INVESTING IN AFRICAN MINING INDABA

DEVELOPMENT PARTNER INSTITUTE

INNOVATION & RESEARCH BATTLEFIELD

NEW LEADERS. FRESH IDEAS. REAL IMPACT.

2024 ALUMNI MAGAZINE

ABOUT THE MINING INNOVATION AND RESEARCH BATTLEFIELD

At the Development Partner Institue (DPI) we believe in the future of mining, but we know things have to change. Overcoming decades of unsustainable mining practices requires new ways of thinking and operating, brave experimentation and collective vision. It's with this focus that we created **The Mining Innovation and Research Battlefield (MIRB).**

MIRB, convened by DPI and Mining Indaba, is a competitive event that offers the opportunity to accelerate change with a unique platform that invites cross-sector innovations and research ideas. Piloting research innovation at speed, the Battlefield brings to life new and workable solutions to some of the industry's toughest sustainable development challenges. With significant activity to date, this platform is already unlocking valuable sustainability advances.

MIRB invities mining industry professionals, academics, NGOs, and young leaders to bring out-of-the-box solutions to some of the toughest sustainable development challenges in mining.

How does the Battlefield work?

ANNUAL RESEARCH CHALLENGE

Using the platform of Mining Indaba, held in February in Cape Town, South Africa, we issue a pressing sustainable mining for development challenge.

INVITATION TO PARTICIPATE

When submissions open, we invite industry professionals, academics, NGOs, and young leaders to submit research proposals to unlock new or improved ways of practice to tackle the challenge.

ENTRIES ASSESSED

When entries close, we competitively evaluate the research proposals. Our panel of industry judges shortlists proposals against pre-defined scoring criteria.

BATTLEFIELD ROUNDS ONE AND TWO

Shortlisted proposals present their pitch in a global online heat (Round One), with finalists progressing to pitch at Mining Indaba (Round Two). The winning proposal receives a grant and support to further their ideas over the following twelve months.

THE 2024 COMPETITION

The Challenge

What are the innovative responsible collaborations between Large Scale Mining (LSM) and Artisanal and Small-Scale Mining (ASM), and how can these be applied to the just energy transition?

The Prize

In addition to having the opportunity to pitch in front of leading mining executives and experts and receive recognition for their work, the winning innovation and research proposal received a US$25,000 Research and Innovation Grant sponsored by BHP Xplor.

The awarded grant gives our winner the funding to further advance their ideas over the following twelve months. They also had the opportunity to be interviewed during the Fireside Chat at the Mining Indaba Young Leaders Forum to inspire the next generation in pursuing studies and careers around mining and sustainability.

BHP Xplor

JUDGES AND SELECTION COMMITTEE

Bringing together a judging panel of experts in their fields is key to a successful event. With a breadth of experience, entrepreneurship and exposure to the global mining industry over many years, the 2024 panel was well-qualified to identify viable, innovative solutions that could drive positive impact at speed.

For the 2024 Battlefield we were privileged to have leading voices in the industry join our selection committee and two judging panels.

2024 Selection Committee

NELLIE MUTEMERI
Director of the Mineral Resources Governance Research Group, Wits University

HAYLEY MCGILLIVRAY
PhD Student, CSIRO

CRISTINA MARIA VILLEGAS
Director of Sustainable Markets, Pact

CASSIA JOHNSON
Policy Analyst, PARDP

2024 Judging Panels

Round One Judges

SHEILA KHAMA
Battlefield Master of Ceremonies
Former CEO, De Beers
Non-Executive Director, DPI

MARK CUTIFANI
Co-Founder and Non-Executive Director, DPI
Chairman, Vale Base Metals

JON SAMUEL
Senior Advisor, Anglo American

CRISTINA MARIA VILLEGAS
Director of Sustainable Markets, Pact

STEPHEN YEBOAH
Chief Executive Officer, Commodity Monitor

DR PONTSHO TWALA
ASM Specialist, School of Mining Engineering, University of the Witwatersrand

Round Two Judges

IAN MWIINGA
Head, Zambia EITI Secretariat

BARBARA DISCHINGER
Founder & Director, International Women in Mining

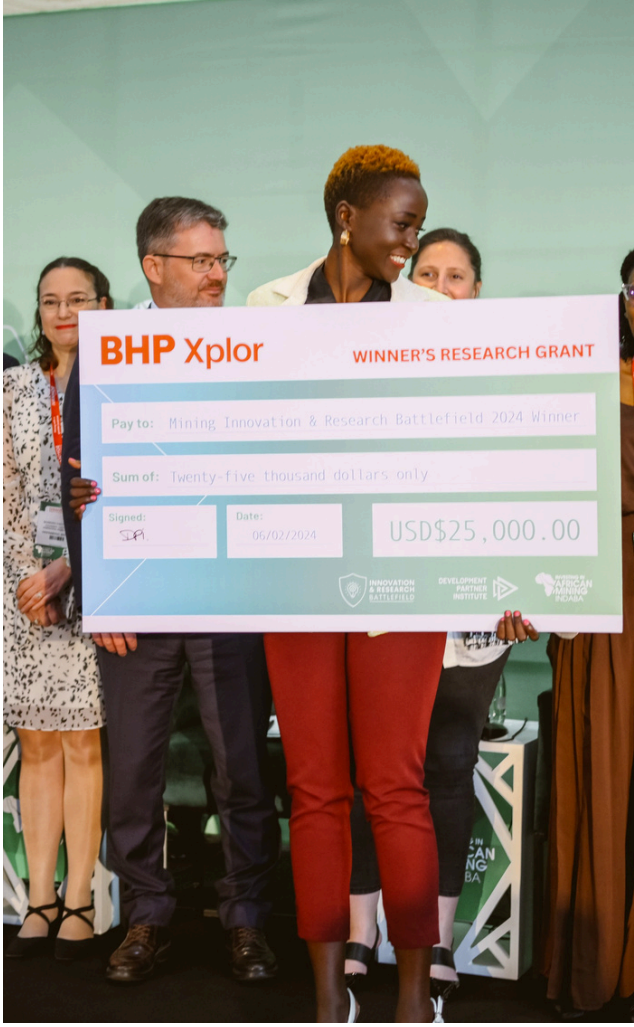
JON SAMUEL
Senior Advisor, Anglo American

JAMES NICHOLSON
Head of Corporate Responsibility, Trafigura

NELLIE MUTEMERI
Director of the Mineral Resources Governance Research Group, Wits University

MARLEY PALIN
Head of Portfolio & Performance, BHP Xplor

BATTLEFIELD WINNER 2024



Grace Akinyi, Kenya

Wima women organisation (Women in Mining Kenya)

Eco-her Green Gold Innovate

"Artisanal innovation, women's hands, nature's heart, Environmental Stewardship"

In her pitch, Grace Akinyi introduced 'Eco-her Green Gold Innovate' as a solution for mercury pollution in ASM. Her innovation included an integrated system of protective gloves made from bacterial cellulose derived from coconut water, along with a multifunctional system featuring alternative heating sources. The aim was to address health risks from direct mercury contact, primarily affecting women, and reducing the environmental impact of mercury in gold mining.

The solution also focused on strengthening the linkages between LSM and ASM sectors, emphasizing supply chain collaboration, environmental compliance, and community relations. Grace highlighted the importance of the just transition, aiming to promote responsible mining, empower communities, and reduce gender disparities in mining activities.

The target market included ASM operators, LSM companies, government agencies, NGOs, investors, and certification bodies. The competitive advantage lay in the simplicity and user-friendliness of the technology, its tailored approach for women, and its environmentally friendly materials.The outreach strategy emphasized community engagement, stakeholder partnerships, and extensive awareness campaigns. The revenue model encompassed product sales, partnerships, training services, data analytics, research, and certification programs.

Grace introduced her team, consisting of a geologist, mining engineer, and biotechnician, who led the development and implementation of the solution. They were focused on product development, with their roadmap including testing, infrastructure development, mass production, sales, partnerships, and scaling.

Overall, Grace envisioned a future where prosperity was shared, environmental impact was minimized, and responsible mining practices were upheld, inviting stakeholders to join the journey with Eco-her Green Gold Innovate.

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BATTLEFIELD ROUND TWO FINALISTS

Meq Mchomvu, Tanzania

Moahi Sustainable Solutions

Hg-free & efficient ASM mining - Improving health, wellbeing, and economic outcomes for women in gold ASM

Meq Mchomvu, a former small-scale miner from Tanzania and Executive Secretary of Tanzania Women in Mining and Mineral Industry, introduced a collaborative project with Moahi Sustainable Solutions to address critical challenges within the ASM sector, particularly in the Great Lakes region. The project aimed to promote sustainable, responsible, and mercury-free gold extraction across 12 countries in the region, involving 20 million people, including 4.5 million women.

The proposed mercury-free extraction technology seeks to reduce mercury usage by 87%, repollinate old tailings, and dispose of mercury professionally. Meq emphasized the transformative potential of the project, inviting judges not only to finance but also to actively participate in bringing about change in the mining sector.

The project's first phase requires a $30,000 investment, with $25,000 sought from the Battlefield research grant. This phase will focus on community engagement, education, training, procurement of processing equipment, capacity building, and demonstration camps. Subsequent phases will involve further studies, the establishment of demonstration centres, and a full-scale rollout over six years, initially targeting gold regions in Tanzania, then expanding to Kenya, Uganda, DRC, and other countries in the region.

Meq emphasized the project's commitment to ASM sector development and invited judges to join in creating a lasting impact, particularly for women and youth.

The goal of this project is to redefine the mining sector narrative, fostering sustainable coexistence between ASM and LSM while promoting commercialization and formalization.

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Bright Foli, Zambia

Amira Global

From Waste to Cobalt - Valorization of cobalt from mine waste using local Pan-African talents.

Bright Foli, Program Manager at Amira Global and spearheading the Pan-African Decarbonization Institute project (PADI), presented his research concept 'From Waste to Cobalt - Valorization of cobalt from mine waste using local Pan-African talents'.

Waste to Cobalt emerged from a client's need to extract cobalt from slag rich in copper and cobalt. Bright orchestrated the collaboration of nine researchers across five African countries through PADI to address this challenge.

The project's significance lies in its dual purpose of waste reduction and cobalt production critical for the energy transition. It also fosters collaboration between ASM and LSM through a collaborative skills enhancement model.

Operationalizing this project would involve key components, including engaging local talent, conducting skills transfer workshops, and forging partnerships with ASM cooperatives to ensure community involvement and project success.

Funding for Waste to Cobalt primarily stems from Amira's network of mining companies, supplemented by potential collaboration with other partners to sustain the program long-term. The project is projected to unfold over twelve months, divided into six main work packages covering researcher assignments, literature review, laboratory testing, technical analysis, capacity building workshops, and project reporting.

With Bright's leadership and Amira's support, Waste to Cobalt aims to yield substantial results in waste reduction, cobalt production, and collaborative mining practices. This initiative would signify a step towards a more sustainable and responsible future in the mining industry.

Bright and the team invite potential investors to join them in driving meaningful change and contributing to a brighter, more sustainable future.

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Francesco Zanin, Italy

Particular Materials

ElemenTag - Put your invisible, permanent signature in everything you manufacture.

Francesco Zanin introduced "Elementag", an innovative nanomarker designed to seamlessly integrate into any material or product, enabling traceability, authenticity, and resistance to counterfeiting.

Francesco highlighted three key aspects: the team's identity, the origin of Elementag, and its relevance for the Mining sector, stressing its potential in the context of LSM & ASM collaboration. Particular Materials, founded in 2017, has spent the last seven years developing sustainable and cutting-edge technologies in the nanomaterials space.

Their projects have focused on recovering metals from industrial wastewaters and developing new technologies for green hydrogen production. Elementag, their latest innovation, offers a discreet alternative to traditional track and trace technologies, being a sort of artificial DNA for products and materials.

Elementag has been successfully tested on various substrates (plastic, metal salts, ceramic, leather, fabric, etc.) and its detection relies on the XRF technology, ensuring seamless integration into existing mining operations. Francesco emphasized Elementag's relevance to Mining in addressing the shortcomings of traditional traceability methods, especially in ensuring transparency and accountability linked to responsible sourcing and the green transition.

Today, raw materials lack robust physical traceability, making them susceptible to dilution and contamination. Elementag offers a simple yet robust solution, enabling traceability throughout the supply chain. In the context of ASM, where informality poses significant challenges, Elementag can play a crucial role in formalizing operations, supporting ASM operators seeking collaboration with LSM and official market channels.

Francesco concluded that Elementag represents a significant advancement in enhancing traceability and accountability within the Mining industry, promising to foster responsible sourcing and sustainable practices.

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Japhet Bukongo, Congo
Transition Mining Solutions
The Community-Centred Resource Development Hubs (CCRDHs)

Japhet Bukongo, a dedicated chemical engineer from the Democratic Republic of Congo (DRC), presented his innovative solution, 'The Community Centered Research and Development Hub' (CCRDH). His innovation aimed at addressing critical issues in mining communities, specifically in the DRC.

Having firsthand experience of the challenges faced by mining communities, Japhet outlined CCRDH's focus on tackling environmental degradation, unsafe working conditions, conflicts, and the unequal distribution of benefits. These issues not only hinder economic progress but also threaten community well-being.

CCRDH could represent a transformative approach to mining, prioritizing community welfare, environmental restoration, and sustainable economic growth. By empowering local communities and bridging the gap between large-scale and artisanal mining through capacity-building programs, CCRDH aims to enhance efficiency and foster responsible practices.

Additionally, CCRDH's conflict resolution mechanism ensures transparent communication between stakeholders, while their revenue-sharing agreement promotes economic equity.

Japhet proposed leveraging the $25,000 research grant strategically for infrastructure development, capacity-building programs, community development projects, and environmental remediation. However, he acknowledged the need for additional investment from government and stakeholders for long-term success.

In conclusion, CCRDH is not merely a solution but a catalyst for transformation in the mining sector, promising a more responsible and sustainable future for communities in the DRC.

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BATTLEFIELD ROUND ONE FINALISTS

Andrew Kulwa Buluba, Tanzania

Geologist, Geological Survey of Tanzania
ASM and LSM eLearning platform - Learn to discover more.

Andrew Kulwa Buluba brought forward his concept 'ASM and LSM eLearning platform - Learn to discover more'. He outlined the challenges between ASM and LSM, including differing objectives, conflicts, and economic disparities. His proposed solution was an e-learning platform aimed at promoting inclusive decision-making, capacity building, technology transfer, and fair benefit-sharing mechanisms to bridge the gap between ASM and LSM.

The uniqueness of his idea lies in its holistic approach, integrating tailored content, interactive learning, collaborative spaces, localization, real-life case studies, continuous improvements, and diverse expertise. The platform aims to revolutionize ASM and LSM relationships, contributing to energy transition, cleaner processes, compliance guidance, and collaborative initiatives. Implementation would involve needs assessment, content and platform development, partnerships, testing, and continuous improvement over one year.

The expected accomplishments include knowledge empowerment, sustainable practices promotion, safety standards enhancement, compliance facilitation, industrial transformation support, and contribution to Sustainable Development Goals. Overall, Andrew's innovation aimed to promote a responsible, inclusive, and sustainable mining industry aligning with global development goals.

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Josh Warner, United Kingdom

Terra-trace
Terra-trace: Bringing clarity to the metal supply chain to enable more informed purchases
Josh Warner introduced TerraTrace, an innovative concept revolutionizing mining industry practices by enhancing transparency and responsibility. TerraTrace integrates mining accreditation with metal traceability to enlighten consumers about the origins of metals in their products.

Through user-friendly package labeling akin to the UK's food labeling system, consumers easily discern responsible mining practices, fostering informed purchasing decisions. Leveraging blockchain technology, TerraTrace would ensure the security and integrity of metal tracing efforts, allowing consumers to understand the journey from mine to product via QR code scanning.

Seeking a $25,000 investment for blockchain development, website design, and marketing, TerraTrace aimed to catalyze positive industry change. This innovation offers companies the opportunity to appeal to environmentally conscious consumers, commanding premium prices and generating revenue through facilitated transactions.

TerraTrace plans strategic partnerships with ASM miners, blockchain developers, and progressive companies to refine and optimize its approach, advancing towards a more transparent, responsible, and sustainable future for the mining industry.

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Naomi Nangoku Mumoita, Uganda

Ministry of Energy and Mineral Development

Addressing Environmental effects of ASM mining

Naomi Nangoku Mumoita introduced an innovative solution to the challenges of ASM, focusing on tin mining. ASM operations, known for their informal and unregulated nature, pose significant environmental risks despite their role in identifying mineral-rich areas.

The proposed approach integrates ASM operators into the larger mining framework, leveraging the strengths of both ASM and large-scale miners while addressing environmental concerns. Large-scale miners would acquire concessions, providing regulatory compliance and resources for responsible practices. ASM operators would participate across the value chain under the guidance of larger entities, ensuring social security and market access.

This collaboration emphasizes environmental stewardship through advanced technologies and mitigation strategies. Scaling up this approach with investment could enhance tin production and facilitate a just energy transition, offering benefits for both ASM operators and large-scale miners, and promoting sustainable mining practices globally.

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Massaran Traore, Mali

ARDI

Innovation in the ASM sector, bridging the knowledge gap in LSM-ASM in Mali

Massaran Traore's project, 'Innovation in the ASM Center: Bridging the Knowledge Gap,' focused on establishing a pilot centre for ASM innovation in Mali's Kayes Region. The initiative aims to assess the feasibility of setting up the center within budget and time constraints by researching existing solutions, including efforts by multinational companies in the Kéniéba region.

The project intends to involve local female organizations in solutions that are already being developed by companies and organisations. It aims to strengthen these groups and formalize their activities, a crucial need given the prevalent use of harmful chemicals in ASM, which is endangering community members.

As part of Massaran's PhD work, the project will provide miners with information and training, including guidance on licensing processes and access to formal mining sites. Stakeholder engagement, including local authorities and large-scale mining companies, will be central, addressing the lack of knowledge about formalization processes.

In its second phase, the project plans to strengthen the LSM and ASM platform, expanding it to include ASM sector leaders from the Kéniéba district. This collaborative approach aims to foster sustainable coexistence between ASM and LSM, ultimately implementing responsible mining practices in Mali.

Bruce Cosgrove, Canada

Manipueira Gold Recovery Technology

Manipueira to replace cyanide in gold ore leaching

Bruce Cosgrove, President/CEO of Manipueira Gold Recovery Technology presented his ESG driven and scalable climate action initiative. Over five years, they have researched human health threats and biodiversity destruction caused by artisanal miners' use of mercury and cyanide salts to recover gold from ore.

In response to the issues discovered, they intend to revolutionize the artisanal gold mining industry by replacing mercury and cyanide salts with Manipueira, a plant-based solution extract from the cyanogenic bitter cassava plant. Our innovative approach promises to recover 2-3 times more gold sustainably, with significantly lower costs and environmental impact.

They've designed a Manipueira precious metals leaching centre pilot plant, aiming to repurpose existing mercury amalgamation processing centres.

Ongoing research aims to increase cyanide concentration in cassava plants, further reducing reliance on traditional cyanide salts. Collaboration between artisanal and large-scale miners in adopting plant-based extraction methods will promote sustainability and align with global clean energy initiatives. This approach fosters inclusivity, community empowerment, and socially responsible mining practices, contributing to a cleaner, more responsible resource extraction industry.

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Donald Yates, Australia

COLUMBUS Group

HSI can assay 'in-the-field', so much better than a smart metal detector

Donald Yates from COLUMBUS Group presented his innovative technology, 'Find the BEST', which uses Hyperspectral imaging (HSI) with artificial intelligence (AI) to address the difficulties in detecting compounds, particularly gold. HSI technology began being used in a mining context in 2004 to detect gold, silver, copper and lithium. While this was the most effective technology available, its truck-mounted set-up was not convenient.

Find the BEST overcame this challenge by (A) reducing the size of the detection system to a torch-like hand held multi-beam, topological cavity laser to scan terrain and use Ai energy-saving electronics to logically assemble the analysis data. This hand-held technology innovation, HSI with Ai, advances gold mining by providing a developed and refined method for faster discovery of new and profitable ore bodies.

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DEVELOPMENT PARTNER INSTITUTE

ABOUT DEVELOPMENT PARTNER INSTITUTE

The Development Partner Institute was founded to tackle intractable, multi-stakeholder sustainability challenges in mining by connecting the global value chain. Through facilitating conversations, convening events, and catalysing projects, we unlock transformative potential and accelerate mining's contribution to a better future.

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INVESTING IN AFRICAN MINING INDABA

ABOUT INVESTING IN AFRICAN MINING INDABA

Also known as Mining Indaba, the world's largest mining investment conference and exhibition is dedicated to the successful capitalisation and development of mining interests in Africa. For almost 30 years, Mining Indaba has held a unique and widening perspective of the African mining industry, bringing together international and African stakeholders, visionaries and innovators from across the spectrum. We are also dedicated to supporting education, career development, sustainable development and as a next-generation platform to help economies thrive in Africa.

The 4-day Mining Indaba event attracts junior, mid-tier and major mining companies, along with global and continental investors, heads of state, ministers and Africa's leading policymakers.

miningindaba.com