

The 26th Annual International Conference joined by,
RobMech, PRASA and AMI, co-hosted by **CSIR and Tshwane University
of Technology, Pretoria**

RAPEDASA

RAPID PRODUCT DEVELOPMENT ASSOCIATION OF SOUTH AFRICA

Annual

www.rapdasa.org

CONFERENCE

27 - 30 OCTOBER 2025

CSIR International Convention Centre in Pretoria, South Africa

**BRIDGING THE GAP BETWEEN
INDUSTRY & ACADEMIA**

CONFERENCE BOOKLET

Co-hosted by CSIR and Tshwane University of Technology



RAPDASA

RAPID PRODUCT DEVELOPMENT ASSOCIATION OF SOUTH AFRICA



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The Hosts



CSIR

Touching lives through innovation

The Council for Scientific and Industrial Research
<https://www.csir.co.za/>



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We empower people

Tshwane University of Technology, Pretoria
<https://www.tut.ac.za>

Conference Sponsors

A huge thank you to all of the Conference Sponsors!

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www.necsa.co.za



Stellenbosch University (SU)
www.su.ac.za



Exhibitors

Listed alphabetically, also featured on <https://site.rapdasa.org/exhibitors/>

EXHIBITOR	WEBSITE
Aditiv Solutions	www.aditiv.co.za/
AFSA (Aluminium Federation of South Africa)	www.afsa.org.za/
AMT 3D	www.amt3d.com
Anton Paar Southern Africa	www.anto-paar.com.za
CK Connectors t/a Proto Prints	www.protoprints.co.za/
CRPM / CUT	www.crpm.co.za
CSIR	www.csir.co.za
DSTI	www.dsti.gov.za
Elogium	www.elogium.co.za
HH Industries	www.h-h.co.za/
NECSA	www.necsa.co.za/
SIMTEQ Engineering	simteq.co.za/
TUT (Tshwane University of Technology)	www.tut.ac.za
Verder Scientific	www.verder-scientific.com/
VUT	www.vut.ac.za
Weartech	https://weartech.co.za/

Exhibitors



Aluminium - light, strong and beautiful



Exhibitors Profiles

Aditiv Solutions



Aditiv Solutions is a local manufacturer of metal Powder Bed Fusion equipment. The HYRAX is their flagship machine which is designed, built and supported in South Africa. The HYRAX is easy to install, operate and maintain and is one of the most cost-efficient metal powder bed fusion machines on the market. The HYRAX is also the most commonly found metal 3D printer in South Africa today with 6 installations across the country.

www.afsa.org.za

Exhibitors Profiles

Aluminium Federation of South Africa (AFSA)



Aluminium - light, strong and beautiful

The Aluminium Federation of South Africa (AFSA) has actively promoted the awareness of and use of aluminium in South Africa since 1981. The federation is one of the most engaged aluminium industry associations globally. AFSA advocates for the South African aluminium industry at regional and international levels. South Africa's aluminium industry contributes significantly to the nation's economy, producing primary metal, secondary alloys, extrusions, rolled products, and various finished products.

AFSA's members enjoy various benefits, including access to technical information and advice, training, skill enhancement, market research, and business development support. The federation also plays a crucial role in representing and safeguarding the interests of its members in the market. Most AFSA members operate within sub-sectors such as primary and secondary aluminium ingot production, rolling, extrusion, and metal fabrication. The locally produced aluminium is used in architecture and construction, general engineering and fabrication, packaging and castings.

www.afsa.org.za

Exhibitors Profiles

AMT 3D



AMT 3D specialises in Advanced Metal Manufacturing Systems, supplying world-class metal 3D printing and machining solutions to the Sub-Saharan African market. Our mission is to make high-performance metal manufacturing more accessible, efficient, and cost-effective, enabling faster fabrication of precision-engineered metal parts.

AMT 3D is the authorised sales representative for BLT, Meltio, MX3D, and Amazemet across Sub-Saharan Africa. We provide industry-leading equipment, expertise, and support that span the entire metal manufacturing process from concept to finished part.

While Additive Manufacturing continues to transform industries such as aerospace, automotive, defence, oil & gas, medical, mining, and academia, we believe that true innovation lies in understanding how to integrate both additive and subtractive processes. Each technology brings unique advantages, and when used intelligently either individually or together they unlock new levels of capability, flexibility, and performance.

At AMT 3D, we don't just sell machines. We partner with our clients to identify the right technology for their specific goals providing honest, expert guidance and tailored manufacturing solutions that deliver the best possible outcomes at the best possible price. With one of the largest metal AM install bases in Africa, we're proving every day that advanced manufacturing isn't just the future, it's happening now, together with our clients.

www.amt3d.com

Exhibitors Profiles

Anton Paar Southern Africa



The Anton Paar Group develops, produces, distributes and provides support for analytical instruments used in research, development and quality control worldwide. Located in South Africa, Anton Paar Southern Africa (Pty) provides sales, application support and service to users across Southern Africa. Anton Paar produces high-end measuring and laboratory instruments for industry and research. It is the world leader in the measurement of density, concentration and CO₂ and in the field of rheometry. Other areas of specialty are: Petroleum testing, microwave synthesis, viscometry, polarimetry, refractometry, X-ray scattering, sample preparation and surface characterization.

www.anto-paar.com.za/

Exhibitors Profiles

Proto Prints



Protoprints is a South African-based supplier specialising in 3D-printing materials — in particular, high-quality PLA filament in various diameters and weights. Their online store lists locally manufactured PLA offerings (for example: “PLA – Yellow – 1 kg – 1.75 mm – New SA brand”).

They present themselves as a brand that empowers makers, engineers, educators and production specialists with the reliable materials needed to bring creative concepts to life. On their Instagram bio they say: “Whether you’re an innovator, educator, or production specialist, Protoprints provides the materials you need to bring your ideas to life – one...”

While the website itself has limited “about us” detail, the combination of product offering and brand positioning suggests the following traits:

A local South African source of 3D-printing filament and related supplies, addressing scarcity or lead-time issues associated with imports.

A focus on hobbyist to professional markets — from learners and makers through to engineers and production environments.

A value proposition anchored around reliability, consistency and local availability of 3D-printing materials (especially PLA) rather than being purely a design-oriented service.

<https://protoprints.co.za/>

Exhibitors Profiles

Centre for Rapid Prototyping and Manufacturing



CRPM will be exhibiting a selection of 3D printed models and showcasing our machinery, materials and some of our research and development projects, demonstrating how we bridge the gap between academia and industry through innovative additive manufacturing solutions.

The Centre for Rapid Prototyping and Manufacturing (CRPM) is located at the Central University of Technology, Free State (CUT) in Bloemfontein and was established in 1997 as part of a research initiative. At that time, Additive Manufacturing (AM) also commonly known as 3D printing, was in its infancy worldwide.

Through the foresight of the founders of the CRPM, a laser sintering machine was imported from Germany for research at the Faculty of Engineering. This was the fifth machine in the country. It was soon realised that our equipment could benefit industry by offering a service in rapid prototyping. This would fulfil one of the missions of the university which is to introduce new technology to the South African manufacturing industry.

The centre received ISO 13485 certification for 3D printing of medical devices making it the first centre in SA and Africa to receive this prestigious certification for an Additive Manufacturing Centre.

CRPM is proudly hosted by The Central University of Technology, Free State (CUT) in Bloemfontein.

www.crpm.co.za/

Exhibitors Profiles

The Council for Scientific and Industrial Research (CSIR)



The Council for Scientific and Industrial Research (CSIR) is a nationally-mandated research, development and innovation organisation in South Africa, established through an Act of Parliament in 1945.

Its vision is to be “accelerators of socio-economic prosperity in South Africa through leading innovation”, and its mission is to “collaboratively innovate and localise technologies while providing knowledge solutions for the inclusive and sustainable advancement of industry and society”.

The CSIR focuses on nine strategic clusters—such as Advanced Agriculture & Food, NextGen Health, Future Production (Manufacturing, Chemicals, Mining), Smart Mobility, Smart Places and Defence & Security—to deliver impact by marrying multidisciplinary science and engineering with real-world industrial and societal challenges.

With state-of-the-art infrastructure and experts, it positions itself as a solution partner to both government and industry, supporting technology localisation, industrial advancement, and improved quality of life for South Africans.

www.csir.co.za/

Exhibitors Profiles

The Department of Science, Technology and Innovation (DSTI)



science, technology
& innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA

The Department of Science, Technology and Innovation (DSTI) is a South African government department tasked with driving socio-economic development through research, technology and innovation. Its vision is “increased well-being and prosperity through science, technology and innovation” and its mission is to provide leadership, an enabling environment and resources for science, technology and innovation in support of South Africa’s development.

The DSTI’s role includes funding research infrastructure, developing high-end skills, supporting innovation commercialisation, fostering transformation of the national system of innovation, and enabling strategic technologies (for example national space and digital initiatives).

In late 2024, the department was officially renamed from the Department of Science and Innovation (DSI) to the Department of Science, Technology and Innovation (DSTI).

If you like, I can pull out their current strategic priorities, recent funding programmes, and how they engage with industry and academia.

www.dsti.gov.za/

Exhibitors Profiles

Elogium



ELOGIUM

IMPROVING OPERABILITY THROUGH INNOVATION

Elogium started in 2021 with a passionate vision to bring super polymer 3D printing technology and solutions to companies in Sub Sahara Africa. The process starts with identifying the customer's need, digitizing the components, preparing a simulation to determine if the design and selected material will solve the requirements, printing of a prototype and then printing of the final part in the selected polymer. Elogium believes in a partnership with customers to assist them to improve their operability through innovation. One of our core values is knowledge transfer and therefore Elogium provides training to develop entrepreneurs who wish to embark on the 3D or Additive manufacturing journey.

Elogium is based in Sasolburg and serves a wide variety of customers in various industries ranging from FMCG, Perto Chemical, Automotive, Agriculture, Aero Space, mining and Paper and Pulp.

www.elogium.co.za

Exhibitors Profiles

HH Industries



HH Industries is a dynamic company with expertise spanning four key focus areas, making it a significant player in the realm of advanced manufacturing and 3D printing services across Africa. With a strong commitment to innovation, sustainability, and excellence, the company offers a range of services tailored to meet the diverse needs of its clients.

<https://www.h-h.co.za/>

Exhibitors Profiles

The South African Nuclear Energy Corporation (NECSA)



The South African Nuclear Energy Corporation (Necsa) was established as a public company (in the 1940's) and is wholly owned by the State. The main functions of Necsa are to undertake and promote research and development in the field of nuclear energy and radiation sciences and technology; to process source material, special nuclear material and restricted material and to co-operate with persons in matters falling within these functions.

<https://www.necsa.co.za/>

Exhibitors Profiles

SIMTEQ Engineering



SIMTEQ Engineering is a specialist South African firm headquartered in Pretoria, founded in 1995.

Their core mission is to help product-development and manufacturing companies become more competitive by replacing expensive and time-consuming physical trial-and-error processes with advanced virtual simulation technology.

They offer a comprehensive suite of services and software solutions in computer-aided engineering (CAE), covering structural analysis, system dynamics, flow and thermal, acoustics & noise, fatigue/durability, multiphysics co-simulation, generative design & optimisation, digital manufacturing costing and lifecycle management.

SIMTEQ acts both as a reseller of global-leading simulation technologies and as a provider of training, consulting, knowledge-transfer and support services to help clients apply those tools effectively.

Overall, SIMTEQ Engineering positions itself as a strategic partner to help manufacturers reduce development cost, accelerate time-to-market, improve quality and performance, and manage risk through simulation-driven product and process innovation.

<https://simteq.co.za/>

Exhibitors Profiles

Tshwane University of Technology (TUT)



Tshwane University
of Technology
We empower people

Faculty of Engineering and the Built Environment will showcase innovative research, student projects, and academic programs through interactive displays, models, and multimedia presentations. The goal is to engage delegates ranging from prospective students to industry professionals by demonstrating the real-world impact of what the faculty does; disciplines, fostering collaboration, and enhancing the institution's visibility and reputation within the academic and professional community.

<https://www.tut.ac.za>

Exhibitors Profiles

Verder Scientific



Verder Scientific is the scientific-division of the globally active VERDER GROUP and specialises in the development and manufacture of high-tech laboratory and analytical equipment focused on solid-material sample preparation and subsequent analysis for both research & development and quality-control purposes.

With a workforce exceeding 1,300 employees, sales of over €300 million, 22 sales offices and 11 manufacturing sites, the company combines global reach with local service expertise.

Their product portfolio covers sample-preparation and analytical solutions across diverse technologies such as heat treatment, elemental analysis, materialography & hardness testing, milling & sieving, and particle characterization.

Founded originally from the Verder Group's pump-and-trading business in 1959, the scientific division has grown through strategic acquisitions (e.g., RETSCH, ELTRA, CARBOLITE) and remains family-owned and managed.

In its own words, Verder Scientific positions itself as a trusted solution partner enabling "economic, technological and environmental progress" for customers by helping them master their scientific applications — with the overarching aim of making the world healthier, safer and more sustainable.

www.verder-scientific.com/

Exhibitors Profiles

Vaal University of Technology (VUT)



VAAL UNIVERSITY
OF TECHNOLOGY

Inspiring thought. Shaping talent

We are the premier technology hub in the Southern Gauteng region and renowned for our distinguished Advanced Manufacturing Precinct.

Purpose is to drive and support innovation – applied research, research collaborations, prototype development, and production/engineering components. To transfer innovation – IP processing, commercialization, and contracting.

Finally, to transfer innovation skills – Idea To Product (I2P) and shoe manufacturing called Centre of Footwear Enterprise (CoFE).

www.vut.ac.za

Exhibitors Profiles

Weartech



Metal Powders for the AM Industry, Laser Cladding Machines, Explosion-Proof Vacuums and Sieving Stations suited for Additive Manufacturing.

Weartech has been supplying Metal Powders to the Thermal Spray, Welding and Metal-Injection-Moulding (MIM) industries for 40 years and from there has branched in to supplying Metal Powders to the Additive Manufacturing Industry. Apart from powders, Weartech also trade in Laser Cladding machines as well as AM related ancillaries such as explosion proof vacuum cleaners, sieving equipment and de-powdering cabinets.

<https://weartech.co.za/>

2025 RAPDASA-ROBMECH-PRASA-AMI CONFERENCE

Technical Committee

CONFERENCE EDITOR:

**Prof Willie du Preez (Visiting Professor, Central University of
Technology, Free State)**

GUEST EDITORS:

Pre-conference seminar on Design and additive manufacturing of
titanium and platinum group metal parts, as well as Materials engineering
B

Dr Thywill Dzogbewu (Central University of Technology, Free State)

Computational and Data-Driven Modelling A

**Dr David Tshwane (NITheCS: National Institute for Theoretical &
Computational Sciences)**

Computational and Data-Driven Modelling B

Prof Hasani Chauke (University of Limpopo)

Computational and Data-Driven Modelling A

Dr Ramogohlo Diale (Mintek)

Materials Engineering A

Dr Gerrit ter Haar (Stellenbosch University)

Materials engineering B

Dr Lerato Tshabalala (CSIR-NLC)

Process Development

Dr Jaco van der Walt (Summit Renewables)

Additive Manufacturing Material and Part Characterisation

Dr Hertzog Bissett (South African Nuclear Energy Corporation)

Additive Manufacturing Post Processing and Qualification

Prof Thorsten Becker (University of Cape Town)

Product Design and Development

Mr Heinrich van der Merwe (Fabco Technologies)

Rapid Casting, as well as Materials Engineering B

Dr Joseph Moema (Mintek)

Robotics and Mechatronics A

Dr Natasha Botha (CSIR)

Robotics and Mechatronics B

Dr Callen Fisher (Stellenbosch University)

Pattern Recognition

Dr Hairong Wang (University of the Witwatersrand)

Posters

Dr Bathusile Masina (CSIR)

Reviewers

CONTRIBUTING TO THE 2025 RAPDASA-ROBMECH-PRASA-AMI CONFERENCE PROCEEDINGS

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REVIEWERS 2025 (continued)

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Prof Claudia Polese	



Foreword and Welcome

Foreword and Welcome by the 2025 RAPDASA Conference Chair:



Dr Ntombi Mathe-Maleboho

It is my great pleasure to welcome you to the RAPDASA 2025 Conference, held under the theme “Bridging the Gap between Industry and Academia.” This year’s gathering provides an invaluable platform to align cutting-edge research with the practical needs of industry, fostering collaboration that drives innovation, competitiveness, and socio-economic impact.

As the manufacturing landscape rapidly evolves under the influence of digitalisation, advanced materials, and the Fourth and Fifth Industrial Revolutions, our ability to co-create solutions across academia and industry becomes ever more critical. By sharing knowledge, insights, and practical experiences, we collectively accelerate technology transfer, ensure skills relevance, and create sustainable pathways for industrial growth.

We extend our gratitude to all contributors, partners, and participants who make this conference possible. Together, we reaffirm RAPDASA’s role as a catalyst for innovation and as a bridge between knowledge creation and industrial application.

Dr Ntombi Mathe

DIMITRI DIMITROV SCHOLARSHIP

In honour of Prof Dimitri Dimitrov

Enabling Student Participation

Financial aid for postgraduate students to attend and present at the annual RAPDASA conference

Make your donation to grow the number of students attending future conferences and ensure sustainability via the Snapscan QR code.



RAPDASA

For more information, visit
www.rapdasa.org

Submission for Review Process

A formal “Call for papers” for the 26th Annual International RAPDASA Conference joined by RobMech, PRASA and AMI, co-hosted by CSIR and Tswane University of Technology, was issued in January 2025 to submit an extended abstract within the identified conference themes. Extended Abstract submissions were subjected to an internal reviewing process by the Track Chairs. The authors of successful submissions were notified and invited to submit a full paper, which was intended for publication in the conference proceedings. Both the extended abstracts and full papers were submitted online through the EasyChair conferencing system, whereafter acknowledgement of receipt was sent to authors through the system. Authors were informed that their submitted full papers would be subjected to a double-blind review process.

The following dates were set by the technical committee:

- First call for abstracts for conference: **13 January 2025**
- Deadline for submission of abstracts: **17 March 2025** (including posters)
- Notification of acceptance of extended abstracts: **24 March 2025** (including posters)
- Extended deadline for submission of extended abstracts for posters: **31 May 2025**
- Notification of acceptance of poster abstracts: **17 June 2025**
- Deadline for submission of industry abstracts: **6 June 2025**
- Deadline for submission of full papers: **9 June 2025**
- Feedback on paper reviews: **4 August 2025**
- Submission deadline for poster text: **30 August 2025**
- Submission deadline for final revised papers: **1 September 2025**
- Submission deadline for poster designs: **26 September 2025**

Extended Abstracts were required to be a maximum length of 2 pages. Full papers were required to comply with the Author Guidelines and template provided on the conference website and in EasyChair. A double-blind peer

review process was used in the selection of full papers for publication in the conference proceedings. Throughout the review process the authors' identities were concealed from reviewers and the reviewers' identities were concealed from the authors. Each full paper was sent to a minimum of two reviewers, with a third reviewer being requested in case of a lack of consensus between the first two reviewers. The reviews were performed by national and international academics and other experts in the respective field, listed on the Reviewers page under the Technical Committee heading. Reviewers were asked to review submissions according to the following criteria and were encouraged to provide recommendations and suggestions.

- Does the title reflect the contents of the paper?
- Does the paper relate to what has already been written in the field?
- Do you deem the paper to be proof of thorough research and knowledge of the most recent literature in the field of study?
- Is the paper clearly structured, easy to read and with a logical flow of thought?
- Are the arguments employed valid and supported by the evidence presented?
- Are the conclusions clear and valid?
- Does the paper conform to accepted standards of language and style?
- Any other recommendation(s)?

Reviewer feedback was saved in the EasyChair submission system, from where emails together with review comments were sent to the authors, requesting them to submit a rebuttal to the review reports and a revised paper. The authors were given 2 to 3 weeks to prepare these documents, after which the revised document was reviewed by the Track Chair for adequate response to the review reports. If satisfactory, the revised paper was recommended to the Conference Editor for acceptance and publication in the conference proceedings.

Based on the outcome of the double-blind peer review process and the recommendations of the reviewers, five to ten papers of high quality that complied with the scope of the journal, were selected from the papers submitted to the conference and were submitted to the South African Journal of Industrial Engineering (SAJIE) to be considered for publication as journal articles. These papers were not included in the conference proceedings and were subjected to SAJIE's editorial process.



Invited Speakers

Prof Khalid Zarbane



4D printing is an advanced/augmented form of additive manufacturing that combines the principles of 3D printing with the use of smart materials to manufacture components and structures whose aspect, shape, properties, and functionality can change in a controllable manner over time when exposed to an external energy source or other environmental stimuli. The term “4D” refers to the fourth dimension, namely time, highlighting the dynamic behavior of these components or structures.

Since its conceptualisation in 2013, this technology has the potential to revolutionise a wide range of fields such as medical, robotics, construction, aerospace, architecture, fashion, etc. 4D printing is therefore a very promising and valuable area of research.

In the medical field, researchers are creating 4D-printed implants, stents, and artificial organs that can automatically adapt to patients’ needs. In the construction sector, 4D printing makes it possible to create buildings that can change and adapt to environmental changes, such as wind, humidity, or temperature. This could make them more efficient and less wasteful of raw materials and energy. The aerospace industry is another field where 4D printing could have a significant impact. Parts printed in 4D could be designed to change shape in response to changes in the environment, such as temperature or pressure. This could lead to more efficient, safer aircraft that are better able to withstand the stresses of flight.

Despite the many potential benefits of 4D printing, there are still many challenges to overcome. One of the biggest challenges is the development

of new materials that can self-assemble or transform in the desired way. Researchers are also working to improve the accuracy, speed, scalability, and integration of materials in 4D printing, as well as finding ways to integrate this technology with other manufacturing processes. The interdisciplinary nature of 4D printing, which spans several fields, highlights the importance of collaboration between different disciplines. This collaboration, which transcends disciplinary boundaries, has the potential to solve complex challenges, stimulate innovation, and pave the way for holistic solutions. Other challenges must also be addressed, including the development of design and simulation tools capable of visualising the properties of smart materials and optimising 4D-printed objects, the integration of 4D printing technology with artificial intelligence (AI) to facilitate prediction, as well as regulation and standardisation to ensure the safety of materials, intellectual property, reliability and consistency of 4D printed objects.

Biography

Khalid ZARBANE is a professor at the Ecole Supérieure de Technologie, Hassan II University of Casablanca (Morocco). In 2009, he obtained his PhD from the University of Poitiers (France). He is currently head of the Dynamic Systems and Smart Factory (D2SF) team, Laboratory of Computer Science and Smart Systems (C3S), and President of the Moroccan Association of Additive Manufacturing and 3D Printing (AMFAIM3D).

Since 2022, Pr. Khalid ZARBANE has been a member of the editorial board of the “Materials Engineering” section of MDPI’s ENG journal, a member of the “Editorial Key Reviewers Committee” of the Journal of Achievement in Materials and Manufacturing Engineering (JAMME)”, an associate editor of the ‘Archive Materials Science and Engineering (AMSE) Journal’ and a member of the editorial board of the ‘Special issue: Additive Manufacturing in Africa’ of the Scientific African Journal.

Prof. Khalid ZARBANE received an honorary diploma from Poland’s AMME WORLD ACADEMY (World Academy of Materials and Manufacturing Engineering) for his cooperation with the Polish academic community in the field of materials science. He has over 69 publications to his name, including 5 scientific chapters and 29 Scopus-indexed papers.

Johan Maartens



Bridging the Gaps

Two of the gaps that are currently facing South Africa industries:

1. The gap between industry and education, which arises from both internal and external constraints imposed on these sectors. This has led to the development of separate profit centers within industry and education, ultimately disadvantaging individuals who lack the financial resources to acquire the necessary education and skills to enter the workforce.
2. The gap between knowledge and certification, which is exacerbated by evolving legal requirements and the tendency of engineering practitioners to dismiss warnings that are perceived as exaggerated or alarmist.

Biography

Johan Maartens is a seasoned professional engineer with over 40 years of experience in electrical engineering, instrumentation, IT, project management, and automation.

He has held key roles in the petrochemical and the automation supplier industries.

He is an active member of the Engineering Council of South Africa (ECSA), trained as a Mentor and Virtual Panel Member, and has significantly contributed to the development of training guidelines and codes of practice

for Mechatronics. He was also involved in the latest definition of the Identification of Engineering Work (IoEW) for Mechatronics and Computer Engineering.

He currently serves as CEO and Director of SAIMC. He holds engineering and science degrees from North-West University.

Sergio Sanchez



Enabling South Africa's Additive Manufacturing Future: From Standards to Real-World Impact

Additive manufacturing (AM) presents a strategic opportunity for South Africa to enhance industrial competitiveness, drive local innovation, and address critical socio-economic challenges. This presentation maps a practical pathway from standards development to measurable real-world impact. It examines local capability development in South African AM landscape focusing on design for additive manufacturing, quality assurance and safety applicable to different industry sectors. Emphasis is placed on the pivotal role of standards and conformity frameworks for material qualification, process control, testing, personnel qualification and quality assurance to unlock adoption at scale. The talk highlights on ASTM AM CoE initiatives that catalyzes AM adoption globally and how it can be transferred to the South African AM ecosystem. Case studies illustrate how standards-enabled AM solutions can reduce lead times, lower costs, localize critical supply chains, and create high-value parts while meeting safety and regulatory requirements. The presentation concludes with key take aways to guide stakeholders across industry, government, academia, and standards bodies toward a resilient, inclusive AM ecosystem that delivers economic and social impact for South Africa.

Biography

Sergio H. Sanchez is a seasoned leader with over 15 years of experience in additive manufacturing, advanced materials, and product development, spanning roles at NxStage Medical, The Boeing Company, and Jabil Inc. With deep expertise in standards, material testing, quality systems, and pre-sales and business development, he has delivered impactful solutions across aerospace, defense, and medical industries.

At NxStage Medical, Sergio contributed to the development of medical technologies, navigating complex regulatory environments with a focus on quality and innovation. At Boeing, he integrated advanced materials and manufacturing technologies into key airplane programs, driving cost reductions and improving operational efficiency. At Jabil, he provided pre-sales and technical support to commercial teams, optimizing quality systems and manufacturing processes to meet the demands of highly regulated markets.

Now, as Director, Business Development and Strategic Relations at ASTM AM CoE, Sergio leverages his technical expertise and strategic acumen to help customers solve challenges and achieve measurable progress. He works across the supply chain to align customer needs with innovative solutions, collaborating with industry, government, and academia to drive the adoption of advanced manufacturing technologies and standards.

Sergio holds both Bachelor's and Master's degrees in Plastics Engineering from the University of Massachusetts Lowell and recently completed a Professional Certificate in Sales from Northwestern University's Kellogg School of Management. Fluent in English and Spanish, he is skilled at building trust, fostering collaboration, and delivering impactful results.

Based in Miami, FL, Sergio is passionate about advancing innovation, enabling progress, and supporting customers in achieving their goals.

Prof Kingsley Obodo



Harnessing Computational Material Science in Africa: From Fundamental Discovery to Societal Impact

Computational science stands at the forefront of modern scientific discovery, driving innovation across diverse disciplines—from pharmacology, engineering, and materials design to clean energy and sustainable development. This invited presentation will highlight how computational and machine learning approaches can be strategically harnessed to address both fundamental scientific challenges and pressing societal needs within the African context. The first part of the presentation will demonstrate the use of first-principles methods and machine learning models in accelerating materials discovery for critical technologies, with examples drawn from space materials, catalyst design and screening, and battery materials. The focus will be on both 2D and 3D materials, emphasizing how deeper understanding of material properties enables accelerated discovery and innovation. The second part will explore the application of machine learning techniques in biogas production optimization and quantum systems. Specifically, it will discuss models such as RSM, ANN, ANFIS, ARIMA, and hybrid RSM-GA methods for optimizing ozone-pretreated biogas systems, alongside analytical–ML frameworks that combine the Klein-Gordon equation with machine learning regressors (Random Forest and Neural Networks). These hybrid approaches provide efficient tools for predicting the energy spectra of diatomic molecules, effectively bridging quantum mechanics with data-driven modelling. Collectively, these examples underscore how computational materials science and artificial intelligence can bridge the gap between academic research and industrial application, enabling

sustainable innovation. Beyond the scientific insights, the presentation will also emphasize the role of computational research in capacity building, mentorship, and infrastructure development across Africa—fostering regional collaboration and strengthening the continent’s contribution to the global knowledge economy.

Biography

Kingsley Onyebuchi Obodo is a professor at school of Agriculture and Science at University of KwaZulu-Natal, South Africa. He currently serves as an adjunct professor at Addis Ababa University, extra-ordinary associate professor at North-West University, and a visiting professor at ACES-SPED, University of Nigeria. He holds a B.Tech. in Physics and Electronics Technology from Nnamdi Azikiwe University, Awka, Nigeria, an M.Sc. in Materials Science from the African University of Science and Technology, Abuja, Nigeria, and a Ph.D. in Physics from the University of Pretoria, South Africa. He is an NRF C2 rated researcher as well as a professional member of the South African Institute of Physics and an associate of the National Institute for Theoretical and Computational Sciences, South Africa. His research interests are in computational condensed matter physics and materials science. He is deeply committed to mentoring and supervising students across Africa, contributing to the next generation of scientists based on this he has organized and co-lead several capacity building workshops. With extensive experience both in teaching and learning as well as research, he has authored several research publications in high impact journals as well as given several invited conference presentations.

Dr Shathani Nkhwa

Meng Biomedical Engineering, PhD Biomaterials

Institution: University of Botswana, Faculty of Medicine, Department
Biomedical sciences



Beyond the Blueprint: Regenerative Medicine and 3D Printing – Building a Multidisciplinary Platform for Personalized Surgical Care and Health Equity in Africa

In Botswana, the promise of regenerative medicine and 3D printing remains largely untapped due to limitations in infrastructure, skilled personnel, and access to patient-specific biomedical technologies. This presentation shares the journey of establishing a first-of-its-kind Regenerative Medicine Lab at the Sir Ketumile Masire Teaching Hospital (SKMTH) in Botswana. The lab integrates two synergistic arms: a biomaterials and 3D printing section, and a tissue culture section focused on human cell banking and tissue engineering.

The biomaterials and 3D printing wing builds on a previously published proof-of-concept study demonstrating the local design and manufacture of patient-specific implants using accessible digital technologies. Meanwhile, the tissue culture section is currently being equipped for human cell banking and research on regenerative constructs, with the aim of supporting context-relevant innovation and setting the stage for future applications such as bioprinting, lab-on-a-chip platforms, cell therapies, drug screening platforms, and personalized surgical solutions.

This work offers insights into building translational research capacity in resource-limited settings, fostering cross-sector collaboration, and laying the groundwork for a future where Africa leads in its own biomedical solutions.

The presentation will reflect on challenges, creative problem-solving, and the broader vision: decentralizing surgical innovation, improving health equity, and establishing a continental ecosystem where personalized care is made by and for African populations. This is not just a lab—it is a call to reimagine what's possible.

Biography

Dr Shathani Nkhwa is a regenerative medicine and additive manufacturing specialist, focused on finding and developing affordable means of advancing Regenerative medicine (biomaterials, tissue engineering) and medical device fabrication in Botswana. Her undergraduate was in Biomedical Engineering at the University of Sheffield. Her PhD in Biomaterial development of resorbable synthetic grafts for tissue regeneration from King's College, London focused on the development of orthobiologic dual network composites for bone regeneration. The developed synthetics grafts were suited for technology transfer clinical translation. Her research focuses on Biomaterial development for tissue regeneration, additive manufacturing – 3D printing in medicine, and tissue culture.

Currently based at the University of Botswana, Dr Nkhwa established a research lab (Regenerative Medicine Lab) at Sir Ketumile Masire Teaching Hospital in xxx. The lab caters for biomaterial development and 3D printing, and tissue engineering. Funding allowing, the lab has the capacity to train master's and PhD students. Dr Nkhwa has developed strong collaborations locally (Botswana Institute for Technology Research and Innovation), regionally (Central University of technology, South Africa) and internationally (WHO Collaborating Centre, University of Sheffield (UK) & University of Pittsburgh (USA)).

Dr Luyolo Mabhali

Executive Cluster Manager, CSIR Future Production: Manufacturing



Shared infrastructure for accelerating technology transfer

This talk addresses a critical obstacle in manufacturing innovation: the prohibitively high cost of accessing today's infrastructure and testing capabilities for South African industries. The CSIR has strategically developed world-class, multi-user national facilities to bridge this gap and accelerate the transfer of research and technology into local industry. The talk will showcase how academic researchers, large enterprises, and SMMEs can leverage world-class infrastructure to de-risk innovation, prove concepts, and scale production.

Specific facilities discussed will include the ecosystem for advanced material development and qualification: Powder Atomisation, Casting, Metal Injection Moulding, and the Hot Isostatic Press. Furthermore, the talk will detail the utility of the Additive Manufacturing labs, the quality assurance provided by the Non-Destructive Testing and Acoustic Testing Facility, and the capabilities of the Mechanical Testing Lab and Forensic Engineering Lab. The discussion will also highlight the integration of the Learning Factory and Smart Factory concepts, which provide a hands-on environment for research into production digitisation and the rapid training of a future-ready workforce, transforming academic breakthroughs into industrial reality.

Biography

Dr Luyolo Mabhali, Executive Cluster Manager for CSIR Future Production: Manufacturing, has over 15 years of expertise in driving innovation across manufacturing, and research. He holds two PhDs, one in Metallurgical Engineering and another in Innovation Management, as well as an MBA from the University of the Witwatersrand and Wits Business School.

In his former role as a Research Group Leader at the Photonics Centre, previously known as the CSIR National Laser Centre, Dr Mabhali showcased his extensive knowledge in laser applications. He steered research efforts in laser additive manufacturing and surface engineering, making significant contributions to the field. This expertise is reinforced by his experience as a Research and Development Manager at the South African Mint Company, where he drove forward materials and processes critical to the minting industry.

His background as a Senior Engineer at ArcelorMittal South Africa, where he specialised in process modelling and coke production, further speaks to his versatile skill set in manufacturing. Dr Mabhali merges academic insight with practical experience, cementing his role as a leader in driving manufacturing innovation.

As a member of the South African Institute of Mining and Metallurgy, Dr Mabhali remains engaged in the industry to ensure that he is at the forefront of advancements in metallurgy and manufacturing.

Dr Mmboneni Muofhe



Circularity – A New Opportunity for Economic Growth

The concept of circular economy is gaining global traction as an effective approach to achieving a sustainable, resource efficient, and low-carbon economy, with added potential to unlock new jobs and businesses. Circularity can serve as a powerful enabler for reindustrialisation and inclusive socio-economic development in the South African context. Referring to the Circular Economy Science, Technology and Innovation Strategy, this address will demonstrate how circular practices can unlock value across priority sectors, including manufacturing, agriculture and mining. A key focus will be placed on the role of additive manufacturing (AM) as a high-impact enabler of circularity. AM offers the ability to drastically reduce material waste, extend product lifecycles, localise production, and support customised, low-volume manufacturing — all of which align closely with the circular economy principles of designing out waste and keeping materials in productive use. In the South African context, AM holds particular promise for boosting SMME participation, revitalising local value chains, and reducing reliance on imported goods and materials. In a resource-constrained yet innovation-rich environment like South Africa, circularity is not only a sustainability imperative, but a developmental pathway to economic renewal and social equity. This keynote invites stakeholders across sectors to co-create a future where circularity and technology intersect to drive an innovation-led response to modernization through low carbon, sustainable and circular practices that will boost sector productivity and ultimately economic development of the country.

Biography

Dr. Mmboneni Muofhe is the Deputy Director-General (DDG) for Socio-Economic Innovation Partnerships at the Department of Science, Technology and Innovation in South Africa. Dr Muofhe previously held the position of Deputy Director-General for International Resources and Cooperation and Deputy Director-General for Technology Innovation in the same Department. He has years of experience in the South African Science, Technology and Innovation System and the global innovation systems in general, which includes doing scientific research, managing research, international cooperation, development and implementation of innovation funding schemes and various innovation initiatives and instruments.

Dr Muofhe led the implementation of various science, technology and innovation strategies and plans such as the National Space Science Plan, Bioeconomy, and Hydrogen South Africa (HySA).

Dr. Muofhe currently leads the implementation of the Circular and Digital Economy (the new sources of growth) aspects of the White Paper for Science, Technology and Innovation; the modernisation of critical sectors of the South African Economy such as Mining, Agriculture and Manufacturing and the mainstreaming of Science, Technology and Innovation in government through innovation sensitive planning and budget coordination.



Keynote Speakers

Opening Address for the Pre-Conference Seminar on Computational & Data-Driven Modelling



Prof Cornie van Sittert

Professor of Chemistry at North-West University (NWU), Potchefstroom

The Quest in Catalyst Development for Green Hydrogen Production

The transition toward a sustainable hydrogen economy depends critically on the development of efficient, durable, and cost-effective catalysts for green hydrogen production. Water electrolysis, the core process for generating hydrogen using renewable electricity, relies heavily on catalysts to drive the hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) with minimal energy loss. Current commercial systems predominantly use noble metals, such as platinum for HER and iridium or ruthenium oxides for OER, owing to their superior activity and stability.¹ However, their scarcity and high-cost present substantial barriers to large-scale commercialisation. However, recent research has therefore focused on investigating earth-abundant alternatives that can compete with noble metal performance. Transition metal-based catalysts, including those derived from manganese, iron, cobalt, nickel and molybdenum compounds, have shown promising results through nano structuring, heteroatom doping, and surface engineering strategies.^{2,3} Additionally, advances in computational modelling have deepened the understanding of reaction mechanisms, enabling the rational design of catalysts with optimized electronic structures and active sites.⁴ At the Laboratory for Applied Molecular Modelling various materials based on nickel containing alternatives have been investigated as electrode materials to be used as catalysts in water electrolysis. At least two case studies will be discussed during the presentation.

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Biography

Professor Cornelia G.C.E. van Sittert is Professor of Chemistry at North-West University (NWU), Potchefstroom Campus, where she leads the Laboratory for Applied Molecular Modelling within the Chemical Resource Beneficiation research focus area. She obtained her PhD in Chemistry (1999) from the Potchefstroom University for Christian Higher Education and an MSc in Molecular Modelling (2004) from Cardiff University, UK.

Her research focuses on computational catalysis, exploring reaction mechanisms, transition-metal catalysts, CO₂ conversion, and hydrogen production. By combining theoretical insights with practical applications, her work supports the development of sustainable catalytic and energy processes. She has published over 60 journal papers, presented internationally, and supervised 21 MSc and 9 PhD graduates. Professor van Sittert has played key leadership roles in South African chemistry. She served as Chair of the Catalysis Society of South Africa (CATSA), Chair of the Molecular Modelling Division of the South African Chemical Institute (SACI), and Chair of the Computational Chemistry and Material Sciences group at the Centre for High-Performance Computing (CHPC). She was Editor-in-Chief of the South African Journal of Chemistry (2020–2022) and continues as a subject editor.

Her teaching and mentorship emphasize critical thinking, collaboration, and scientific integrity. She is known for making theoretical chemistry accessible and inspiring students to link molecular principles to real-world challenges. She is a member of the South African Academy of Science and Art (SAAWK). She also serves on the Water Research Council Advisory Committee. In 2024, she was appointed Honorary Professor at the University of KwaZulu-Natal, School of Engineering.

Dr Terry Wohlers

Wohlers Associates, Additive Manufacturing Center of Excellence, USA



Promising Progress Coupled with Difficult Times

Methods of rapid product development and advanced manufacturing are of shared interest among academia and private industry worldwide. Additive manufacturing (AM) has been a cornerstone around which many complimentary processes, products, and services have developed. Defense, aerospace, healthcare, transportation, and other sectors have benefited from decades of work and collaboration among researchers and practitioners. This has resulted in compelling applications, yet AM faces challenges, such as scaling to production quantities and profitability among producers of systems and materials.

Biography

Industry analyst, author, and speaker Terry Wohlers has provided consulting assistance to nearly 300 organizations in 27 countries. He has authored 450 books, articles, and technical papers, and given more than 200 keynote presentations on six continents. He has appeared on many television programs and has twice served as a featured speaker at events in the U.S. White House. In 2004, he received an Honorary Doctoral Degree from Central University of Technology in South Africa. For 29 years, he served as a principal author of the Wohlers Report, the undisputed industry-leading report on additive manufacturing and 3D printing worldwide. Wohlers was inducted into the TCT Hall of Fame in 2020. He is an adjunct professor at RMIT University in Melbourne, Australia.

Upadrasta Ramamurty

Nanyang Technological University, Singapore



Strength, ductility, fracture toughness, and fatigue resistance of additively manufactured alloys

A detailed understanding of the correlations between the processing, microstructures, and mechanical performance of alloys is a must before they can be deployed for structural applications with a high degree of reliability. Such an understanding, which allows for tailoring of advanced alloys for the targeted performances, is well-established for those manufactured using the conventional route of manufacturing alloys. Moreover, there are several options available for tuning the microstructures in that route. However, some of them—especially microstructural tuning through the judicious selection of the thermo-mechanical processing steps—are not available in additive manufacturing (AM) of metallic components, which offers a number of technological advantages such as near-net shape forming using a single processing step, flexible and on-demand manufacturing, near-zero material loss during fabrication, etc. and hence is being pursued with considerable scientific and technological vigor across the world. However, alloys made with AM techniques such as laser powder bed fusion (LPBF) have substantially finer microstructures (due to rapid solidification) and distinct mesoscale features. Consequently, their strength is often higher while the ductility is lower, vis-à-vis CM alloys. The meso-structural features, a result of the ‘bottom up’ approach of building components—line-by-line and layer-by-layer with in-situ alloying capability—can impart very high fracture toughness to these alloys. The presence of porosity, which is inevitable given that the feedstock is powder, results in lowered unnotched fatigue resistance.

Implications of these in terms of possible directions for designing AM alloys with high mechanical performance will be discussed.

Biography

After obtaining a PhD degree from Brown University under the supervision of Professor Subra Suresh and post-doctoral stints at UCSB and MIT, Ramamurty held faculty positions at the Nanyang Technological University, Singapore and the Indian Institute of Science, Bangalore, India, before returning to NTU in 2018 where he currently holds a President's Chair Professor position. His research interests include deformation and fracture behavior of amorphous as well as crystalline alloys, additive manufacturing, and the development and application of the nanoindentation technique. He is an editor of *Acta Materialia* and *Scripta Materialia*, and an Academician of both the National Academies of Engineering and Sciences of India, and TWAS-The World Academy of Sciences.

Joanne Zambelli

Chief Technical and Commercial Officer, Aerosud



Rebuilding the Future: Bridging the Gap Between Industry and Academia in South Africa's Aviation Landscape

South Africa's aviation and aerospace sector has long been a source of national pride and innovation. Yet in recent years, the industry has faced turbulence—from the decline of major state enterprises and loss of experienced professionals, to growing dependence on foreign inputs and fewer graduates ready for real-world challenges.

This keynote explores how the gap between academia and industry has become one of the biggest barriers to progress—and how closing that gap can unlock the next chapter of South African aerospace capability.

Drawing on lessons from Aerosud's three decades of experience, the address shares practical approaches to rebuilding collaboration: co-designing university curricula to reflect new technologies like composite and additive manufacturing; creating research internships that place students in live engineering environments; and building two-way mentorships where engineers and academics learn from each other.

The presentation also calls for a bold national effort—one that encourages joint R&D, establishes shared centres of excellence, and reconnects South African talent at home and abroad.

Ultimately, this keynote is a call to action: to move beyond discussion and commit to partnership, innovation, and people development. By working

together, industry and academia can ensure that South Africa remains not just a classroom for the world—but a workshop, a launchpad, and a leader in the skies once again.

Biography

I have had the privilege of building my professional career within the aerospace sector, dedicating over 20 years to Aerosud, where I currently hold the position of Chief Technology and Commercial Officer (CTCO). My journey began as an engineering graduate, and through progressive technical and leadership roles, I have gained comprehensive experience across engineering, product development, certification, and strategic business integration.

Throughout my career, I have been directly involved in the development and certification of aerospace structures, including key work packages on the Airbus A400M program such as the Cargo Hold Linings, Nose Fuselage, Rigid Bulkhead, Galley, and Wingtip structures. In these roles, I have been responsible for structural analysis, qualification testing, and ensuring full regulatory compliance, combining technical rigour with practical execution.

My involvement extends beyond structural engineering into the advancement of composite material technologies. I have led research and development initiatives focused on material innovation and industrial application, working in close collaboration with both local and international academic and industry partners. These partnerships have been instrumental in enhancing technological capability within Aerosud and aligning with the company's long-term strategic objectives.

In my capacity as Head of Engineering, and now as CTCO, I have overseen the integration of technical development with business strategy, ensuring that engineering excellence, innovation, and commercial performance are aligned to support the company's growth. My role encompasses leadership across engineering teams, driving product development from concept to certification, while maintaining a focus on operational efficiency, technical integrity, and customer satisfaction.

Professor Ian Gibson

Department of Design, Production and Management, University of Twente,
Netherlands



The Long and Winding Road that leads to Industrial Additive Manufacturing

The development of additive manufacturing seems to go on and on, with many twists and turns. Whilst we continue to see new AM technologies pushing the boundaries of possibilities, more and more manufacturers are directing their attention towards serious, commercially viable implementation. This presentation will discuss how the Fraunhofer Innovation Platform at the University of Twente is helping local industry to effectively implement AM. It will go on to discuss new initiatives that are underway to support the European industrial community, and how groundbreaking research can be channeled towards new applications.

Biography

Ian Gibson is Professor of Advanced Manufacturing, Sustainable Products and Energy Systems in the Department of Design, Production and Management at the University of Twente (UT), Netherlands. He is also Director of the Fraunhofer Innovation Platform for Advanced Manufacturing, located at UT (FIP-AM@UT). He has been a key figure in additive manufacturing research for over 30 years, having published more than 300 related papers, articles and book chapters during his career. He is chief editor of the Rapid Prototyping Journal (the world's first AM-focused research journal) and co-author of the best-selling book, Additive Manufacturing Technologies, published by Springer. As a regular visitor to South Africa and RAPDASA, he is a strong supporter of worldwide collaborations and initiatives and always on the lookout for new challenges and opportunities.

Dr William Hlakoane
Denel SOC Ltd, South Africa



A paper on bridging the gap between Industry and Academia

Dr Khohlong William Hlakoane is a seasoned professional with over 29 years of experience gained in various industries, he is currently employed as a Group Executive at Denel SOC LTD. His career span from Rail, Energy, Mining and Defence industries, and held various positions as Section Engineer, Reliability Engineer, Maintenance Manager, Engineering Manager, Project Director, Executive Manager, Group COO, and Interim Group CEO. He holds a ND Mech Eng, B Tech Mech Eng, MBA and recently awarded Honorary Doctoral in Mechanical Engineering from CUT. He served in various boards of directors both in South Africa, Middle East and Europe.

An Engineer by profession, he is also a businessman in the property sector, he continues to mentor young Engineer's and aspiring executives in the field of Business Management. With immense knowledge and experience in different sectors, he crafted and executed Denel's 5.Y strategy which saw the company being restructured for profitability. In his career he managed large and complex projects of more than US\$9Bn and continues to contribute significantly in Research and Development through cutting technologies within the defence sector

Dr Khalid Abdelghany

Central Metallurgical Research and Development Institute (CMRDI), Egypt



Towards the fabrication of large-scale additive manufacturing products

Additive manufacturing is the technology that builds industrial products from raw powders or resin layer by layer. AM is a complicated metallurgical process where different substitutes of thermal energy are applied in controlled matter to change the fragmented phases of the raw materials and bring up more stable and solid structures of the same materials. For example, for metal AM, the key factors to build durable end-user products is to have uniform and homogeneous microstructure, crack free body with completely welded layers, limited residual stresses, etc. If any one of these – and other – key factors are missing, the whole part structure could be rejected, and the AM process loses credibility. For small products, most of the new metal AM system have QC monitoring sensors that can correct and optimize the microstructure phases during processing, however, for large scale products still the optimization is under development. In this presentation, large scale AM processes will be illustrated, and recent research and field development will be discussed with examples.

Biography

Dr Khalid Abdelghany is a Professor of Materials and Additive Manufacturing, and he is the current Dean of the Advanced Manufacturing Technology Institute at the Central Metallurgical R&D Institutes (CMRDI) in Cairo, Egypt. In addition, he is the founder and current director - since 2003 - of the Laser and Additive Manufacturing Research Department in Egypt, which is the

first specialized academic research department for 3D Printing and Digital Freeform Fabrication in Egypt and North Africa (www.rpcmrdr.org).

He has excellent technical and research experiences in Additive Manufacturing technologies and systems, AM materials and post treatment, medical prosthesis design and manufacturing, laser materials processing, CAD/CAM, Reverse Engineering and related subjects.

During the past 10 years, he supervised more than 21 M.Sc. and Ph. D. Thesis for engineering and medical students, most of them are related to AM and medical AM technologies and was the author and co-author of more than 30 published papers and journal articles. Dr Khalid has participated as active counterpart in several international and national projects related to AM with South African partners, European partners and others as well.

Through practical activities, Dr Khalid has gained wide field experience as operator and integrator of different AM systems specially for laser based systems, metal PBF, large size FDM and Robot based systems from the major suppliers in USA, Europe and Asia. Due to his experience, Dr Khalid has been nominated as technology expert and consultant for several factories in Egypt and regional countries.

Dr Febe de Wet

On contractual assignment at the BMW IT Hub at BMW (South Africa)

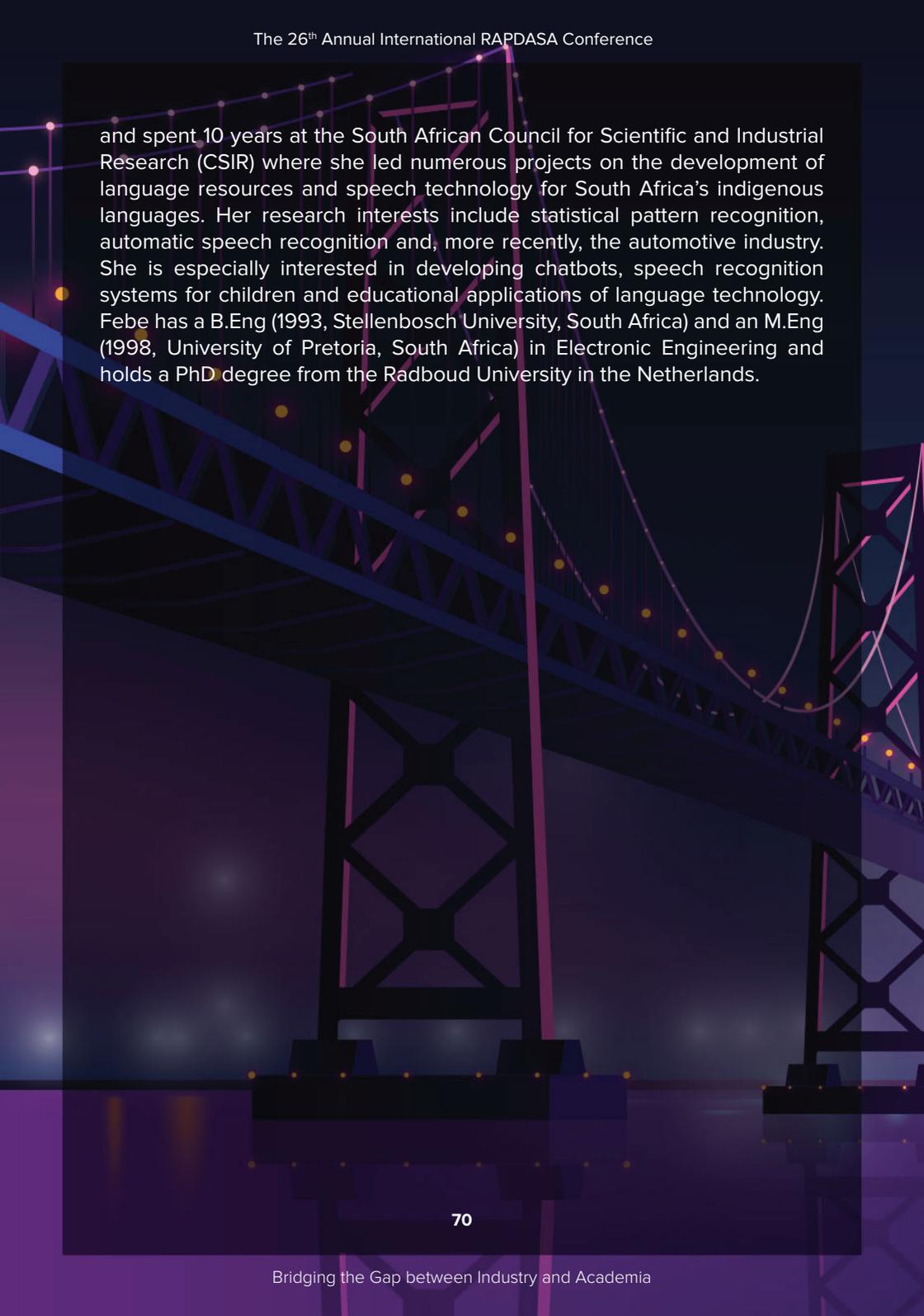


Being a Data-Driven Enterprise: Platform Strategies and AI Integration at BMW

The automotive industry is experiencing a paradigm shift driven by digital ecosystems, regulatory pressures, and rapid technological innovation. This presentation outlines BMW Group's approach to being a digital enterprise, emphasizing the role of platform-based business models and artificial intelligence (AI) in enabling scalable, efficient, and compliant operations. BMW's strategy relies on three foundational platforms: the Data Platform, which ensures centralized governance and accessibility of diverse data sources; the AI Platform, which facilitates the development and deployment of intelligent applications; and the Software Development Platform, which accelerates delivery through AI-enhanced DevOps tools. Together, these platforms support automation, analytics, and innovation across the organization. By leveraging platform strategies, BMW enhances operational resilience, fosters cross-functional collaboration, and unlocks new value. Real-world applications, such as AI-powered sound diagnostics and bespoke intelligent assistants, will be shared to illustrate the tangible benefits of adopting a platform business model.

Biography

Febe de Wet is currently a member of the Conversational AI team at BMW SA's IT Hub. She is also an extraordinary associate professor at Stellenbosch University's Department of Electrical and Electronic Engineering. Before joining the assignment at BMW SA, she held various positions in academia



and spent 10 years at the South African Council for Scientific and Industrial Research (CSIR) where she led numerous projects on the development of language resources and speech technology for South Africa's indigenous languages. Her research interests include statistical pattern recognition, automatic speech recognition and, more recently, the automotive industry. She is especially interested in developing chatbots, speech recognition systems for children and educational applications of language technology. Febe has a B.Eng (1993, Stellenbosch University, South Africa) and an M.Eng (1998, University of Pretoria, South Africa) in Electronic Engineering and holds a PhD degree from the Radboud University in the Netherlands.

Professor Henk de Jager
CEO of THENSA, South Africa



SHAPING TOMORROW: UNIVERSITIES AS CATALYSTS AT THE NEXUS OF INDUSTRY AND ACADEMIA

Henk de Jager studied on a full-time basis for three years and on a part-time basis for 15 years. During his studies, he obtained an MDipTech in Electrical Engineering, a BA in Industrial Psychology, a Postgraduate Diploma in Tertiary Education, and a DTech in Education Management.

He has 36 years of experience in higher education, including 12 years as Executive Dean in Engineering, Technology, Built Environment and Information Technology, Deputy Vice-Chancellor: Research, Innovation & Engagement and served as acting and substantive Vice-Chancellor and Principal of the Central University of Technology with effect from 1 October 2016 until 30 September 2021.

He is currently the Chief Executive Officer (CEO) of the Technological Higher Education Network of South Africa (THENSA). He is also a Senior Associate at Sereni T People Development, where his involvement in strategic projects includes being the Project Coordinator for the Feasibility Study: Phase 2 of the new University of Science and Innovation at Ekurhuleni.

Henk is registered as a Professional Engineering Technologist with the Engineering Council of South Africa. He was also a Board member of Universities South Africa (USAf) and the South African Technology Network (SATN), Chairperson of the World of Work Strategy Group of USAf, and a member of the International Association of University Presidents (IAUP). He

has supervised at the postgraduate level and holds several publications in proceedings and scientific journals. His research is focused on innovation ecosystems, governance of higher education institutions, and strategic management and leadership in higher education.

Henk regards himself as a proud African and as a son of the soil of this great continent. He embraces the late President Nelson Mandela's approach to leadership – "I am leading by serving others" – and regards the function of leadership as producing more leaders, not more followers.



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PROGRAMME

PRE-CONFERENCE SEMINAR ON DESIGN AND ADDITIVE MANUFACTURING OF TITANIUM AND PLATINUM GROUP METAL PARTS

MONDAY, 27 OCTOBER 2025

CSIR International Convention Centre, Pretoria
Hosted by the Central University of Technology, Free State
Supported by the Department of Science, Technology and Innovation

Program Director: Prof Kobus van der Walt

08:30 – 09:00

Registration

09:00 – 09:10

Welcoming Address: **Prof Kobus van der Walt**, CUT

09:10 – 09:30

Opening Address: **Mr Beeuwen Gerrits**, Chief Director: Technology
Localisation, Beneficiation and Advanced Manufacturing, DSTI

09:30 – 09:50

Use of Advanced Technologies in Metal Powder Production for Additive Manufacturing by **Donald Mkhonto**

09:50 – 10:10

Additive Manufacturing of PGM's: Current Research Landscape and Emerging Trends by **Imdaadulah Adam**

10:10 – 10:30

Development of PGM alloys suitable for the manufacture of jewelry by **Rivoningo Chauke, Rutendo Matengaifa, Charles Siyasiya and Maje Phasha**

10:30 – 11:00 | Tea

11:00 – 11:20

In-situ alloying of Ti-xPt using laser powder bed fusion to produce novel alloys by **Gerrit Ter Haar and Dean-Paul Kouprianoff**

11:20 – 11:40

Aerodynamic performance of a topologically optimised nose wheel fork of a light aircraft produced through selective laser melting by **Lehlohonolo Francis Monaheng, Willie Bouwer du Preez, and Claudia Polese**

11:40 – 12:00

X-ray diffraction analysis and microstructures of laser powder bed fusion Ti6Al4V for application in aerospace structural components by **Diali Phillip Mokoena, Thywill Dzogbewu, Amos Muiruri and Deon de Beer**

12:00 – 12:20

Investigating wear performance of surface treated additively manufactured Ti-6Al-4V temporomandibular joint replacement implants by **Sizwe Ntimane, Gerrie Booysen, and Kobus van der Walt**

12:20 – 13:00

General Discussion - All

13:00

Closure: Prof Kobus van der Walt

13:00 | Lunch

PROGRAMME

PRE-CONFERENCE SEMINAR ON COMPUTATIONAL & DATA-DRIVEN MODELLING

MONDAY, 27 OCTOBER 2025

Hosted by MINTEK,
Supported by the Department of Science, Technology and Innovation

Programme Director: Dr Ramogohlo Diale

08:30 – 09:00

Welcoming Address by **Dr Ramogohlo Diale**

09:10 – 09:40

Opening Address by **Prof Cornie van Sittert**

09:40 – 10:00

Comparing convolutional neural networks with variational quantum circuits for biomedical data classification
Kelvin Mpofu and **Patience Mthunzi-Kufa**

10:00 – 10:20

DFT analysis of spin coupling and its impact on manganese oxide cathodes by **Mogau Zanele Kgasago**, **Katlego Phoshoko**, **Raesibe Ledwaba** and **Phuti Ngoepe**

10:20 – 10:40

Molecular dynamics simulations of Li_xTiO_2 nanosphere as an anode electrode material by **Blessing Rikhotso** and Phuti Ngoepe

10:40 – 11:10 Tea/Coffee Break

11:10 – 11:30

First-principles study of alloying effect on FCC Fe-Mn alloy by **Maje Phasha**, Lebedike Mampuru, Mbavhalelo Maumela and Joseph Moema

11:30 – 11:50

Investigation of Ti-Pt-V high temperature shape memory alloys towards aerospace applications: a cluster expansion screening by **Mordecai Mashamaite**, Phuti Ngoepe and Hasani Chauke

11:50 – 12:10

First principles study of structural, electronic and elastic properties of hexagonal copper (I) selenide (Cu_2Se) by **Moshibudi Ramoshaba** and Thuto Mosuang

12:10 – 12:30

First principles study of structural, electronic, and charge transfer properties of high entropy alloys by **Jacquiline Tau**, Charles W Siyasiya, Steve Dima, David Tshwane, Regina Maphanga, Rosinah Modiba, Ntombi Mathe, Sisa Pityana and Nana Arthur

12:30 – 13:30 Lunch

13:30 – 13:50

Evaluating the performance of active learning models on selective laser melting data sampling by **Jacob Wafula**, Clint Steed and Gerrit Ter Haar

13:50 – 14:10

Numerical simulation for the formation of nanoparticles through vapor condensation in reactor by **Alex Seya**, Andrei Kolesnikov, Lucey Mavhungu and Herzog Bissett

14:10 – 14:30

Development of machine-learned force fields for lithium-manganese-oxide (Li-Mn-O) spinel with machine learning. Density Functional Theory Accuracy at a Lower Computational Cost by **Donald Hlungwani**, Raesibe Ledwaba and Phuti Ngoepe

14:30

Closure

15:00 Coffee

Annual

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CONFERENCE

PROGRAMME

**BRIDGING THE GAP BETWEEN
INDUSTRY AND ACADEMIA**

PROGRAMME

Venues

FOR BREAKAWAY SESSIONS

RUBY

DIAMOND

EMERALD

AMETHYST

PROGRAMME

MONDAY, 27 OCTOBER 2025

RUBY

08:30	Pre-conference seminar on Design and Additive Manufacturing of Titanium and Platinum Group Metal Parts – Prof Kobus van der Walt
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AMETHYST

08:30	Pre-conference seminar on Computational and Data-driven Modelling – Dr Ramogohle Diale
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LEARNING FACTORY

09:00	Industry Day – Mr Heinrich van der Merwe
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17:00

Welcoming Cocktail & Registration

PROGRAMME

TUESDAY, 28 OCTOBER 2025

07:30	Registration
PLENARY SESSIONS IN THE DIAMOND AUDITORIUM	
08:00	Plenary Sessions: Chair: Dr Ntombi Mathe-Maleboho
08:10	Welcoming: Chairperson 2025 RAPDASA-RobMech-PRASA-AMI Conference – Dr Washington Makoana
08:30	Opening address: Dr Thulani Dlamini, CEO of CSIR
Keynote address K1:	
09:00	Dr Terry Wohlers , Wohlers Associates, Additive Manufacturing Center of Excellence, USA: Promising progress coupled with difficult times
Keynote address K2:	
09:30	Prof Upadrasta Ramamurty , Nanyang Technological University, Singapore: Strength, ductility, fracture toughness, and fatigue resistance of additively manufactured alloys
Keynote address K3:	
10:00	Ms Joanne Zambelli , Chief Technical and Commercial Officer, Aerosud: Rebuilding the future: bridging the gap between industry and academia in South Africa's aviation landscape
10:30	TEA/COFFEE BREAK

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Dr Gerrit Ter Haar	Session Chair: Prof Riaan Stopforth	Session Chair: Dr Jaco van der Walt	Session Chair: Dr Maje Phasha
Theme: Materials Engineering	Theme: Robotics and Mechatronics	Theme: Process Development	Theme: Computational & Data-driven Modelling
11:00			
4D printing and smart materials: a technological revolution Invited speaker: Prof Khalid Zarbane	Bridging the Gaps Invited speaker: Johan Maartens	Enabling South Africa's additive manufacturing future: from standards to real-world impact Invited speaker: Sergio Sanchez	Harnessing Computational Material Science in Africa: From Fundamental Discovery to Societal Impact Invited speaker: Prof Kingsley Obodo
11:30			
3D Printing and injection moulding of quartz glass - upscaling from laboratory to industrial process Stefan Schneider	Design of a low-cost modular actuator for humanoid robotics William Duckitt	Investigating how spatter evolves in metal additive manufacturing processes with machine learning Brighton Nkomo	Investigating the structural, mechanical and electronic stability of Li7-xLa3Zr2-xNbxO12 garnet-type solid electrolyte Khumbulani Tibane
11:50			
Investigation of AI-Cu using different preparation methods on the Amazemet RePowder machine Kiyaasha Dyal Ukabhai	Assessing Depth Anything V2 monocular depth estimation as a LiDAR alternative in robotics Jakobus Murray Louw	DevOps for advanced manufacturing: accelerating innovation and fostering technological adoption Teboho Sekopa	Investigating the structural stability and electronic properties of carbon doped silicon anode for lithium-ion batteries Samson Singo

12:10

The effect of heat treatment on the metallurgical properties of FeCo alloy Ramogohlo Diale	Practical implementation of Depth Anything V2 as a LiDAR alternative in robotics navigation Jakobus Murray Louw	Chemical, structural and physical characterisation of the synthesis of WC-TiC particles using a radio frequency plasma Rearabetswe Dire	Co3O4 surface studies and adsorption of Li2O2 nanocluster Pabalelo Malatjie
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12:30

The effect of heat treatment on the microstructural changes and hardness of cast Ni50Ti30Zr20 alloy Paul Shangase	Adapting SegMap: a LiDAR place recognition framework for standalone use in C++ applications Thabisa Maweni	Characterizing the spatial non-uniformity and temporal stability of QWIP and T2SL cooled infrared detector focal plane arrays Mathews Chirindo	Influence of gallium addition on the magnetic properties of MnAl alloy Thabang Mokwena
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13:00

LUNCH

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Mr Imdaadulah Adam	Session Chair: Dr Natasha Botha	Session Chair: Prof Deon de Beer	Session Chair: Prof Hasani Chauke
Theme: Materials Engineering	Theme: Robotics and Mechatronics	Theme: Process Development	Theme: Computational & Data-driven Modelling

14:00

Metallurgical characterisation of B2 Ti-based binary alloys with Group VIII transition metals Bongani Ngobe	Towards robust gesture-based control for mobile robots: implementing and validating a limited recognition system on Voyager Natasha Botha	Effect of cooling rate and chemistry on mechanical properties of Ti-V HSLA plate steels Seyed Reza Jafarpour Rezaei	The effects of high content Tin (Sn) doping on the layered LiMnO2 cathode material for lithium-ion batteries Bridget Mokgabudi
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14:20

Effect of ball-milling on the thermal properties of MgH₂/AlCrNiZrVNb materials for hydrogen storage
Lindokuhle Ntanzi

Embedded systems design of a low-cost flight controller for use in UAV platforms
James Hepworth

Effects of extended soaking time preceding roll bonding on the microstructure and mechanical properties of a modified AA3003 clad with AA4045
Joseph Moema

The effect of Nb doping on LiNiO₂ (101) surface: DFT+U study
Mmeshi Hiine

14:40

Investigation of friction and corrosion properties of aluminium alloy reinforced with zirconium and copper oxide
Sadiq Abiola Raji

Development of a high-fidelity simulation environment for a Crazyflie2.1 quadcopter
Arnold Pretorius

Electrochemical behaviour of PBI-based vanadium redox flow battery membranes
Kagiso Mampa

A hybrid experimental-computational approach for predicting Ti-6Al-4V powder degree of spheroidization using artificial neural networks
Justin Mbwebwe

15:00

TEA/COFFEE BREAK

15:20 - 15:40

POSTER SESSION

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Dr Washington Makoana	Session Chair: Prof Callen Fisher	Session Chair: Prof Kobus van der Walt	Session Chair: Dr Kemeridge Malatji
Theme: Materials Engineering	Theme: Robotics and Mechatronics	Theme: Process Development	Theme: Computational & Data-driven Modelling
15:40			
Refurbishment of small diameter nitrided spindles with laser based direct energy deposition Danie Louw	Propulsion Rig: a multirotor performance measurement test platform Arnold Pretorius	Catalytic role of graphene in green hydrogen production Chika Oliver Ujah	Modelling of Ti and Cl diffusivity in two TiCl ₄ mediums for titanium production processes Andile Mazibuko
16:00			
Study of elastic modulus of Ti(70-x)-Nb _x -Ta ₂₅ -Zr ₅ alloys for biomedical applications Mandy Madigoe	Formation following: multi-sensor object detection and localization using ROS2 and Gazebo Beatrice van Eden	Effect of processing parameters on the microstructure and density of LPBF processed CoCrMo Marné van Niekerk	Structural, electronic and mechanical properties of TiNbVZrHf alloy Lebogang Motsomone
16:20			
A study of the uptake of hydrogen in pipeline steels using accelerated laboratory methodologies Patrick Kambilinya	Reinforcement learning for object recognition and room classification in an indoor environment Beatrice van Eden	Process parameter optimization of laser additive manufactured AlCrFeNiTiVZr alloys using response surface technique Abidemi Adeyoye	The ionic conductivity and diffusivity of NASICON-type LiTi ₂ (PO ₄) ₃ and Li ₃ Ti ₂ (PO ₄) ₃ solid electrolytes Lisbon Maake
16:40			
The role of inoculant on grey cast iron (GCI) and impact on microstructure and mechanical properties Pertunia Seema	Evaluation of a lightweight visual-inertial state estimator for GPS-denied environments Alyssa Ramwell	Enhancing the properties of HEAs-ceramic composites using SPS technique Chika Oliver Ujah	Surface interaction of H ₂ O and O ₂ on the ternary Fe ₁ -XXXAl metal alloy doped with Ru and Pd Christine Mkhonto
17:00	RAPDASA Annual General Meeting		

PROGRAMME

WEDNESDAY, 29 OCTOBER 2025

08:00	Welcoming: Dr Ntombi Mathe-Maleboho
PLENARY SESSIONS IN THE DIAMOND AUDITORIUM	
08:05	Plenary Sessions: Chair: Dr Washington Makoana
Keynote address K4:	
08:05	Prof Ian Gibson , Department of Design, Production and Management, University of Twente, Netherlands: The long and winding road that leads to industrial additive manufacturing.
Keynote address K5:	
08:35	Dr William Hlakoane , Denel SOC Ltd, South Africa: Bridging the gap between industry and academia.
Keynote address K6:	
09:05	Prof Khalid Abd Elghany , Central Metallurgical Research and Development Institute (CMRDI), Egypt: Towards the fabrication of large-scale additive manufacturing products.
09:35	Move to Breakaway Sessions

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Dr Ntombi Mathe-Maleboho	Session Chair: Prof Japie Engelbrecht	Session Chair: Dr Hertzog Bissett	Session Chair: Prof. Raesibe Ledwaba
Theme: Materials Engineering	Theme: Robotics and Mechatronics	Theme: AM Material & Part Characterisation	Theme: Computational & Data-driven Modelling
09:40			
Design and evaluation of Ti-15Mo-2Fe alloy for biomedical applications based on electronic parameters Nthabiseng Abigail Moshokoa	Investigating the effect of shore hardness on the adhesion strength of a gecko robot dry adhesive Lungile Nyanga	Thermal property characterisation of additively manufactured copper as a function of sintering time Roy Urwin	Properties of manganese (III) oxide (Mn ₂ O ₃) catalyst for use in Fe-air batteries Edwine Matlou
10:00			
The influence of slab surface temperature on the descalability of fayalite in a hot strip mill Elana Alberts	Comparative analysis of Yolo based algorithms in solar panel detection using resource-constrained hardware Napious Mukandagumbo	Characterisation of heat-treated Ti-rich NiTi fabricated by laser powder bed fusion Londiwe Motibane	Impact of oxygen adsorption on the electronic properties of titanium nickel surfaces Vukosi Chauke
10:20			
Effect of cooling mediums on mechanical properties and wear behaviour of binary β -type Ti-Mo alloy for bio-implant applications Mukhethwa Netshia	Exploring the biomechanics of digitigrade stilts using techniques from legged robotics Stacey Shield	A research ethics framework for training engineers in doctoral degree studies Laetus Lategan	Effect of Ta on the structural, thermodynamic and elastic properties of FCC Pt-W-Ta alloys – first-principles study Kedibone Melita Lekganyane
10:40			

The influence of inorganic dopants on the electrochemical performance of polyaniline-based composites Okechukwu Benjamin Okafor	Development of force control and proprioception on a closed chain 5-segment leg Gavin Foster		Surface properties of Co ₂ VO ₄ Percy Ngobeni
11:00		TEA/COFFEE BREAK	

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Mr Heinrich van der Merwe	Session Chair: Prof Thorsten Becker	Session Chair: Dr Marandela Mulaudzi	Session Chair: Mr Nana Arthur
Theme: Product Design and Development	Theme: AM Post Processing and Qualification	Theme: AM Material & Part Characterisation	Theme: Pattern Recognition
11:30			
Beyond the Blueprint: Regenerative medicine and 3D Printing — building a multidisciplinary platform for personalized surgical care and health equity in Africa Invited speaker: Dr Shathani Nkhwa	Shared infrastructure for accelerating technology transfer Invited speaker: Dr Luyolo Mabhali	Circularity - new opportunities for economic growth? Invited speaker: Dr Mmboneni Muofhe	AI-enhanced real-time energy monitoring and home appliance identification system Mohammad Khan

12:00

<p>A multifunctional adjustable work desk using Arduino mega microcontroller and motors Kyle Flanagan</p>	<p>IoT-based monitoring system for temperature and humidity control in additive manufacturing titanium powder handling and storage Kekeletso Thejane</p>	<p>Influence of laser processing parameters on microstructure and defect formation in PBF-LB printed Al-Si-Mg alloys Lerato Semetse</p>	<p>An economical eye-tracking algorithm for assistive wheelchair control using MediaPipe's facial landmarks Gareth Pienaar</p>
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12:20

<p>The development of a 4IR 12m towing tank used for teaching and learning Ryan du Preez</p>	<p>Surface finishing of L-PBF Ti6Al4V ELI samples for biomedical applications by dry electro- and chemical polishing Moses Mhlanga</p>	<p>The effects of processing parameters on hardness, microstructure and corrosion resistance of AlTiZrNbVCr high-entropy alloy A.O. Ogunyinka</p>	<p>Unmanned surface vehicle with deep learning-based obstacle avoidance for water quality monitoring Jason Saptoe</p>
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12:40

<p>Resource efficiency in high-value material manufacturing with directed energy deposition Jacques Strauss</p>	<p>Fatigue crack growth rate and fractography of Ti6Al4V(ELI) specimens produced through direct metal laser sintering Lehlohonolo Francis Monaheng</p>	<p>Hydrodynamic and thermal analysis of additively manufactured thrust chamber cooling channels Mathew Reynolds</p>	<p>Autonomous drone system with integrated vision-based control for marine buoy retrieval Michael Boreham</p>
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13:00

LUNCH

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Dr Francis Monaheng	Session Chair: Mr Joseph Moema	Session Chair: Dr Arnold Pretorius	Session Chair: Dr Maje Phasha
Theme: Product Design and Development	Theme: Rapid Casting	Theme: Robotics and Mechatronics	Theme: Pattern Recognition
14:00			
An open-source digital image correlation acquisition system, focusing on temporal synchronization with the Gleeble 3800 Maxwell Vos	Impact of binder jetting process parameters on sand mould friability Jonathan Kabadjundi Kabasele	Optimal spine morphology for high-speed bounding in quadruped robots Shalom Abiodun	Remote sensing and analysis of atmospheric aerosols in coastal environments using ceilometer lidar (CL51) and sun photometer data: a case study in Simons Town, Cape Town, South Africa Zimbini Faniso-Mnyaka
14:20			
Electrification of go-kart with second-life lithium-ion batteries: performance analysis and optimisation Ushveer Ramasir	Process impact assessment towards enhancing sustainability in three-dimensional sand printing Accolade Motlhabane	Autonomous stairs climbing carrier cart for enhanced accessibility Vuyokazi Nondabula	A real-time American Sign Language (ASL) alphabet recognition system for assistive communication using TinyML Makhosazana Moyo
14:40			
Axiomatic design framework for innovation in dental implant manufacturing in Africa Jacob Wafula	Analysis of welding techniques for spheroidal graphite cast iron Dieketseng Maya	Development and integration of an autopilot system for a full-sized aircraft using open-source UAV technology Kabelo Mpurwana	A brainwave controller for exoskeleton gait rehabilitation Langa Mandaba

15:00

<p>A joystick-based PWM control system for an electric wheelchair with integrated safety features Kyla Fourie</p>	<p>Potentiodynamic and electrochemical impedance spectroscopy analysis of hybrid metallic systems in 1 M HCl Samson Dare Oguntuyi</p>	<p>Autonomous quadcopter for rapid underground mine mapping and exploration Nico Epler</p>	<p>Neural-network-assisted path planning for oil-spill containment: single-USV validation and collaborative architecture Meredith van der Merwe</p>
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15:20

TEA/COFFEE BREAK

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
<p>Session Chair: Ms Maritha Theron</p>	<p>Session Chair: Dr Stephen Marais</p>	<p>Session Chair: Mr Milton Makhofane</p>	<p>Session Chair: Dr Ramogohlo Diale</p>
<p>Theme: Product Design and Development</p>	<p>Theme: Robotics and Mechatronics</p>	<p>Theme: AM Material & Part Characterisation</p>	<p>Theme: Pattern Recognition & Computational & Data-driven Modelling</p>

15:50

<p>The potential for additive manufacturing of compact horizontal spiral tube condensers Nicolaas Steenekamp</p>	<p>Digital twin and user interface for autonomous inspection robots Adam Daniel Sendzul</p>	<p>Study of interfacial microstructure in hybrid additive manufactured aluminium alloys Mpinda Bob Mampuya</p>	<p>Camera and ultrasonic sensor fusion for electronic travel aid: design and performance analysis Leeroy Majoni</p>
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16:10

<p>The wear and rolling contact fatigue behaviour of AAR Class C wheel and R350 HT rail using a twin-disc tribometer under dry conditions Bridget Sikhondze</p>	<p>Performance analysis of propeller configurations: a study on blade diameter, pitch, and number of blades for optimal thrust Nkosingiphile Langa</p>	<p>Characterisation of welds of Ni-Cr-Cu electrodes on cast-iron substrate Caroline Mphela</p>	<p>Towards a fast image alignment technique for multi-aperture UAV and CubeSat payloads Muhammad Ahmed Nana</p>
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16:30

<p>Thermo-mechanical simulation of Ti-Al based alloy blade in gas turbine engine conditions Praise Mpfu</p>	<p>Towards cooperative collision avoidance for the Voyager unmanned ground vehicle: practical implementation and demonstration Thando Mtimkulu</p>	<p>Pitting corrosion study at the built and substrate region of hybrid additive-manufactured Al-Si-Mg alloys Samson Dare Oguntuyi</p>	<p>Enhancing the structural properties of Li_{1.2-x}NaxMn_{0.8O2} (x=0.00 and 0.05) by doping with sodium: DFT and FHI-aims Njabulo Sithole</p>
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16:50

<p>Evaluation of thermal performance of window materials for satellite payloads in low earth orbit (LEO) Andrew Baloyi</p>	<p>Towards trajectory planning and collision avoidance for the voyager unmanned ground vehicle in dynamic environments Dean Jeggels</p>	<p>Manganese effect on room and cryogenic temperature impact toughness of thermomechanical processed Fe-Mn binary alloys and commercial 9wt% nickel alloy Lebedike Mampuru</p>	<p>Comparative study using first principles approach for alloying Tantalum in Nitinol shape memory alloys Jacqueline Tau</p>
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17:10

Closure

18:30 for 19:00

Gala Dinner

Speaker: Dr Vathi Papu-Zamxaka, TUT DVC

PROGRAMME

THURSDAY, 30 OCTOBER 2025

08:00	Welcoming: Dr Ntombi Mathe-Maleboho
PLENARY SESSIONS IN THE DIAMOND AUDITORIUM	
08:05	Plenary Sessions: Chair: Prof André van der Merwe
Keynote address K7:	
08:05	Dr Febe de Wet , On contractual assignment at the BMW IT Hub at BMW (South Africa) (Pty) Ltd: Being a data-driven enterprise: platform strategies and AI integration at BMW
Keynote address K8:	
08:35	Prof Henk de Jager , CEO of THENSA, South Africa: Shaping tomorrow: universities as catalysts at the nexus of industry and academia
09:05	Move to Breakaway Sessions

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Dr Bathusile Masina	Session Chair: Ms Beatrice van Eden	Session Chair: Prof André van der Merwe	Session Chair: Dr Mordecai Mashamaite
Theme: Materials Engineering	Theme: Robotics and Mechatronics	Theme: Industry Presentations	Theme: Computational & Data-driven Modelling
09:10			
The effects of aluminium additions on the mechanical and microstructural properties of FeCrNiCu medium entropy alloys Thapelo Mogakane	A leap for physics-based character animation: automated gait cycle generation for characters of arbitrary morphologies using trajectory optimisation Joshua Harford	Centre for Rapid Prototyping and Manufacturing (CRPM) Johan Els	Prediction of the optimal hydrogen storage in TiVCrMnAlFe alloys using machine learning models Ashley Phala
09:30			
Tailoring dual-phase steel properties through controlled temperature and holding time during heat treatment Emmanuel Olorundaisi	The design of a humanoid robotic research platform William Duckitt	From Vision to Victory - crafting a metal part with selective laser melting Jurgens Taljaard	Phase stability of Ta-doped tetragonal Li7La3Zr2O12 (LLZO) via cluster expansion and Monte Carlo Kemeridge Malatji

09:50

Characterization of abnormal lubricant film pressure distribution mechanisms in pure sliding AISI52100 ball bearing contacts using sliding contact fatigue distribution and wear behaviour
Sipho Masilela

Why the best keeps on getting better – insight into industry’s challenges and utilisation of CAE technology
Zak Fourie

Comparative analysis of HTTP request handling in different python frameworks
Patrick Malatjie

10:10

TEA/COFFEE BREAK

BREAKAWAY SESSIONS

RUBY	DIAMOND	EMERALD	AMETYST
Session Chair: Dr Bathusile Masina	Session Chair:	Session Chair: Prof Deon de Beer	Session Chair: Dr Mordecai Mashamaite
Theme: Materials Engineering	Theme:	Theme: Industry Presentations	Theme: Computational & Data-driven Modelling

10:40

Application of artificial neural networks in predicting and optimising electroplating parameters: A systematic review
Nomalungelo Maphanga

New newest machine and process developments at Aditiv Solutions on the locally produced HYRAX metal 3D printer
Marius Vermeulen

Experimental analysis and simulation of the melt pool behaviour in laser powder bed fusion of pure tungsten
Alfred Sidambe

11:00	
Alternative work roll material grade for the late-finishing stands of hot strip mills Davison Nyabadza	Print strong like metal – changing the face of the spare part supply chain Henk Harmse
	Average oxidation state of Ti-Cu alloys comprised of lower temperature α -Ti(Cu) and Ti ₂ Cu phases Zanele Helen Phasha
11:20	CLOSURE
12:00	FINAL LUNCH

The Hosts



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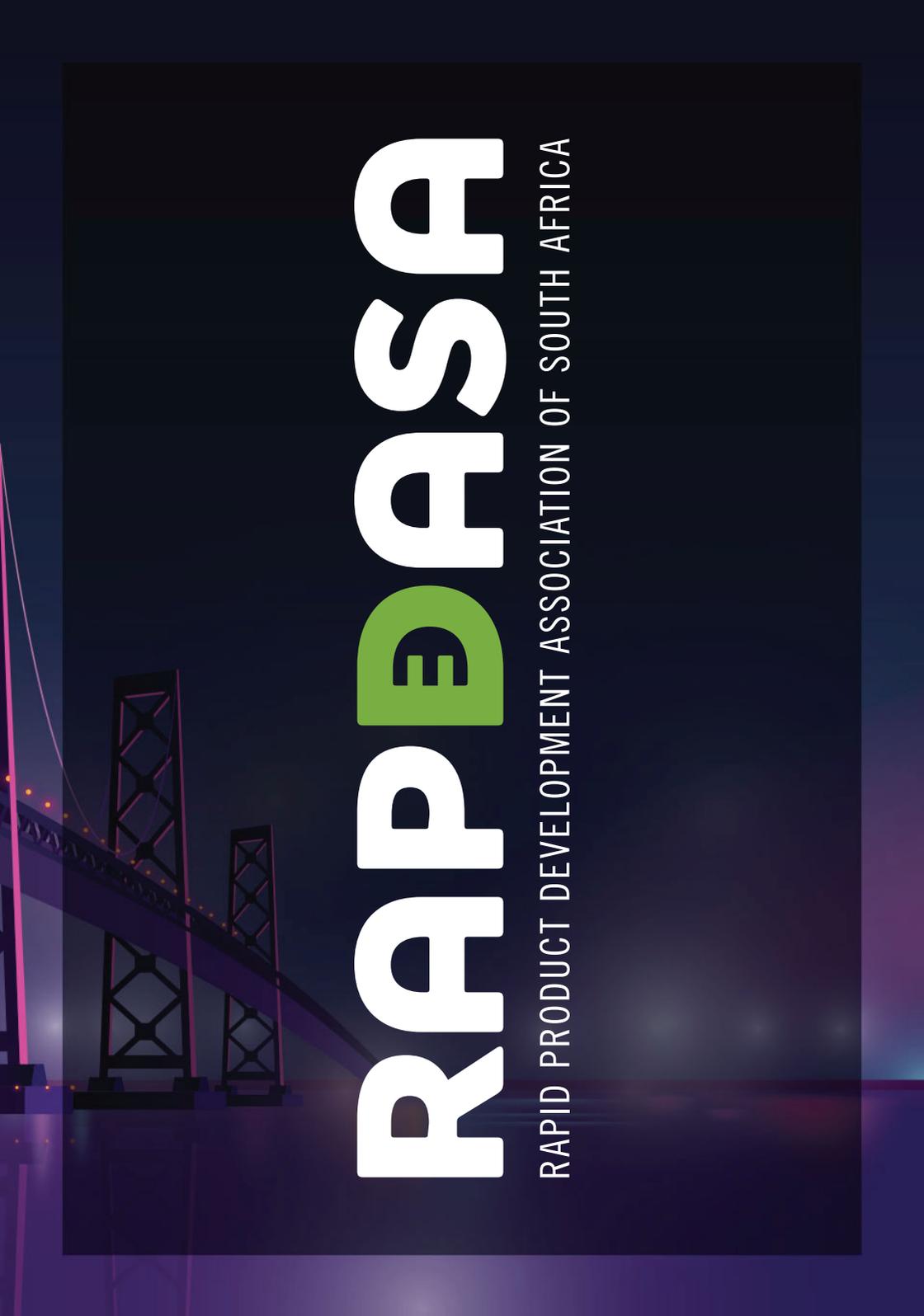


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