio, focusing on strategic and long-term initiatives which aim to promote sustainability across the entire mining industry value chain through collaborative projects. I also work to strengthen Amira's member presence, expand research alliances, and represent Amira during member engagements, prioritizing member needs.

Brief career biography: Redeemina holds a BSc. (Hons) in Minerals Engineering and an M.Eng. in Materials Science and Engineering. With over 9 years of experience, she has expertise in mining, and materials science and engineering. She has been involved in collaborative research projects in the mining industry in Ghana, particularly in metallurgy and tailings management establishing strong industry relationships in her capacity as a research fellow.

Country of origin: Ghana

Tim Cross, Program Manager

Describe your role: Working with researchers and mining/METS companies to imagine and build collaborative solutions to the challenges we're all facing right now with respect to safely and effectively finding and understanding orebodies.

Brief career biography: Aside from a brief stint in gold exploration that supported my undergraduate thesis (2008, Acadia University), most of my career has been in iron ore: exploration, modelling, mining and processing, across Canada and Australia. I started part-time contract work for Amira in November 2024 and moved to a nearly-full-time staff role in July 2025. The breadth and depth of the Program Manager role in Amira has been a real challenge for me, but my belief in the value of collaborative, multi-disciplinary thinking spurs me on.

Country of origin: Canada

AMIRA SUPPORT TEAM

Dr Anil Subramanya, Strategic Advisor

Describe your role: I provide high-level guidance to shape Amira's research and innovation strategy, ensuring it aligns with global priorities such as decarbonisation, critical minerals, and sustainable mining. I work closely with industry partners, government bodies, and research institutions to identify emerging opportunities, foster collaboration, and help position Amira at the forefront of transformative R&D that drives meaningful impact across the minerals sector.

Brief career biography: Anil holds a PhD in geochemistry and economic geology with 35 years of global experience, primarily in exploration and development. Passionate about sustainable industry development, he champions early STEM education to nurture talent in the minerals sector. He's known for fostering collaborations between research institutions, industry, and governments.

Country of origin: India

Ann Woolley, Global Support Manager

Describe your role: I provide support for all projects from inception to completion which includes project meetings, distributing of reports, presentations, and all other project information relevant to the project. I provide administrative support for the Amira RSA Board and the Amira Global Board. I provide staff training on our various systems and processes. I manage the South African office - accounts, memberships, and finances.

Brief career biography: Ann was a partner in a company Called Ridge Systems as administrative support. She has been with Amira since 2008.

Country of origin: South Africa

Jacqueline Russell, Project Support Officer & Office Manager

Describe your role: To provide support on project issues throughout the process and life of the project, as well as collaboration with colleagues in whatever is necessary and required. I maintain the databases in our systems related to contacts, contracts, interactions, documentation, and projects. Administratively, I manage legal documentation, financial information, and contracts.

Brief career biography: Jacky worked at CAP (Compañía de Aceros del Pacifico) as an assistant in the Stock department for almost 18 years. She was also in the Accounting and Finance departments of CAP as an assistant and eventually in the Presidency. She arrived at Amira in 2010 as a Project Support Officer.

Country of origin: Chile

AMIRA SUPPORT TEAM

Claud Bilson, Communication & Marketing Officer

Describe your role: In my role as a Marketing and Communication Specialist, I am responsible for crafting and executing effective marketing strategies across various platforms. This involves creating compelling content, monitoring analytics to gauge campaign effectiveness, and liaising with stakeholders to ensure cohesive messaging. Additionally, I manage our company's social media presence, engage in media relations, coordinate events, and oversee budget allocations. Through rigorous market research, I stay abreast of industry trends to ensure our strategies are current and impactful

Brief career biography: Claud is a graduate from Curtin University with a degree in Marketing & Management and a background in marketing

Country of origin: Ghana

Sumeet Yamdagni, Consultant

Describe your role: I integrate technical, commercial, and strategic insights to help identify and develop opportunities in new global markets. My work spans analysing industry needs, defining the innovation landscape, and building partnerships to bridge capability gaps.

Brief career biography: Sumeet is an innovator and entrepreneur with over 15 years of experience in deep tech innovation, spanning optical sensing, energy and space. He holds an M.Sc. Eng in instrumentation and is a MIT TR35 India awardee.

Country of origin: India

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Major Pipeline Programs

AMIRA THOUGHT LEADERSHIP: PROJECT DEVELOPMENT

collaborateore

Research Frameworks

- Geoscience Framework
- Mining Framework
- Mineral Processing Framework
- Sustainability Framework
- Innovation Framework

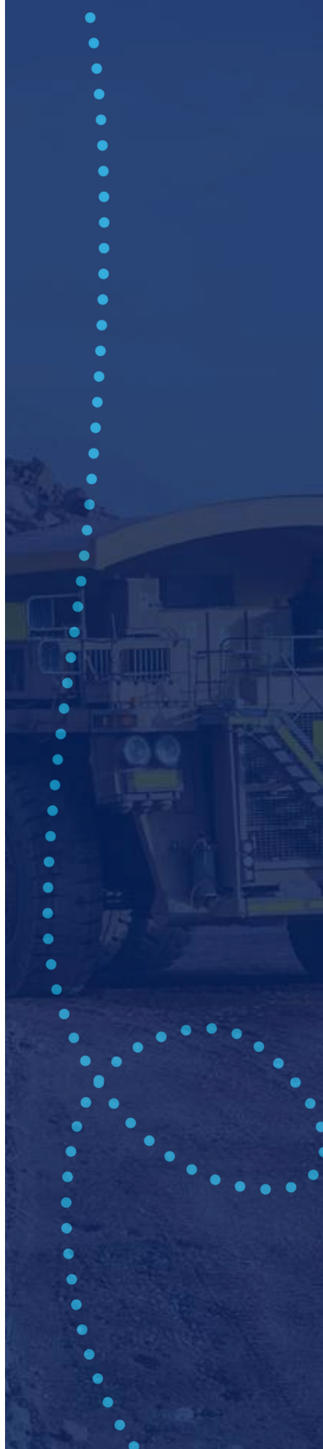
Pan-African Decarbonization Institute (P-ADI) - P1344

Amira Africa Center of Excellence (P1332)

Amira Geometallurgy Program

Amira Lithium Program

Critical Minerals Program



GEOSCIENCE FRAMEWORK

Legend: In Management · Under Development · Future Programs

The Geoscience framework has continued its evolution over the year, in association with its role of providing a dynamic structure for the advancement and prioritization of geoscience projects, in addition to providing visibility of connection between projects.

Over the year projects the framework has advanced with the inclusion of new concepts such as core scanning evaluation and data heritage in South Africa which represent both old and new areas in which Amira can work, founded on its history of delivering independent evaluation and recommendations. Additionally, the role of Amira in leading advancing the resources industry has led to projects such as data heritage to ensure data preservation for longstanding benefit. CollaborateOre and Data Metallogenica projects also have a synergy with the principles of data and knowledge preservation and efforts in this space will continue to be framed around accessibility of geoscience project data.

AXI projects remain a strong portfolio in the Geosciences with EAXI and SAXI advancing to proposal status and WAXI-4 in its penultimate year. Future project ideas have been advanced with stakeholders using the Amira project process with a view to continued geographical expansion of these projects. This process has been reflected with many Geoscience round tables, kick off meetings and SRMs being held over the year.

Member calls for applied projects with a focus on specific commodities, technologies or in supporting more effective application of technologies is reflected in the core scanning, and spectral IP programs.

A main component of the Geosciencs portfolio this year was the preparation for the Exploration Managers' Conference. With a focus on Exploring Exploration; Where does it start? Where does it stop? Through the sub themes of time, uncertainty and collaboration. Introduction of the members room which presented all projects from concept to completion for the geoscience portfolio enabled provision of rapid member feedback and oversight of all projects which may be of interest. This much loved member event, provide opportunity for a rapid feedback on potential project concepts, informing the geoscience framework for the forthcoming year.

P934C WEST AFRICAN EXPLORATION INITIATIVE (WAXI) – STAGE 4

The West African Exploration Initiative (WAXI) is a flagship program under Amira Global's Geoscience Framework, advancing geological knowledge and exploration success across West Africa. Building on previous phases, WAXI Stage 4 extends research beyond the Birimian terranes into the Archean, Pan-African, Meso-Proterozoic, and Phanerozoic basins, aiming to understand how lithospheric and crustal architecture influences mineral system development through time. The project characterises early crustal structures, examines Pan-African reworking processes, and evaluates how the cumulative cratonic framework controls mineralization in younger basins.

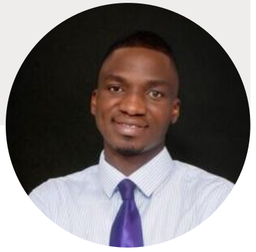
Covering the entire Leo-Man Shield and surrounding regions, WAXI spans Benin, Burkina Faso, Côte d'Ivoire, Ghana, Guinea, Liberia, Mali, Mauritania, Morocco, Niger, Senegal, Sierra Leone, and Togo. This broad scope enables a unified geological framework, fostering cross-border collaboration and knowledge sharing among governments, research institutions, and exploration companies.

With a base budget of US$2.19 million, a full budget of US$3.02 million, and a supplementary budget of up to US$3.66 million (subject to external support), WAXI is structured for scalable impact. The initiative continues to exemplify effective international collaboration, enhancing exploration capability, promoting sustainable development, and advancing understanding of mineral systems across West Africa.

Center for EXPLORATION TARGETING

Research Lead: Centre for Exploration Targeting - University of Western Australia

Program Manager
Bright Foli, Amira Global



P1061B SOUTH AMERICAN EXPLORATION INITIATIVE (SAXI): STAGE 3

The South American Exploration Initiative (SAXI) is one of Amira Global's most ambitious collaborative programs, advancing understanding of the tectonics, architecture, and metallogeny of North-East South America. Building on the success of earlier stages, SAXI Stage 3 represents a once-in-a-generation opportunity to answer key geological questions while directly supporting sponsor companies exploring across the region—across all commodities.

Expanding beyond the Guiana Shield, SAXI Stage 3 now includes the Brazilian Shield, São Luis Craton, Gurupi Belt, Borborema Province, and the Lavras do Sul igneous complex within the Rio de la Plata Craton. The project also broadens its focus from gold to critical minerals such as copper, lithium, nickel, and platinum group elements (PGE), providing vital insights that align with the global energy transition.

Covering the entire Amazon Craton—including Brazil, French Guiana, Suriname, Guyana, Venezuela, and parts of Colombia—SAXI Stage 3 unites research institutions, exploration companies, and governments across borders. Backed by a four-year program budget of USD $3.64 million, the initiative combines world-class science with strong regional collaboration to map South America's ancient foundations and guide the future of sustainable mineral exploration.

Center for EXPLORATION TARGETING

Research Lead: Centre for Exploration Targeting - University of Western Australia and Universidade Federal de Minas Gerais (UFMG)

Senior Program Manager: Dr Silvia Black, Amira Global

P1322 EAST AFRICAN EXPLORATION INITIATIVE (EAXI)

The East African Exploration Initiative (EAXI), Project P1322, is a long-awaited addition to the Exploration Initiative series. Building on the success of the well-established West African eXploration Initiative (WAXI), this first phase of EAXI is focused on developing a comprehensive program designed to improve the understanding of the base metal and gold exploration potential of East Africa. Through an integrated approach of research and data collection, the initiative aims to understand the region's geological "anatomy."

This 4-year program aims to enhance the understanding of the base metal and gold exploration potential of East Africa by generating high-quality data and geological insights to support companies and governments in active exploration, with the overarching objective of understanding metal transfer processes across the lithosphere by investigating the unique and prospective East African geological record. EAXI's initial focus is on the Archean Tanzania-Congo and Zimbabwe cratons, their bordering Paleoproterozoic to Neoproterozoic mobile belts (e.g., the Kuunga Orogen and the East African-Antarctic Orogen), and the influence of the East African Rift. EAXI 1 countries include Tanzania, Kenya, Uganda, Zimbabwe, Rwanda, Burundi, Malawi and Mozambique.

The budget has been developed to support a staged roll-out with a minimum start-up requirement of USD $3.3 million and a full implementation budget of USD $4.4 million, including supplementary modules. EAXI is actively recruiting sponsorship, with the goal of kickstarting the project in Q1 of 2026. Through world-class science and strategic partnerships, the initiative aims at investigating the geological, tectonic and metalogenic evolution of the Tanzanian and Zimbabwe cratons as well as providing capacity building for the region. The net value of a project such as EAXI lies in its ability to deliver scientifically robust, exploration-relevant datasets in a fast-emerging new frontier for multi-commodity Mineral Resource discovery (e.g. Au, Li, Ni-Cu-PGE, REE). Benefits of the project extend to companies and geological surveys.

Centre for EXPLORATION TARGETING

Research Lead: Centre for Exploration Targeting - University of Western Australia

Program Manager:
Redeemina Comfort Bonnah,
Amira Global

P1249 EXPLORING, CHARACTERISING, AND OPTIMISING COMPLEX OREBODIES

AmiraGlobal's P1249 project is transforming how the mining industry understands and manages complex orebodies. With a focus on transition zones—the alteration domains that extend from orebodies into surrounding unmineralised rocks—P1249's research spans a wide range of deposit types, including porphyry, epithermal, carbonate-replacement, and skarn systems, as well as Mt Isa–style Cu, IOCG, and orogenic Au deposits. Building on the success of its predecessor, P1202, the project is pursuing innovative research avenues identified as having the greatest potential to be transformational for its sponsors

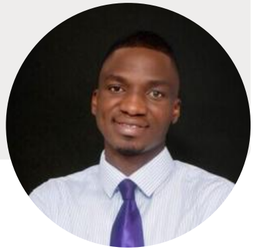
Currently in its fourth year of a five-year program, this project is equipping sponsors with cutting-edge tools, methods, and workflows for recognising proximity to high-grade ore and translating mineralogical, geochemical, and hyperspectral data into actionable quantitative insights. The goal is to optimise orebody knowledge and deliver the detailed mineralogical information required for accurate domaining and resource definition at the mine scale. .

The P1249 project with a budget of AUD $4.55 million, has already delivered a suite of powerful outcomes, including transition zone fertility and vectoring tools, workflows for upscaling mineralogical and textural data, and industry-ready digital tools for large-scale interpretation and application. By integrating advanced science with practical innovation, P1249 is helping sponsors discover, define, and optimise mineral deposits more effectively—unlocking greater value across the entire mining value chain.

CODES
CENTRE FOR ORE DEPOSIT AND EARTH SCIENCES

Research Lead: University of Tasmania (CODES), Australia

Program Manager
Bright Foli, Amira Global



P1372 CORE SCANNING TECHNOLOGY EVALUATION

P1372 is a member-driven concept in an early stage of development. The intent of the program is to provide sponsors with clear, unbiased, evidence-based guidance on selecting, using and managing data associated with various core scanning technologies currently on the market.

Taking inspiration from other seminal collaborations like the 2012-2013 CAMIRO Project 10E01 on portable XRF devices, Amira P1372 aims to evaluate a broad suite of commercially available core scanning techniques across a range of commodities, deposit types and geographies.

Coordinated and led by independent consultants and researchers, the program will provide unbiased guidance to the market - mining and exploration companies, product designers & manufacturers, academic researchers and industry bodies – around each technique's fundamental operating principles, strengths, limitations, ideal operating parameters/procedures, data management and opportunities for improvement, enabling stakeholders of all kinds to focus their investments effectively.

The first roundtables for P1372 will be taking place late in Q4 2025, with details around preliminary scope (timeline, budget, etc.) to be shared at that time.

DIGITAL – LITHICS –

Program Manager:
Tim Cross, Amira Global

Research Lead: James Shreeve, Digital Lithics

P1245A OVERCOMING BARRIERS TO EFFECTIVE MINERAL EXPLORATION WITH SPECTRAL IP

P1245A is a conceptual follow-up to the recently-completed P1245 program on Spectral Induced Polarisation. While detailed outcomes of the original program are subject to a confidentiality period until 30 July 2026, key objectives of the new program revolve around enabling affordable, effective collection, modelling and interpretation of (particularly low-frequency) SIP data for both true (economic minerals) and false (e.g. graphite/pyrite) anomalies.

Amira has been working with former sponsors and the research team from P1245 to identify focus areas and strategy for subsequent research, particularly around aspects of field data collection and interpretation that proved challenging in the former program. Overcoming these barriers to effective real-world application of lab-derived learnings from P1245 is at the core of P1245A, which will be delivered through a partnership of academia and industry (consultants and geophysical service providers), led by Lee Slater from Rutgers University Newark.

The first (P1245-sponsors-only) roundtable for P1245A was held in October 2025, learnings from which will be incorporated into the program design before it's expected to be opened to the broader market at some point in 2026.

RUTGERS

Program Manager:
Tim Cross, Amira Global

Research Lead: Lee Slater, Rutgers University Newark

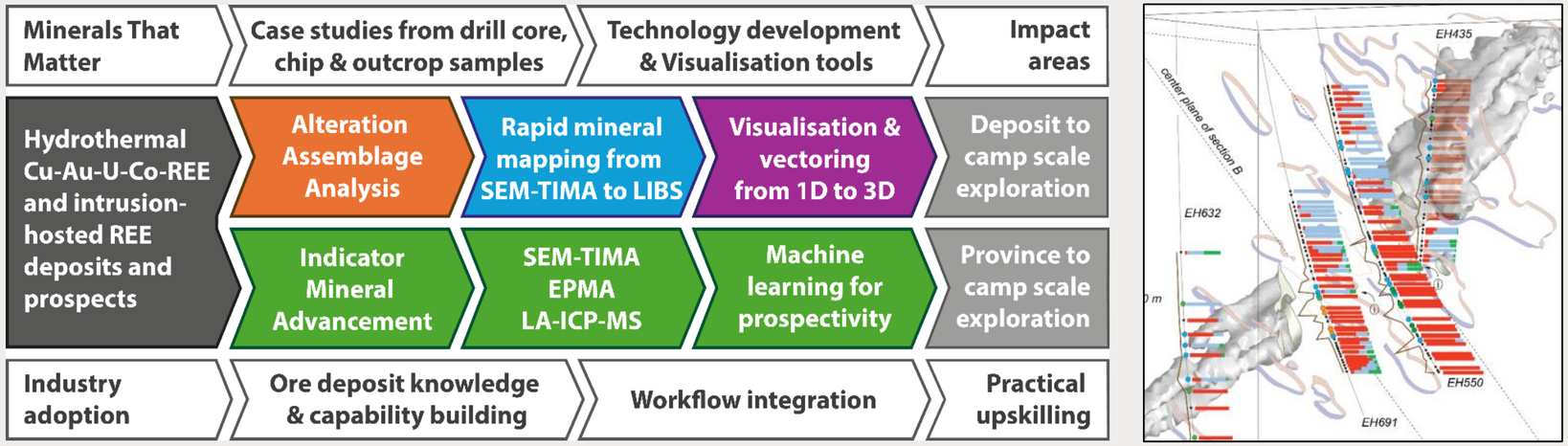
P1364 MINERALS THAT MATTER

P1364 Minerals that Matter aims to accelerate discovery and delineation of hydrothermal Cu, Au, U, Co, REE and magmatic REE deposits, using rapidly collected alteration mineral assemblage data from LIBS, paired with mineral chemistry indicators and advanced visualisation tools, to assess prospectivity and vector toward mineralisation at various scales.

Grounded in over a decade of CSIRO research in Australian Cu and Au deposits (e.g. Carrapateena, Ernest Henry, Eloise, North-Portia, Kalkaroo), this research leverages the principle that Cu hydrothermal systems, despite genetic differences, form metasomatic halos and mappable mineral assemblage gradients. P1364 aims to apply proven techniques and workflows across a broad range of case studies – open to IOCG-ISCG, sediment-hosted stratiform Cu, and porphyry Cu–Au–Mo deposits – to (1) identify spatial and paragenetic relationships of mineral assemblages that define alteration zonation and ore grade variability and (2) define semi-quantitative alteration mineral gradients for vectoring and improved orebody knowledge.

The revised program also retains P1364's original objective of identifying mineral chemistry signatures for prospectivity of intrusive REE systems, hosted in carbonatites and peralkaline intrusions, while extending this workflow to IOCG-ISCG deposits and prospects.

Initially envisaged as a 2-2.5-year program costing about $2M AUD, roundtables for P1364 Minerals that Matter were held in September 2025, with a current focus on securing expressions of interest to progress to Proposal.



Proposed workflow/elements of P1364 (left) and an example of visualizing downhole mineral distribution from the roundtable (right)

Program Manager:
Tim Cross, Amira Global

Research Lead: Tobias Schelgel, CSIRO

P1306 DATA METALLOGENICA

As part of the internally-funded development of CollaborateOre Phase 1, Amira is currently investing in a revamp of the Data Metallogenica (DM) collection, starting with transitioning the digital collection to a more accessible, interactive and data-enabled platform.

To support this initiative and ensure the digital DM collection remains an accurate representation of the physical collection, Amira and DEM South Australia are co-funding employment of a curator (Peter Keller), based at DM in the South Australia Drill Core Library Facility, to undertake a full reconciliation of the lithotheque collection and assist with next stages of data digitization and expansion.

In the near future, Amira will be looking for industry advisors and partners to help guide and support DM's next phase of growth, building it from a primarily visual reference into a modern, interactive, data-rich platform that enables broad, new knowledge and insights to be gleaned from this unique, global collection of mineral deposits.

Clockwise from left: Peter Keller (Curator, left) and Tim Cross (Amira Global Program Manager) outside the DM room in Adelaide; example "lithotheque" (plate mounted with 20 samples) representing the Batu Hijau deposit in Indonesia; some examples of the 8000+ "macrotheques" (hand specimens) currently stored at DM but absent from the digital collection

Government of South Australia
Department for Energy and Mining

Program Manager:
Tim Cross, Amira Global

Research Lead: Amira-funded with in-kind support from DEM South Australia

P1335 GEODYNAMIC ANDES EXPLORATION SOUTH AMERICA

The Geodynamic Andes Exploration Initiative (GAXI) is the latest addition to Amira Global's Exploration Initiative series, expanding the success of WAXI into Western South America—covering Ecuador, southern Peru, and the Chile–Argentina corridor. This four-year project (2024–2028) aims to deepen understanding of the spatial and temporal distribution of Cu-Mo-Au/Au-Cu and Au-Ag mineral systems, while also assessing the potential for associated critical minerals along the Andean margin.

GAXI applies a Mineral Systems–based approach to uncover the fundamental geological processes controlling the genesis and localization of ore deposits within a Unifying Framework and Causality Scheme. At its core, the project explores how geodynamic inheritance—the influence of ancient tectonic and lithospheric structures—has shaped pathways for mineralization through time. By studying trans-lithospheric fault systems (TLFs) and their reactivation during major tectonic events, GAXI aims to distinguish fertile versus barren zones, providing a powerful predictive framework for modern exploration.

New Sponsors have been welcomed to the GAXI project this year with fieldwork completed in November 2024 and May 2025. The Annual sponsor review meeting was held in September 2025.year, with fieldwork completed in November

New Sponsors: Lundin Gold
Fieldwork for GAXI (Use photos from the second slide attached)
November 2024 – Fieldwork South Peru
May 2025 – Fieldwork Chile & Argentina (San Juan, La Rioja and Cordoba)

GAXI fieldwork activities included a November 2024 campaign in South Peru and a May 2025 campaign covering Chile and Argentina at latitude 31°




General Manager LATAM / Head of Global Alliances: Patricio Pastorelli

Research Lead: Economic Geology Research Centre, James Cook University & Centre for Exploration Targeting - University of Western Australia

EXPLORATION MANAGERS' CONFERENCE

Exploring Exploration: Where does it start? Where does it stop?

Subthemes: Time, Uncertainty, Collaboration

This year the EMC2025 brought together leaders from across the global exploration community to reflect on the future of the sector. The conference provided a platform for both technical insight and open discussion, surfacing key themes around time and cost pressures, the need for greater collaboration, increasing uncertainty, and the role of integrated technologies. The event reinforced Amira's position as a trusted convener and innovation partner in the exploration ecosystem.

92 Attendees

30 Companies

04 Types of organisations

07 Universities

06 Surveys

15 Speakers

06 Panel Sessions

MINING FRAMEWORK

collaborateore

Energy & Sustainability

Equipment footprint & efficiency

- P1262 Block modelling and forecasting mine seismicity hazard with more accuracy and better accessibility

Initiatives/Options

- Hydrogen
- Battery
- Other energy sources: HVO – Hydrotreated Vegetable Oil (Carbon free)
- Other energy sources: Atomic

Selective mining

Preconcentration techniques

- Grade deportment by size (upgrade by screening)
- Ore Sorting
- Other techniques excluded from the mining framework

Mining Systems

- Alternatives to the conventional load & haul by shovel & trucks
- Geometallurgy and Predictive Modeling
- Automation and Robotics
- Digitalization and Data-Driven Mining

Talent, Capability building, education and training

Legend: In Management · Under Development · Future Programs

Amira Global's Mining Framework is a forward-looking platform designed to accelerate the transformation of mining systems through innovation, sustainability, and advanced technologies. The framework brings together a collection of interconnected projects aimed at addressing emerging challenges in mining while unlocking new opportunities for efficiency, safety, and value creation.

Externally, the framework fosters collaboration between industry, research, government, and funding partners to support innovation in key focus areas—such as low-impact energy sources, alternative mining systems, preconcentration, selective mining, automation, and data-driven operations. It enables shared development of cutting-edge technologies, including hydrogen and battery-powered systems, hydrotreated vegetable oil (HVO) solutions, and next-gen digital tools for predictive modelling and geometallurgy.

Internally, the framework provides strategic alignment for building and managing Amira's mining project portfolio, allowing for greater integration with allied frameworks such as Mineral Processing, Geoscience, and Sustainability. It supports the development of new programs based on industry feedback and global trends, while enhancing internal efficiencies and targeting near- to mid-term innovation outcomes.

Talent development, education, and training are embedded throughout the framework to build capability across the mining value chain—ensuring a skilled workforce equipped to lead the transition to next-generation mining.

P1262 - BLOCK MODELLING AND FORECASTING MINE SEISMICITY HAZARD WITH MORE ACCURACY AND BETTER ACCESSIBILITY

This three-year Amira Project aims to address current shortfalls in forecasting seismic hazards for underground excavations using advanced numerical modelling methods. The project will formulate spatial probabilistic and risk-based descriptions of the largest possible seismic events by area, the probable location of large events, the expected number of subsequent triggered events, and the anticipated peak ground velocities and surface displacements generated at key locations, that have been triggered by mining activities.

The key outputs from this project will be a detailed guideline and a tailored software plug-in that can be used by operational and consulting engineers to design future mines more safely and more economically and, more importantly streamlining the training and knowledge transfer for new engineers. The project is currently in its second year under active management. Discussions are ongoing regarding a potential extension of the project to build on the progress achieved so far and to further enhance the outcomes and value for participating sponsors.

Program Manager:
Redeemina Comfort Bonnah, Amira Global

Research Lead: Mining One Pty Ltd

MINERAL PROCESSING FRAMEWORK

collaborateore

Overarching themes: Techno-Economic Analysis, Efficiency, Throughput, Geometallurgy, Energy Mix, Coarse separation, Data, Ai, Optimization

Integrated Digital Modelling of Mineral Processing Circuit

(Extension into new units and equipment)

- P1354 Digital Transformation of Mineral Processing through Integrated Modelling and AI - Combining physics-based understanding and artificial intelligence to improve throughput and recovery

Energy, Technology and Data Science

- P1359A Coarse Particle Flotation and HydroFloat
- P1359B New Machine RIMMS
- Dry Processing.
- Energy saving, economics & carbon footprint analysis

Critical minerals & ESG

Metal recovery & extraction flowsheet from:

- P1358B Development of a geometallurgically informed model for extraction of critical minerals
- Primary Ore Sources Secondary Soures(e-waste & industry produced water

Extractive Metallurgy

- P420H Gold Processing Technology
- (P1331) Enhanced Treatment of Refractory Gold and base metal Ores
- Flotation Chemistry Aspect

Talent, Capability building, education and training

Mineral Processing Conference (Every 2 years)

Legend: In Management · Under Development · Future Programs

Amira Global's Mineral Processing Framework is a coordinated platform designed to guide, connect, and accelerate innovation across the global mineral processing landscape. It identifies current and future challenges and opportunities, supporting interdependent, cross-collaborative R&D that fuels mutual knowledge growth and delivers measurable industry value.

By aligning researchers, industry leaders, governments, and funding bodies, the framework defragments research efforts to promote complementary and supplementary development. It also strengthens Amira's standing as a leader in mineral processing innovation on the global stage.

Internally, the framework enables Amira to develop targeted programs that respond to member feedback and industry needs—especially those offering short- to medium-term value enhancement. It leverages key Amira resources such as the Pan-African Decarbonisation Institute (P-ADI) and the Centres of Excellence (CoE) to enhance existing and emerging projects.

The framework fosters operational efficiency, aligns the mineral processing portfolio with related areas including Mining, Geoscience, and Big Data, and provides clear direction to focus efforts on productivity, collaboration, and impact.

P1359A COARSE PARTICLE FLOTATION AND HYDROFLOAT

P1359A will use Computational Fluid Dynamics (CFD) to simulate multiphase flow in HydroFloat™ cells, analysing bubble–particle–liquid interactions to identify optimal operating conditions. The study will also test advanced techniques such as nano-bubbles, oily-bubbles, and aerosol collector dosing to improve bubble-particle attachment and recovery efficiency in fluidized bed flotation systems.

The scope includes understanding the impact of fines on HydroFloat™ teeter bed hydrodynamics, developing a model of key variables (KVDs) to optimise process performance, and aligning outcomes with OEMs like Eriez. The project aims to deliver new tools and insights that enhance flotation performance and unlock value for assets with complex ore or clay-rich feeds.

Program Manager:
Redeemina Comfort Bonnah, Amira Global

P1359B RIMM PROCESS FOR THE RECOVERY OF COPPER, COBALT AND REE FROM LOW-GRADE ORES AND MINERAL WASTES

Developed by InnovEco Australia and tested at the University of South Australia, the RIMM process offers a simple, efficient, and low-water method for recovering copper, cobalt, and other valuable metals from low-grade ores, tailings, and mineral wastes. Its portable, modular design makes it suitable for small deposits, tailings reprocessing, and environmental site rehabilitation.
The current project aims to expand RIMM's capability for recovering critical minerals—including copper, cobalt, and rare earth elements (REEs)—from complex, low-grade, and secondary resources such as mine waste, wastewater, and acid mine drainage (AMD). By integrating RIMM with complementary technologies, the project seeks to unlock eco-friendly and economically viable processing pathways.

Objectives:

- Identify and characterise low-grade ores, wastes, and secondary resources for RIMM application.
- Demonstrate recovery of critical minerals and environmental rehabilitation through bench and pilot-scale studies.
- Integrate RIMM with complementary technologies for end-to-end eco-friendly processing.
- Develop adaptable process flow sheets for a range of resource types.

Program Manager:
Redeemina Comfort Bonnah, Amira Global

P1354 DIGITAL TRANSFORMATION OF MINERAL PROCESSING THROUGH INTEGRATED MODELLING AND AI - COMBINING PHYSICS-BASED UNDERSTANDING AND ARTIFICIAL INTELLIGENCE TO IMPROVE THROUGHPUT AND RECOVERY

Amira P1354 represents the next major step in the evolution and offers sponsors a unique opportunity to shape the next generation of mineral processing by building on the proven legacy of the P9 series to deliver research outlining enhanced expert models that directly improve plant optimisation, efficiency, and decision-making.

Building on over six decades of international collaboration and modelling innovation, this project combines mechanistic process understanding with AI/ML and real-time data integration to deliver the next generation of intelligent, adaptive mineral processing systems.

The project will develop platform-neutral, AI-ready expert models that can be continuously recalibrated using plant data, enabling data-informed decision-making, real-time optimisation, predictive maintenance, and paving the way toward autonomous plant control.

Participation in Amira P1354 offers strategic value for the sponsors :

1. Higher throughput and recovery through data-driven optimisation.
2. Reduced variability and energy intensity via adaptive, AI-enabled control.
3. Improved capital efficiency by maximising existing plant capacity.
4. Future-ready capability to support the transition toward autonomous operations.

By bridging deep mechanistic expertise with digital intelligence, P1354 will redefine how mineral processing circuits are designed, calibrated, and optimised—turning data into a continuous source of value and competitive advantage.

Program Manager:
Redeemina Comfort Bonnah, Amira Global

P1358B DEVELOPMENT OF A GEOMETALLURGICALLY INFORMED MODEL FOR EXTRACTION OF CRITICAL MINERALS (CMS) FROM SULFIDE AND IRON TAILING PILES

This project develops a mineralogy model to create geometallurgy-informed flowsheets for efficiently extracting critical minerals from sulfide and iron tailings. By applying advanced mineral processing and hydrometallurgy techniques, the project unlocks economic value, improves resource recovery, and addresses the growing demand for critical minerals.

As high-grade deposits become rarer, tailings—once considered waste—offer new opportunities. Sulfide tailings may contain copper, nickel, cobalt, PGMs, gold, germanium, and gallium, while iron tailings can yield vanadium, titanium, iron oxides, and rare earth elements (REEs) such as neodymium, dysprosium, and terbium, vital for high-tech and green technologies.
A key advantage of this project is its adaptability: the model and methods can be applied across a wide range of mining residues, making it a flexible and scalable solution for both tailings management and critical mineral recovery.

Proposal Objectives:

- Develop a geometallurgically informed model to optimise mineral extraction from tailings.
- Integrate cutting-edge mineral processing and hydrometallurgical techniques to maximise recovery, improve resource efficiency, and support sustainability goals.

Program Manager:
Redeemina Comfort Bonnah, Amira Global

P420 GOLD PROCESSING TECHNOLOGY

P420 has a long and valuable history of delivering new data, technology, and knowledge to the gold mining sector over 27 years. The current iteration of the series, P420H, is supported by companies in Australasia, North America and South Africa.

The P420H project aims to continue support of the gold industry in achieving operating excellence despite the challenges, both continuing and emerging, being encountered by the industry today:

- Human resources are still the key to successful operation, yet skilled gold metallurgists are in short supply.
- Large high grade, free-milling deposits are becoming less common, and companies are turning to difficult to process (i.e. lower grade, complex and refractory) orebodies to maintain reserves.
- The tools to evaluate, optimise and predict performance are limited for dealing with anything other than well-established technologies or simple free-milling orebodies. The Gold Technology Group (GTG) has a long history of Amira collaborative projects related to the gold industry and will be leading P420H. GTG is a research group, primarily funded by industry, at the Western Australian School of Mines: Mining, Energy and Chemical Engineering, Curtin University in Perth, Australia.

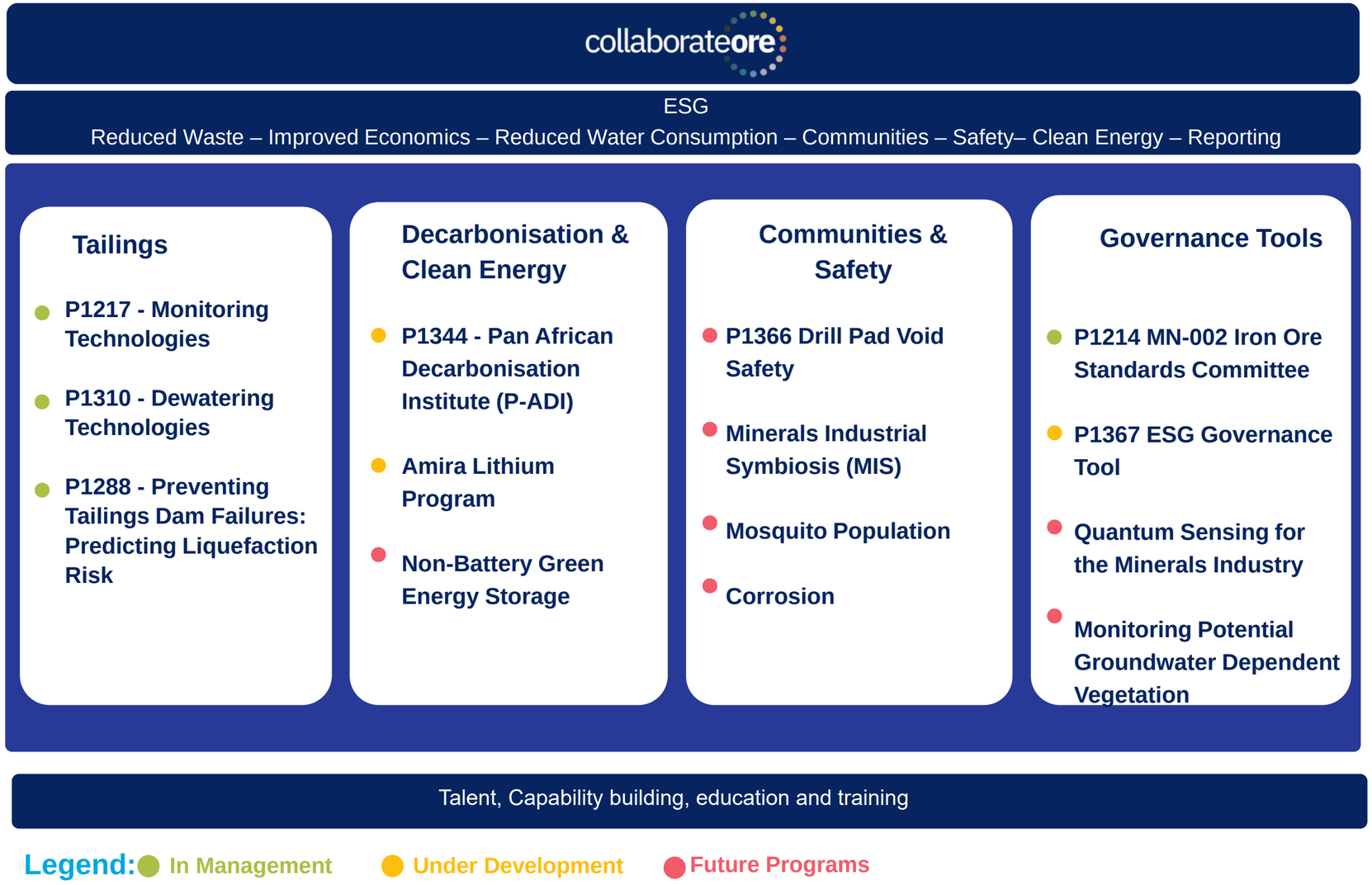
Senior Program Manager: Dr Silvia Black, Amira Global

Curtin University

Gold Technology Group

Research Lead: Gold Technology Group, Curtin University

SUSTAINABILITY FRAMEWORK



Amira Global's Sustainability Framework brings together a globally connected portfolio of projects and programs designed to embed sustainability into every facet of the mining value chain. The framework drives forward environmental, social, and governance (ESG) excellence, aligning innovation with improved economics, reduced waste, responsible water use, community impact, safety, clean energy and reporting requirements.

Externally, the framework promotes collaborative R&D to address global sustainability challenges in mining. It strengthens connections across the globe between industry, researchers, government, and funding bodies, helping to coordinate and amplify sustainability-focused innovation. Through initiatives like the Pan-African Decarbonisation Institute (P-ADI), tailings projects and the Amira Lithium Program, it supports transition pathways for low-emission mining, energy transformation, and circular economy practices.

Internally, the framework provides strategic structure to develop and scale new programs aligned with member priorities. It enhances the management of Amira's sustainability portfolio, creates synergies with allied frameworks (such as Mining and Mineral Processing), and directs focus toward near- and mid-term ESG outcomes. The framework also supports capability building and knowledge transfer across communities and industry.

P1217 EVALUATION OF TAILINGS STORAGE FACILITIES MONITORING TECHNOLOGIES

In the aftermath of the recent spate of Tailings Storage Facilities (TSF) failures, there has been a significant increase in activity relating to the monitoring of TSFs.

A focus of this project is to provide an independent evaluation of a range of monitoring technologies and their suitability for the application of providing advance warning of potential instabilities of TSFs.

This will be achieved through an integrated programme of laboratory and field testing as well as physical and numerical modeling of sponsor selected sites. Monitoring equipment vendors will be able to contribute to the project through provision of their technologies for site testing.

Senior Program Manager: Dr Silvia Black, Amira Global

ACG AUSTRALIAN CENTRE FOR GEOMECHANICS
CSIRO | The University of Western Australia | Joint Venture

Research Lead: Australian Centre for Geomechanics

P1214: MN-002- IRON ORE STANDARDS COMMITTE

Amira Global's P1214 project supports Standards Australia in fulfilling the International Secretariat role for ISO TC 102/SC2 Iron Ore and Direct Reduced Iron – Chemical Analysis, and assists the national mirror committee MN-002. The project ensures iron ore standards remain current, rigorous, and aligned with global best practice.

By partnering with Standards Australia, BHP, Rio Tinto, FLSmidth, Fortescue Metals Group, and Roy Hill, P1214 strengthens the accuracy and consistency of ore characterization, improving quality control, communication, and decision-making across the supply chain. This collaboration drives innovation, promotes best practice, and supports the growth and sustainability of the iron ore sector.

Senior Program Manager: Dr Silvia Black, Amira Global

STANDARDS Australia

Research Lead: Standards Australia

P1288 PREVENTING TAILINGS DAM FAILURES: PREDICTING LIQUEFACTION RISK

This project aims to undertake new research and facilitate knowledge transfer and training activities to help the mining industry prevent failures of tailings storage facilities (TSFs). Particular attention will be given to methods and tools used to assess liquefaction susceptibility as well as the reductions in strengths and stabilities of TSFs post-liquefaction. The research will target poorly understood characteristics of TSFs including:

- Varying states of saturation
- High concentrations of fine particles
- Physical changes with age which occur through internal mechanical and geochemical processes
- And how they can be dealt with in assessments of liquefaction propensity.

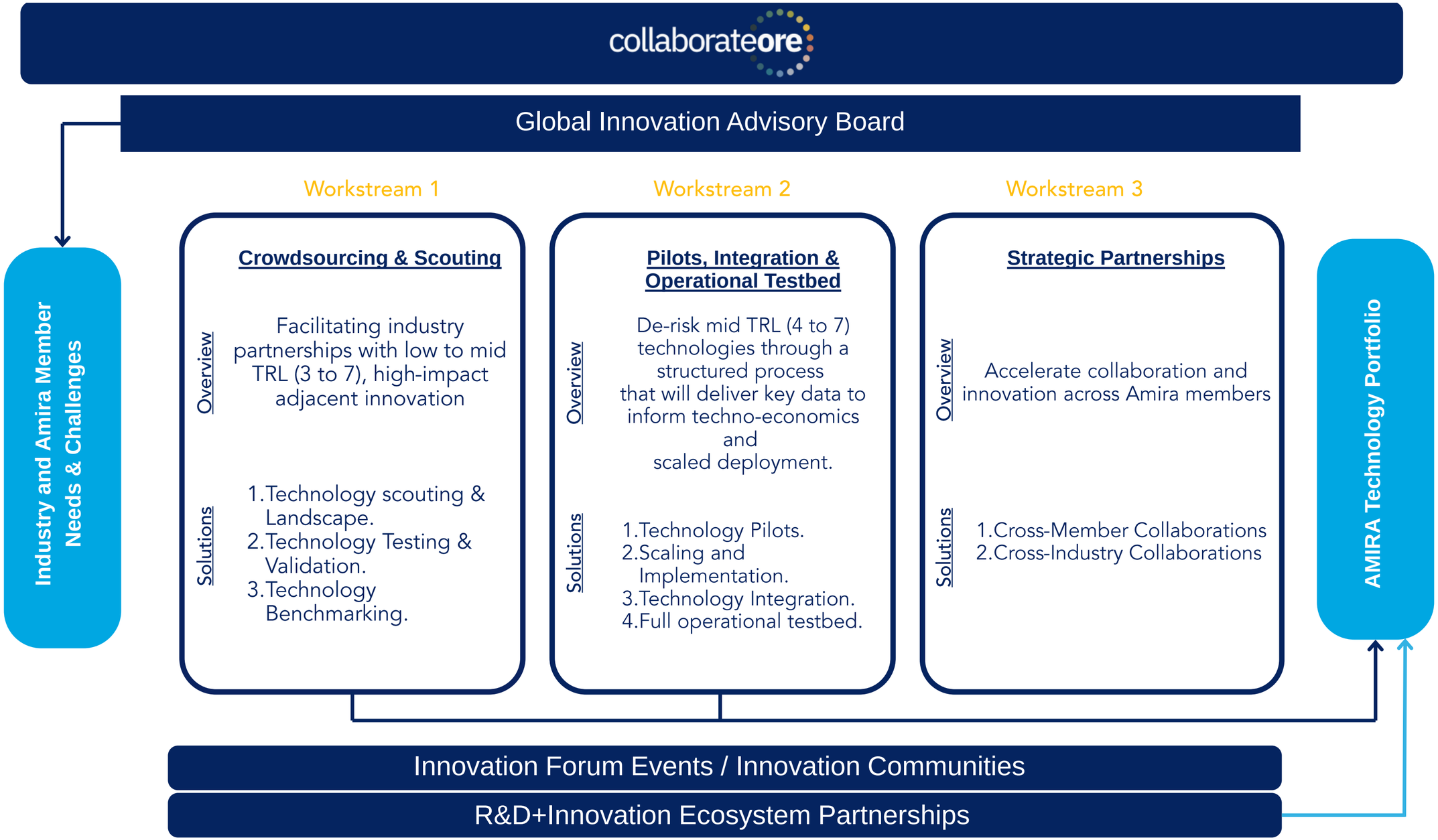
In March the research team, in collaboration with the University of Pretoria, successfully delivered a training workshop in South Africa titled “Partial Saturation Influences on Strength and CPT Interpretations in Silty Tailings and Potential TSF Failure Modes.” The workshop attracted strong participation from industry professionals, reinforcing Amira’s commitment to capacity building and global knowledge exchange.

UNSW Global

Research Lead: University of New South Wales Global

Senior Program Manager: Dr Silvia Black, Amira Global

AMIRA INNOVATION FRAMEWORK



Lead Consortium for Horizon Europe Application

- *Amira Global led the development of the proposal "Innovative Sustainable Approaches for Enhanced Recovery of Critical Raw Materials from Mine Waste and Secondary Raw Materials in Chile." This initiative strengthens international collaboration in sustainable resource recovery.*
- *Allies: Helmholtz-Zentrum Dresden-Rossendorf, Technical University of Denmark, Universidad Adolfo Ibáñez, and EIT Raw Materials, among other partners.*

Lead Consortium for Grant Application in Chile

Amira Global also led a major grant proposal titled "Piloting and Development of Technologies for the Sustainable Recovery of Elements Globally Known as 'Rare Earths' from Secondary Sources – Creation of the Strategic Minerals Technology Center."

- This project brings together leading research and industry partners to accelerate innovation in rare earth recovery.
- Allies: Universidad Adolfo Ibáñez, Stanford Mineral X, Codelco, Anglo American, Orion Resources Partners, and First Solar, among others

amira

Multidisciplinary Programs

AMIRA MULTIDISCIPLINARY FRAMEWORK

collaborateore

Overarching themes: Fostering productive interconnectedness throughout the mineral value chain

Real-time process prediction and control through modelling

Pan-African Decarbonization Institute (P-ADI) - P1344

- Micro Certification
- Sandwich programs
- Decarbonisation & renewables research
- Critical minerals research
- Industry-focus approach
- Africa skills enhancement

Amira Africa Center of Excellence (P1332)

- Physical Infrastructure
- Competency & skills development
- Flowsheet development
- New mining & processing project support
- Toll processing & refining

Geometallurgy projects

- Geometallurgy, Data Science and Technology projects
- Data based grindability maps
- AI platforms for Mineral processing

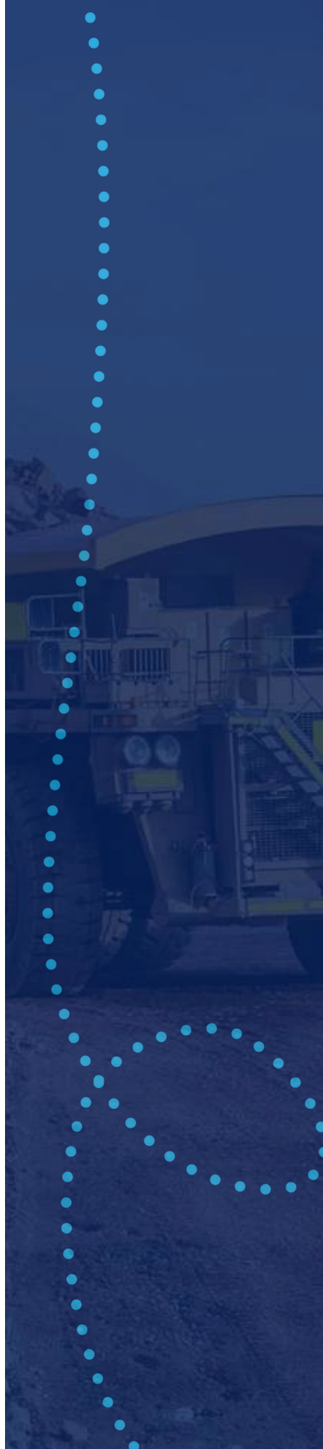
Amira Lithium Program

- Exploration & Geometallurgy,
- Primary Resources Products
- Refined Products
- Recycled Products

Critical Minerals Program

- Exploration of Potential Host Rocks for Critical Mineral
- Petrographical and Mineralogical Characterization of Critical Minerals
- Innovations in minerals recovery from primary and secondary sources

Talent, Capability building, education and training



PAN-AFRICAN DECARBONISATION INSTITUTE

The Pan-African Decarbonisation Institute (P-ADI) is an institution that enables collaboration of nine (9) African, and thirteen (13) global institutions to undertake research in the whole value chain of decarbonization with the key object of African skills development and improvement to take advantage decarbonization opportunities.

Amira Global will manage P-ADI using its 60years' experience in research collaboration and ensure that the leverage accrued from the size of the program will assist significantly in defragmenting the decarbonization research effort across the continent. P-ADI will provide leadership for Africa to participate meaningfully in the decarbonisation of its mining value chain. It will contribute industry focused research to the development of the whole value chain, transforming energy systems and sectors, and ensure that economic, environmental and community return is maximized for Africa's new energy resources.
The Institute will connect world class research capability with the needs of African and global industry to build knowledge, and to develop processes and decarbonisation applications using Africa's talents. The P-ADI program will:

- Secure funding for this work to be done
- Develop the youth of Africa – who are key to the future global skilled resource
- Develop African research institutions
- Serve as a global model for academic collaboration

Ongoing pilot project under P-ADI:

- Industrial policy for a just transition in Africa.

This is an Open Society Funded Project with University of the Witwatersrand. Utilizing the P-ADI platform, universities from Ghana, Tanzania, DRC, Zambia and South Africa are collabrating on the 2-years project to develop an industrial policy for just energy trainsition in Africa

AMIRA AFRICA CENTRE OF EXCELLENCE

The future of mining lies in the ability to nurture talents now. The Africa Center of Excellence is committed to fostering the development of researchers through the strategic design of research programs, which include regular training, development opportunities benchmarking, and industry application. The Africa Center of Excellence is seamlessly integrating a network of testing facilities, pilot plants, and research centers to enhance the core sciences of geosciences, mineral processing, and extractive metallurgy. This infrastructure not only supports comprehensive investigations but also establishes a physical presence for numerous other Amira projects across Africa. This coordinated approach benefits our members in the mining industry by providing immediate access to valuable resources.

Expected Impact in the Mining Space

- Amira Africa Centre of Excellence aims to promote efficient and sustainable mining practices by offering technical expertise and resources.
- Align and support development of complementary and supplementary research across Africa and connect current and emerging talent into the global research landscape.
- Aim to foster collaboration and knowledge sharing among industry stakeholders at both local and international levels, encompassing government agencies, mining companies, and research institutions.
- Attract investment and facilitate the growth of the mining sector in Ghana and the broader West Africa subregion.
- Aspires to establish a robust platform for capacity building and skills development within the mining industry.
- Connect Mineral resource operators, Mining Equipment, Technology and Service providers, end users and build critical mass across Africa to address decarbonization.

Key Highlights

Advisory Board	Research Expertise	Industrial Lands	EPCM	Business Plan
Securing key partnerships with industry and government leaders as advisory board members	Formation of a working group consisting of expertise from Senior Managers in Environmental, Engineering, Geology, Mining, Processing Departments as Industrial Advisors	Securing four industrial lands for the setting up of the Centers of Excellence, namely: AGA-Obuasi Industrial land, KNUST, UMaT 7 UG	A scoping study and design development phase has been initiated, with preliminary funding provided by EPCM named MPPE	Business plan is being prepared as an essential tool for defining objectives, guiding strategy, securing funding, assessing feasibility, attracting partners, managing cash flow, monitoring progress, communicating vision, and managing risks.

Key Completed & Active Projects under AACOE

- A 3-day Amira Africa Workshop And Technical Session 2023 held in Ghana and present some key Amira projects to our stakeholders in Ghana and West Africa.
- Amira Workshop and Skill Transfer Series in Flotation
- Amira Metallurgical Training Program for Siguiri Mine
- Amira Global & Sibanye Stillwater_ Short-Term Mineral Processing Audit for Sibanye Stillwater

Working for Members

AMIRA'S ENDURING STRENGTH...

Technical sciences that underpin the mine value chain

- Creation of knowledge, data, information
- Development and testing of new technology
- Development of skills, capability, leadership
- Setting of standards and benchmarking
- Roadmaps that envisage future developments and needs

... for over six decades

OUR MEMBERS


ABITIBI
GEOPHYSICS


AngloAmerican


ANGLOGOLDASHANTI


ArcelorMittal


aura
energy


AGA


B2GOLD


loupe


BARRICK


BLUESTONE
MINES TASMANIA
JOINT VENTURE PTY LTD


BHP


RioTinto


NEW
BOLIDEN


Evolution
MINING


Resolute


CENTAMIN


AGINCOURT
RESOURCES
MEMBER OF ASTRA


CODELCO


FLSmidth


ENDEAVOUR
MINING


GLENCORE


GREENHEART
GOLD


Fortescue


FREEPORT-McMoRan


KEMIX®


GEKKO


GOLD FIELDS


PODEROSA


InnovEco
australia


ROY HILL


igo


RainStorm
The Dust Control Professionals


FIRST QUANTUM
MINERALS LTD.


KoBold
Metals


KOULOU
GOLD CORP.


MINROM


Sandfire


LITHODAT


Newmont


MAGOTTEAUX


NORTHERN STAR
RESOURCES LIMITED


metso


Perseus
MINING


TMK
"UZBEKISTAN TECHNOLOGICAL METALS COMPLEX" JSC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