

# 6TH CSIR CONFERENCE



IDEAS THAT WORK FOR  
**INDUSTRIAL**  
• DEVELOPMENT

5 - 6 OCT 2017



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

CSIR  
our future through science

# THE CSIR MANDATE

---

The Council for Scientific and Industrial Research (CSIR) was established on 5 October 1945.

The CSIR's mandate is as stipulated in the Scientific Research Council Act (Act 46 of 1988, as amended by Act 71 of 1990), section 3: Objects of CSIR:

“The objects of the CSIR are, through directed and particularly multidisciplinary research and technological innovation, to foster, in the national interest and in fields which in its opinion should receive preference, industrial and scientific development, either by itself or in co-operation with principals from the private or public sectors, and thereby to contribute to the improvement of the quality of life of the people of the Republic, and to perform any other functions that may be assigned to the CSIR by or under this Act.”

(Scientific Research Council Act 46 of 1988, amended by Act 71 of 1990)



# TABLE OF CONTENTS

FOREWORD	4
NOTES ON INTERACTIVE ACTIVITIES AT THE CONFERENCE	6
CONFERENCE AT A GLANCE	8
DAY ONE	11
DAY TWO	23
TOURS, PANEL DISCUSSIONS AND SHOW-AND-TELL SESSIONS	34
SIDE EVENTS	38
CSIR SPEAKER PROFILES	42
EXTERNAL SPEAKER PROFILES	58

# FOREWORD

---



Welcome to the 6th CSIR Conference - *Ideas that work for industrial development*. We are looking forward to sharing and exchanging ideas on this theme, but even more, we are keen to hear your thoughts and want to encourage you to participate in the sessions over the next two days.

Our mandate upholds two equally important pillars from which our efforts to improve the lives of South Africans are launched: (a) leveraging directed multidisciplinary research and technological innovation to (b) foster industrial and scientific development.

Over the past decade, the CSIR has made significant strides in strengthening its scientific development capability. This is evident in the establishment of new science platforms and the development of strategic partnerships that are aligned with this objective. However, if we are to decisively address South African challenges such as poverty, inequality and unemployment, we need to maximise our contribution to industrial development, through the establishment of new industries and enterprises, as well as the development of innovative technologies that contribute to South Africa's competitiveness.

Therefore, a conference that focuses exclusively on how our scientific, engineering and technological research can contribute to industrial development seems perfectly cogent.

Our 2017 conference will celebrate some of the work that we undertake with public and private sector partners to contribute to industrial development. Our expert speakers will share perspectives on challenges and opportunities for industrial development and related issues in several sectors. Topics covered include technology localisation for industrial development; the development of small, medium and micro enterprises in various sectors; infrastructure innovation as an industrial development enabler; emerging manufacturing technologies;

# 6TH CSIR CONFERENCE

a competitive aerospace sector; cybersecurity as a prerequisite for Industry 4.0 and sustainable economic growth through cleaner production and efficient resource utilisation.

The conference exhibition will feature live demonstrations of CSIR-developed technologies that are benefiting an array of sectors, from mining and energy, to aerospace and defence.

The conference programme features many of our industry partners – collaborations that bode well for ensuring that the CSIR's innovation portfolio is aligned with the needs of industry.

I look forward to engaging with you on ways to strengthen the CSIR's role in industrial development and providing value-adding solutions to some of our pressing challenges.

Have an enjoyable and fruitful 6th CSIR Conference.

**Dr Thulani Dlamini**

**CSIR Chief Executive Officer**

# Notes on interactive activities at the conference



## Website:

Visit <https://conference2017.csir.co.za> for all conference-related information.

## Social Media:

Conference delegates are encouraged to follow the CSIR on the following platforms, and to make use of the hashtag **#CSIRConf2017**



**Twitter:** @CSIR



**Facebook:** CSIRSouthAfrica



**Instagram:** CSIRSouthAfrica



## Live Streaming:

Remote web viewing will be available for the plenary session on day one. This enables individuals with web access to view proceedings via the website and to comment on the session in real-time.

Access link via <https://conference2017.csir.co.za>

All other sessions will be recorded and made available as soon as possible on the conference website.



# CONFERENCE AT A GLANCE

## DAY ONE: THURSDAY 5 OCTOBER 2017

FIRST SESSION 08:30-11:00	Opening plenary session p11  Diamond				
	TEA BREAK				
SECOND SESSION 11:30-13:30	Localisation for industrial development  p12  Diamond	Industrial development of SMMEs in the bioeconomy sector  p14  Jade	From waste to value-adding alternatives for improved industrial competitiveness  p16  Crystal	Infrastructure innovation as an enabler for industrial development  p18  Ruby	Maximising South Africa's mineral endowment  p20  Amethyst
	LUNCH				
THIRD SESSION 14:30-16:30	The growth and transformation of the South African defence industry  p13  Crystal	The elusive competitive advantage in local pharmaceutical manufacturing  p15  Jade	Industrial development guided by science: Opportunities and risks of shale gas development  p17  Diamond	Industrial development in the transport sector  p19  Ruby	Product lifecycle management in the context of industrial development  p21  Amethyst

Any changes to venue allocations will be displayed in the foyer.



## DAY TWO: FRIDAY 6 OCTOBER 2017

**FIRST SESSION**  
08:30 - 10:00

**Plenary:**  
**The changing face of manufacturing: Industry 4.0**  
p23

TEA BREAK

**SECOND SESSION**  
10:30 - 12:30

Digitalisation to foster industrial development I

p24

**Amethyst**

Emerging manufacturing technologies I

p26

**Diamond**

Cybersecurity threats to the growth of the South African industry

p28

**Crystal**

A competitive aerospace industry

p30

**Ruby**

Sustainable economic growth

p32

**Amber**

TEA BREAK

**THIRD SESSION**  
12:40-13:30

Disruptive mobile technologies for media entrepreneurs: A show-and-tell session

p34

**Jade**

Tour to the Biomanufacturing Industry Development Centre

p34

**Diamond**

Funding instruments for industrial development: A panel discussion

p35

Tour to the CSIR National Laser Centre

p36

**Ruby**

Industrial development and climate change: Opportunities and responsibilities under the Paris Agreement

p37

LUNCH

**FOURTH SESSION**  
14:30-16:30

Digitalisation to foster industrial development II

p25

**Amethyst**

Emerging manufacturing technologies II

p27

**Diamond**

Cybersecurity as an enabler and pre-requisite for Industry 4.0

p29

**Crystal**

Industrial development of medical devices and diagnostics

p31

**Ruby**

Industrial development and its link to water

p33

**Amber**



IDEAS THAT WORK FOR  
**INDUSTRIAL**  
• DEVELOPMENT

**DAY ONE:**  
**THURSDAY 5 OCTOBER 2017**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 08:30 – 11:00

### Opening plenary session

#### Safety briefing

**08:30**   **Singing of the national anthem**

**08:35**   **Welcome**

*Dr Thulani Dlamini, Chief Executive Officer, CSIR*

**08:40**   **Keynote address**

*Dr Rob Davies, Minister of Trade and Industry*

**09:10**   **Industrial Policy: Where does innovation fit in?**

*Saul Levin, Executive Director: Trade and Industrial Policy Strategies*

**09:40**   **Entertainment**

**09:45**   **Trends in and outlook for the global and South African economies**

*Jorge Maia, Head: Research and Information, Industrial Development Corporation*

**10:15**   **Skills and innovation as a driver for industrial development in South Africa**

*Sizwe Nxasana, Founder of Future Nation Schools and Chairperson of National Student Financial Aid Scheme and National Education Collaboration Trust*

**10:45**   **Concluding remarks**

*Dr Philip Goyns, CSIR Board*

**10:55**   **Entertainment**

**11:00**   **Session ends**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 11:30 – 13:30

### Localisation for industrial development

**Session chair:** Johan le Roux, Executive Director: CSIR Implementation Unit

#### **11:30 Implementing localisation programmes in South Africa**

*Garth Strachan, Deputy Director-General: Industrial Development, The Department of Trade and Industry*

#### **12:00 Industrialisation and transformation through procurement: The Eskom experience**

*Henk Langenhoven, Corporate Specialist: Supplier Development and Localisation, Eskom*

#### **12:30 Localisation for industrial development**

*Ashley Bhugwandin, Manager: Technology Localisation Implementation Unit, CSIR*

#### **13:00 Panel discussion:** Is designation working in public procurement and can it stimulate industrial development?

**Panellists:** *Garth Strachan, Deputy Director-General: Industrial Development Division, The Department of Trade and Industry; Henk Langenhoven, Corporate Specialist: Supplier Development and Localisation, Eskom; Ashley Bhugwandin, Manager: Technology Localisation Implementation Unit, CSIR; Imraan Patel, Deputy Director-General: Socio-Economic Innovation Partnerships, Department of Science and Technology; Colette Yende, Senior Manager: Enterprise and Supplier Development, Transnet Engineering; Prasheen Maharaj, Chief Executive Officer, Southern African Shipyards.*

#### **13:30 Lunch**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 14:30 – 16:30

### **The growth and transformation of the South African defence industry**

**Session chair:** Johan Strydom, Strategic Research Manager, CSIR Defence, Peace, Safety and Security

**14:30 A state-owned enterprise perspective on the growth and transformation of the South African defence industry**

*Theo Kleynhans, Group Executive: Strategy, Denel*

**14:55 The reconfiguration of the SA defence industry in the post-2015 defence review environment: Prospects and challenges**

*Dr Moses D Khanyile, CD(SA), Managing Director: Masharps College*

**15:20 Towards a transformed defence industry that contributes to the growth of the South African economy**

*Erlank Pienaar, CSIR Defence, Peace, Safety and Security*

**15:45 Panel discussion:** The Defence Industry Strategy of the National Defence Industry Council: Opportunities and obstacles to growth and transformation

**Panellists:** *Theo Kleynhans, Group Executive: Strategy, Denel; Dr Moses D Khanyile, CD(SA), Managing Director: Masharps College; Erlank Pienaar, Acting Executive Director: CSIR Defence, Peace, Safety and Security; Florence Musengi, Director, Floida Engineering Services.*

**16:30 Session ends**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 11:30 – 13:30

### Industrial development of SMMEs in the bioeconomy sector

**Session chair:** Dr Raj Lalloo, CSIR Chief Researcher

*Bottlenecks in the translation of research and development into market-ready products and services in the biomanufacturing sector*

**11:30 IDC perspectives on biotech SMME development**

*Christo Fourie, Head: New Industries, Industrial Development Corporation*

**11:55 From concept to commercialisation: The European perspective**

*Kris Wadrop (Fellow of the Institute of Chemical Engineers), Director: Industrial Biotechnology and Biorefining, Centre for Process Innovation, United Kingdom*

**12:20 Developing South Africa's biomanufacturing industry through a hub for open innovation: Experiences from the Biomanufacturing Industry Development Centre**

*Dr Daniel Visser, Research and Development Strategy Manager, CSIR*

**12:45 Panel discussion:** How to stimulate the growth of a biomanufacturing based economy and create sustainable jobs

**Panellists:** Christo Fourie, Head: New Industries, Industrial Development Corporation; Dr Kris Wadrop, Director: Industrial Biotechnology and Biorefining, Centre for Process Innovation, United Kingdom; Dr Daniel Visser, Research and Development Strategy Manager, CSIR; Dr Gerhard Niemand, Managing Director, Puris Natural Aroma Chemicals; Dr Santosh Ramchuran, Director, JVS BioTech; Ross Norton, Managing Director, Amino SA; Makekele Sono-Tladi, Managing Director, Elvema Nutrition; Bandile Dlabantu, Managing Director, Khepri Innovations (Pty) Ltd; Yugen Pillay, Director: Economic Transformation Services, Sizwe Gobodo Ntsaluba; Dr Hannes Malan, Managing Director, Chemical Process Technologies (Pty) Ltd.

**13:30 Lunch**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 14:30 – 16:30

### The elusive competitive advantage in local pharmaceutical manufacturing

**Session chair:** Dr Boitumelo Semete: Executive Director: CSIR Biosciences

*Challenges and opportunities in local pharmaceutical production, as well as research and development needs*

**14:30 Building a world-class, globally competitive pharmaceutical business out of South Africa**

*Stavros Nicolaou, Senior Executive (Strategic Trade), Aspen Pharmacare*

**14:50 Building active pharmaceutical ingredient manufacturing capabilities in South Africa**

*Glaudina Loots, Director: Health Innovation, Department of Science and Technology*

**15:10 Perspectives from a new entrant in biopharmaceuticals**

*Martin Magwaza, Co-founder and CEO, BGM Biopharmaceuticals*

**15:30 Enabling local production of biopharmaceuticals in South Africa**

*Dr Tsepo Tsekoa, CSIR Principal Researcher*

**15:50 Panel discussion:** Local pharmaceutical manufacturing: What can South Africa's competitive advantage be?

**Panellists:** Stavros Nicolaou, Senior Executive (Strategic Trade), Aspen Pharmacare; Glaudina Loots, Director: Health Innovation, Department of Science and Technology; Martin Magwaza, Co-founder and CEO, BGM Biopharmaceuticals; Dr Tsepo Tsekoa, CSIR Principal Researcher; Dr Skhumbuzo Ngozwana, Kiara Health; Prof. Shabir Banoo, Chief Technical Specialist and Head: Pharmaceutical Policy and Programmes, Right to Care.

**16:30 Session ends**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 11:30 – 13:30

### From waste to value-adding alternatives for improved industrial competitiveness

**Session chair:** *Dr Douglas Trotter, Competence Area Manager: Green Economy, CSIR*

**11:30 Africa, the sleeping giant: E-waste as a resource**

*Ruben Janse van Rensburg, Sustainability Manager: Africa, Hewlett-Packard Inc*

**11:55 Responding to the changing environmental landscape: Using innovation to drive cost-effective solutions**

*Dr Sarushen Pillay, Environmental Technology Manager, Sasol*

**12:20 CSIR contributions to maximising the value of industry waste**

*Prof. Bruce Sithole, Chief Researcher and Research Group Leader: Biorefinery and Forest Products, CSIR*

**12:45 Panel discussion:** What green economic opportunities are evident within the biomass and waste sectors in South Africa and what are the key obstacles and actions needed to unlock them?

**Panellists:** *Ruben Janse van Rensburg, Sustainability Manager: Africa, Hewlett-Packard Inc; Dr Sarushen Pillay, Environmental Technology Manager, Sasol; Prof. Bruce Sithole, Chief Researcher and Research Group Leader: Biorefinery and Forest Products, CSIR; Dr Henry Roman, Director: Environmental Services and Technologies, Department of Science and Technology; Prof. Linda Godfrey, CSIR Principal Researcher and Manager: Waste Research Development and Innovation Roadmap.*

**13:30 Lunch**



## DAY ONE

THURSDAY 5 OCTOBER 2017 | 14:30 – 16:30

### Industrial development guided by science: Opportunities and risks of shale gas development

**Session chair:** Zanele Tshwete, Manager: Specialist Services, CSIR Implementation Unit

**14:30 Assessment in the global context: From ozone to ecosystems**

*Prof. Bob Scholes, Distinguished Professor of Systems Ecology, Global Change Institute, University of the Witwatersrand*

**14:55 The role of technology in unlocking the possibilities of shale gas**

*Rudi Heydenrich, Senior Vice President, Research and Technology, Sasol*

**15:20 The scientific assessment of shale gas development**

*Luanita Snyman-Van der Walt, Environmental Scientist and Assessment Practitioner, CSIR*

**15:45 Shell's use of and contribution to science in de-risking projects in South Africa: The case of shale gas**

*Nigel Rossouw, Environmental Planner, Shell Integrated Gas Ventures*

**16:10 Panel discussion:** As social-ecological challenges become more complex and contested, how can science and evidence-based assessments contribute towards making responsible decisions on much-needed industrial development and on delivering on the Sustainable Development Goals?

**Panellists:** Prof. Bob Scholes, Distinguished Professor of Systems Ecology, Global Change Institute, University of the Witwatersrand; Nigel Rossouw, Environmental Planner, Shell Integrated Gas Ventures; Luanita Snyman-Van der Walt, Environmental Scientist and Assessment Practitioner, CSIR; Rudi Heydenrich, Senior Vice President, Research and Technology, Sasol.

**16:30 Sessions ends**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 11:30 – 13:30

### **Infrastructure innovation as an enabler for industrial development**

**Session chair:** Dr Pravesh Debba, Competence Area Manager: Spatial Planning and Systems, CSIR

**11:30 Infrastructure innovation as an enabler for industrial development: Case study of the Gautrain**

*Jack van der Merwe, Chief Executive Officer, Gautrain Management Agency*

**11:55 The CSIR's work in infrastructure innovation as an enabler for industrial development**

*Llewellyn van Wyk, CSIR Principal Researcher*

**12:20 The IDC's role in stimulating and supporting infrastructure innovation: Past, present and future**

*Lizeka Matshekga, Divisional Executive: Agro, Infrastructure and New Industries, Industrial Development Corporation*

**12:45 Panel discussion:** Challenges and opportunities in infrastructure innovation for industrial growth

**Panellists:** Jack van der Merwe, Chief Executive Officer, Gautrain Management Agency; Lizeka Matshekga, Divisional Executive: Agro, Infrastructure and New Industries, Industrial Development Corporation; Llewellyn van Wyk, CSIR Principal Researcher; Dr Tshenge Demana, Chief Director: Technical Infrastructure, The Department of Trade and Industry; SF van der Linde, Client Director: Property, Africa: Aurecon.

**13:30 Lunch**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 14:30 – 16:30

### Industrial development in the transport sector

**Session chair:** Kenny Kistan, (Acting) CSIR Executive Director, CSIR Built Environment

**14:30 Transforming the Southern African transport sector across the value chain for development impact**

*Mohan Vivekanandan, Group Executive: Origination and Client Coverage, Development Bank of Southern Africa*

**14:55 The role of macrologistics in industrial development: Infrastructure and policy**

*Prof. Jan Havenga, Stellenbosch University*

**15:20 Integrated and sustainable transport systems to support industrial development in South Africa**

*Chris Hlabisa, Deputy Director-General: Roads and Infrastructure, Department of Transport*

**15:45 Panel discussion:** Is there an opportunity to develop Africa-owned transport solutions?

**Panellists:** Mohan Vivekanandan, Group Executive: Origination and Client Coverage, Development Bank of Southern Africa; Prof. Jan Havenga, Stellenbosch University; Chris Hlabisa, Deputy Director-General: Roads and Infrastructure, Department of Transport; Mathetha Mokonyama, Competence Area Manager: Transport Systems and Operations, CSIR.

**16:30 Session ends**

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 11:30 – 13:30

### Maximising South Africa's mineral endowment

**Session chair:** Dr Molefi Motuku, CSIR Group Executive: Research and Development

**11:30 The modernisation of mining**

*Dr Edwin Ritchken, Mining Phakisa*

**12:00 Maximising the developmental impacts of South Africa's mineral endowment**

*Dr Paul Jourdan, Acting CEO: Mining Equipment Manufacturing of South Africa (MEMSA)*

**12:30 The CSIR's role in mining**

*Navin Singh, Competence Area Manager: Mining and Mineral Resources, CSIR*

**13:00 Panel discussion**

**Panellists:** *Dr Edwin Ritchken, Mining Phakisa; Dr Paul Jourdan, Acting CEO: Mining Equipment Manufacturing of South Africa (MEMSA); Navin Singh, Competence Area Manager: Mining and Mineral Resources, CSIR; Prof. May Hermanus, Executive Director: CSIR Natural Resources and the Environment.*

## DAY ONE

THURSDAY 5 OCTOBER 2017 | 14:30 – 16:30

### Product lifecycle management in the context of industrial development

**Session chair:** Rentia Barnard, Lead: National Industrialisation Support Initiative – Product Lifecycle Management Centre of Technology, CSIR

**14:30 Overview of the CSIR Product Lifecycle Management Centre of Technology**

*Rentia Barnard, Lead: National Industrialisation Support Initiative – Product Lifecycle Management Centre of Technology, CSIR and Riaan Coetzee, Competence Area Manager: Mechatronics and Micromanufacturing, CSIR; Garth Strachan, Deputy Director-General: Industrial Development, Department of Trade and Industry; Joost van Gemert, Vice-President, Rheinmetall AG, Germany*

**15:10 Industry 4.0: The next industrial revolution**

*Martin Sanne, Executive Director: CSIR Materials Science and Manufacturing*

**15:30 The Siemens vision and its effect on local industry**

*Bas van Dijk, Regional Channel Manager (Africa): Siemens PLM Software, Netherlands  
Cobus Oosthuizen, Chief Executive Officer, ESTEQ*

**15:50 Panel discussion:** Product lifecycle management supporting industrial development

**Panellists:** *Martin Sanne, Executive Director: CSIR Materials Science and Manufacturing; Riaan Coetzee, Competence Area Manager: Mechatronics and Micromanufacturing, CSIR; Garth Strachan, Deputy Director-General: Industrial Development, Department of Trade and Industry, Philippa Rodseth, Executive Director: Manufacturing Circle; Dr Tony Bunn, Global Health Innovation Accelerator; Bas van Dijk, Regional Channel Manager (Africa), Siemens PLM Software, Netherlands; Cobus Oosthuizen, Chief Executive Officer, ESTEQ.*

**16:30 Session ends**



IDEAS THAT WORK FOR  
**INDUSTRIAL**  
• DEVELOPMENT

**DAY TWO:**  
**FRIDAY 6 OCTOBER 2017**

**DAY TWO**

**FRIDAY 6 OCTOBER 2017 | 08:30 – 10:00**

**Opening plenary session:**  
**The changing face of manufacturing: Industry 4.0**

---

**08:30 Industrial innovation and Industry 4.0**  
*Janeen Uzzell, Head: Women in Technology, General Electric, USA*

**09:00 Staying ahead: Driving and implementing technology evolution**  
*Dr Jean Marc Nasr, Head: Europe, Middle East and Africa, Airbus Defence and Space*

**09:30 Shaping the future of production: Country-readiness and social impact**  
*Wim Plaizier, Partner, A.T. Kearney (Pty) Ltd*

**10:00 Tea break**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 10:30 – 12:30

### **Digitalisation to foster industrial development I**

**Session chair:** Hina Patel, Executive Director: CSIR Meraka Institute

**10:30 Digitalisation in South Africa: Opportunities and challenges**

*Dr Brian Armstrong, Professor in the Chair of Digital Business, Wits Business School*

**11:00 Consumer credit, big data: What this means for businesses**

*Wendy Dent, Director: Research and Industry Insights, Financial Services Research and Consulting - Africa, TransUnion*

**11:30 CSIR research, development and innovation in information and communications technology as an enabler for industrial development**

*Dr Quentin Williams, Strategic Research Manager, CSIR Meraka Institute*

**12:00 Panel discussion:** Where should research and development focus to support South Africa in participating in the 4th Industrial Revolution?

**Panellists:** *Dr Brian Armstrong, Professor in the Chair of Digital Business, Wits Business School; Wendy Dent, Director: Research and Industry Insights, Financial Services Research and Consulting - Africa, TransUnion; Dr Quentin Williams, Strategic Research Manager, CSIR Meraka Institute; Kobus Roux, Strategic Business Development Manager: CSIR Meraka Institute; Shaakira Karolia, Economic advisor, City of Tshwane.*

**12:30 Tea break**



## DAY TWO

FRIDAY 6 OCTOBER 2017 | 14:30 – 16:30

### **Digitalisation to foster industrial development II**

**Session chair:** Hina Patel, Executive Director: CSIR Meraka Institute

**14:30 Reimagining industrial development in the digital age**

*Hans Zachar, Managing Director: Accenture Technology Strategy, South Africa*

**15:00 A strategic perspective on leading global technology developments in pursuit of digitalisation for industrial development**

*Dr Harry Teifel, i2B and Disruptas*

**15:30 The CSIR and bringing smart systems to industry**

*Lee Annamalai, Competence Area Manager: Smart Systems, CSIR*

**16:00 Panel discussion:** What are the technologies that are driving the 4th Industrial Revolution? From a digital perspective, what will industry look like in five years?

**Panellists:** *Hans Zachar, Managing Director: Accenture Technology Strategy; Dr Harry Teifel, i2B and Disruptas; Lee Annamalai, Competence Area Manager: Smart Systems, CSIR; Albert Gazendam, Dimension Data.*

**16:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 10:30 – 12:30

### **Emerging manufacturing technologies I**

**Session Chair:** Martin Sanne, Executive Director, CSIR Materials Science and Manufacturing

**10:30 How the next industrial revolution will reshape South African manufacturing**

*Johann du Toit, Chief Executive Officer, Simera Technology Group*

**11:00 Driving the digital enterprise in product development and manufacturing**

*Ralf Leinen, Vice President: Digital Factory and Process Industries and Drives – Southern and Eastern Africa, Siemens*

**11:30 CSIR research and development in emerging manufacturing technologies**

*Dr Neil Trollip, Strategic Research Manager: CSIR Materials Science and Manufacturing*

**12:00 Panel discussion:** How far away is the next industrial revolution and how proactive do South African manufacturers need to be? What are the short-term changes that our industry needs to make to be fully prepared for this new manufacturing paradigm and to take advantage of the opportunities offered?

**Panellists:** Johann du Toit, Chief Executive Officer, Simera Technology Group; Ralf Leinen, Vice President: Digital Factory and Process Industries and Drives – Southern and Eastern Africa, Siemens; Dr Neil Trollip, Strategic Research Manager: CSIR Materials Science and Manufacturing; Beeuwen Gerryts, Chief Director: Technology Localisation, Beneficiation and Advanced Manufacturing, Department of Science and Technology.

**12:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 14:30 – 16:30

### Emerging manufacturing technologies II

**Session chair:** Delon Mudaly, Manager: CSIR National Laser Centre

**14:30 International collaboration tools for industrial development**

*Dan Nagy, Managing Director, IMS International, USA*

**15:00 The impact of advanced manufacturing technologies: An SMME perspective**

*Peter Erasmus, Chief Executive Officer, Directech Group*

**15:30 The contribution of high-performance computing and modelling for industrial development**

*Dr Happy Sithole, Director: Centre for High Performance Computing, CSIR*

**16:00 Panel discussion:** Automation and robotics technologies are seen in some quarters to take away jobs – panellists are invited to share their views. How can automation technologies assist SMMEs to become more competitive? What obstacles prevent South African companies (specifically SMMEs) from adopting advanced manufacturing technologies, and what can be done to remove them?

**Panellists:** *Dan Nagy, Managing Director: Intelligent Manufacturing Systems, USA; Peter Erasmus, Chief Executive Officer, Directech Group; Dr Happy Sithole, Director: Centre for High Performance Computing, CSIR; Riaan Coetzee, Competence Area Manager: Mechatronics and Micromanufacturing, CSIR; Donald Mabusela, Director: Strategic Partnerships and Customer Care, Department of Trade and Industry.*

**16:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 10:30 – 12:30

### **Cybersecurity threats to the growth of the South African industry**

**Session Chair:** Dr Jackie Phahlamohlaka, Competence Area Manager: Command, Control and Information Warfare, CSIR

**10:30 Insider threats to cybersecurity**

*Darshan Lakha, Head: Vodacom Group Technology Security*

**10:50 Banking sector threats and responses**

*Paul Strauss, Chief Information Risk Officer, Standard Bank*

**11:10 The role of the Cybersecurity Hub in supporting industry**

*Dr Kiru Pillay, Chief Director: Cybersecurity Operations, Department of Telecommunications and Postal Services*

**11:30 CSIR work on improving cybersecurity for the South African industry**

*Dr Barend Taute, Manager: Information and Communications Technology Contract Research and Development, CSIR Meraka Institute*

**11:50 Panel discussion:** Is the South African industry prepared for the threats in cyberspace? What is lacking? What research, development and innovation is needed beyond current solutions?

**Panellists:** *Darshan Lakha, Vodacom Group Technology Security; Paul Strauss, Chief Information Risk Officer, Standard Bank; Dr Kiru Pillay, Chief Director: Cybersecurity Operations, Department of Telecommunications and Postal Services; Dr Barend Taute, Manager: Information and Communications Technology Contract Research and Development, CSIR Meraka Institute; Rivaj Parbhu, Control Risks; Erick Dube, Competence Area Manager: Information Security, CSIR.*

**12:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 14:30 – 16:30

### Cybersecurity as an enabler and pre-requisite for Industry 4.0

**Session chair:** Dr Barend Taute, Manager: Information and Communications Technology Contract Research and Development, CSIR Meraka Institute

**14:30 Cyber 4.0 - The evolution of cybercrime**

*Kovelin Naidoo, Cyber Security Officer, First National Bank*

**14:50 The security of embedded devices and Internet of Things security from an industry perspective**

*Jaco Botha, Senior Product Manager, Parsec*

**15:10 Video killed the radio stars**

*Aubrey Swanepoel, Chief Executive, Pfortner*

**15:30 CSIR research and development aimed at enabling Industry 4.0 from a cyber security perspective**

*Dr Jabu Mtsweni, Research Group Leader: Cyber Defence, CSIR*

**15:50 Panel discussion:** What are the critical needs for cyber readiness and resilience in Industry 4.0? What radically new approaches or technologies are available or needed?

**Panellists:** Kovelin Naidoo, Cyber Security Officer, First National Bank; Jaco Botha, Senior Product Manager, Parsec; Aubrey Swanepoel, Chief Executive, Pfortner; Dr Jabu Mtsweni, Research Group Leader: Cyber Defence, CSIR; Dr Louis Coetzee, Chief Engineer and Research Group Leader: Internet of Things, CSIR; Karel Mathee, Research Group Leader: Trust and Security, CSIR.

**16:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 10:30 – 12:30

### **A competitive aerospace industry**

**Session Chair:** Marié Botha, Key Account Manager: Aerospace Industry Support Initiative, CSIR

**10:30 The importance of international cooperation towards mutual benefit**

*Dr Jean Marc Nasr, Head: Europe, Middle East and Africa, Airbus Defence and Space*

**11:00 Accessing global aerospace supply chains from South Africa**

*Jay Isaac, Head: Strategy and Offset, Saab Grintek Defence*

**11:30 CSIR research and development in aerospace**

*Dr Kaven Naidoo, Competence Area Manager: Aeronautic Systems, CSIR*

**12:00 Panel discussion: How do we see the role of aerospace companies in support of industrial development in SA?**

**Panellists:** *Dr Jean Marc Nasr, Head: Europe, Middle East and Africa, Airbus Defence and Space; Jay Isaac, Head: Strategy and Offset, Saab Grintek Defence; Dr Kaven Naidoo, Competence Area Manager: Aeronautic Systems, CSIR.*

**12:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 14:30 – 16:30

### **Industrial development of medical devices and diagnostics**

**Session chair:** Riaan Coetzee, Competence Area Manager: Mechatronics and Micromanufacturing, CSIR

**14:30 Innovating transformative medical devices and growing the local medical device manufacturing sector**

*Dr Tony Bunn, PATH Health Innovation Consultant, Global Health Innovation Accelerator*

**14:55 Industry and funding challenges: Playing for both teams**

*Pieter de Beer: Senior Industry Development Manager, Industrial Development Corporation*

**15:20 CSIR research, development and innovation initiatives for the medical device and diagnostic industry**

*Dr Busisiwe Vilakazi, CSIR senior researcher*

**15:45 Panel discussion:** How to stimulate the growth on the local devices and diagnostics manufacturing sector

**Panellists:** *Dr Tony Bunn, PATH Health Innovation Consultant, Global Health Innovation Accelerator; Pieter de Beer: Senior Industry Development Manager Industrial Development Corporation; Dr Busisiwe Vilakazi, CSIR senior researcher; Tanya Vogt, Executive Officer, SAMED; Sarusha Pillay: Head: Technology Innovation Cluster Programmes, Technology Innovation Agency; Dr Carl Montagues, Chief Operations Officer MSQ Health Group; Louis Roux, Managing Director, Lifeassay Diagnostics (Pty) Ltd.*

**16:30 Session ends**

## DAY TWO

FRIDAY 6 OCTOBER 2017 | 10:30 – 12:30

### Sustainable economic growth

**Session chair:** Marius Claassen, Research Group Leader: Resource-specific Scientific Measures, CSIR

**10:30 Industrial symbiosis - a means to power regional growth and the green transition**

*Dr Per Møller, Chief Executive Officer, Symbiosis Centre, Denmark*

**11:00 Simultaneous energy and water optimisation in design, synthesis and optimisation of chemical plants**

*Prof. Thokozani Majozi, School of Chemical and Metallurgical Engineering, University of the Witwatersrand and CSIR Board Chairperson*

**11:30 Understanding trade-offs between development and resources**

*Xolisa Ngwadla, Independent expert*

**12:00 Panel discussion**

**Panellists:** *Dr Per Møller, Chief Executive Officer, Symbiosis Centre, Denmark; Prof. Thokozani Majozi, School of Chemical and Metallurgical Engineering, University of the Witwatersrand and CSIR Board Chairperson; Xolisa Ngwadla, Independent expert; Ndivhuho Raphulu, Director, National Cleaner Production Centre, South Africa.*

**12:30 Session ends**



## DAY TWO

FRIDAY 6 OCTOBER 2017 | 14:30 – 16:30

### **Industrial development and its link to water**

**Session chair:** Prof. May Hermanus, Executive Director: CSIR Natural Resources and the Environment  
Water and industrial development: More water needed, less water available

**14:30 Water, job creation, industrial development and the implementation of the Sustainable Development Goals in Africa**

*Alex Simalabwi, Executive Secretary: Africa Coordination Unit, Global Water Partnership Southern Africa*

**14:55 Planning for water infrastructure to support industrial development: The Coega Special Economic Zone**

**Spatial planning to support water demand for long-term growth and short term demand**

*Graham Taylor, Spatial Development Manager, Coega Development Corporation*

**15:20 CSIR technologies and interventions to maximise the availability of water for scenarios of industrial growth**

*Dr Harrison Pienaar, Competence Area Manager: Water resources, CSIR*

**15:45 Panel discussion:** Does the importance of water receive adequate attention in South Africa's industrial development agenda? How do we sharpen this focus?

**Panellists:** Alex Simalabwi, Executive Secretary: Africa Coordination Unit, Global Water Partnership Southern Africa; Graham Taylor, Spatial Development Manager, Coega Development Corporation; Dr Harrison Pienaar, Competence Area Manager: Water Resources, CSIR; Ashwin Seetal, Specialist: Strategic and Integrated Water Management, CSIR; Alan Mukoki, Chief Executive Officer, South African Chamber of Commerce and Industry; Janse Rabie, Head: Natural Resources, AgriSA; Nic Tandi, Programme Manager: Strategic Water Partners Network, Nepad Business Foundation.

**16:30 Session ends**

## TOURS, PANEL DISCUSSIONS AND SHOW-AND-TELL SESSIONS 12:40 - 13:30

### **Disruptive mobile technologies for media entrepreneurs**

**Experience how to operate a TV station over the mobile Internet**

The CSIR has developed a platform that enables media entrepreneurs to operate their own television stations over the mobile Internet. This innovation, called the micro-enterprise media engine or Meme, allows for the streaming of mobile videos without buffering and makes it possible to broadcast scheduled content in both low- and high-bandwidth environments. Join us for a demonstration where we showcase how content can be created; scheduled and broadcast to audiences using mobile devices.

### **Visit the Biomanufacturing Industry Development Centre**

The CSIR Biomanufacturing Industry Development Centre (BIDC), a first of its kind in South Africa, was established in 2013 to support small, medium and micro enterprises (SMMEs) involved in biomanufacturing to meet their customers' needs in short time-frames and to exploit market opportunities.

Companies that are incubated at the BIDC have access to ready-to-use biomanufacturing facilities, support in the use of research and development laboratories, as well as access to experts in the fields of agro and bioprocessing product development and scale up. The supported companies remain the sole owners of their innovations and retain absolute control over their future in terms of added value and partnerships.

The tour will include a visit to molecular biology and protein purification laboratories; chemistry and analytical laboratories; a 20-litre scale bioprocessing facility; a 200-litre bioprocessing pilot plant; a natural products and chemistry pilot facility and downstream processing facility for product isolation, purification and polishing. This demonstrates the full value chain of expertise and facilities required from early stage research and development through to final product or technology. Participants will also see products from SMMEs who have used the facility.

**Hosted by:** Dr Daniel Visser

**Contact:** Lara Kotze, lkotze@csir.co.za

**Venue:** Tour departs from the CSIR International Convention Centre to building 18b

**Duration:** 60 minutes

Maximum number of participants for this tour: 60

Select your tour of choice when registering for the conference.

## **Funding instruments for industrial development: A panel discussion**

**Session Chair:** Dr Ndumiso Cingo, Innovation Manager, Research and Development, CSIR

What is the existing landscape of funding instruments to support industrial development in South Africa? Which of these instruments are applicable to support scientific and industrial research? Are there gaps in the funding landscape that limit industrial development? What are the respective roles of the public and private sectors in supporting/funding industrial research?

**Panellists:** Barlow Manilal, Chief Executive Officer: Technology Innovation Agency; Dr Molapo Qhobela, Chief Executive Officer: National Research Foundation; Dr Phil Mjwara, Director-General: Department of Science and Technology; Shakeel Meer, Divisional Executive: Chemicals and Textiles, Industrial Development Corporation; Donald Mabusela, Director: Strategic Partnerships and Customer Care, Department of Trade and Industry; Representative to be confirmed, Development Bank of Southern Africa.

## Tour to the CSIR National Laser Centre

It is said that the 21st century will depend as much on photonics as the 20th century depended on electronics. Photonics is the science and technology of generating, controlling and detecting photons, which are particles of light. It already underpins many technologies in smartphones, laptops, data communication and medical devices. Join us for a tour to the CSIR National Laser Centre, which is also at the heart of an emerging additive manufacturing platform, to find out about the latest developments in laser research and development.

One of the world's biggest and fastest laser-based 3D printers is housed at the CSIR National Laser Centre. This additive manufacturing powder-bed platform was developed as part of Project Aeroswift, a collaboration between the CSIR and Aerosud Innovation Centre. It uses titanium to produce complex components for the aerospace industry. It has the ability to process difficult-to-machine materials, can produce parts with little material wastage and allows for the printing of components up to 2m long, 600mm in width and 600mm in height. Recently, the team successfully produced two different flight grips (the condition lever and throttle grip) for the South African developed AHRLAC aircraft and a fuel pylon bracket as test component for a commercial aircraft.

During the visit, you will also have the opportunity to visit the Photonics Prototyping Facility. This world-class facility provides expertise, equipment and technical support to help industrialise photonics-based technologies. Also developed and designed in this facility, is South Africa's new-generation 3-D fingerprint sensing technology.

The third aspect of the tour is a visit to the biophotonics research area. The research undertaken by this team seeks to develop a photonics-driven, cost-effective HIV 1 diagnostic device that is easy to use at point-of-care settings and in low-resourced areas. Using super-resolution imaging and spectroscopic techniques, the team aims to develop a device that not only confirms the presence of HIV 1, but is able to also indicate genotypic information and viral load.

**Host:** Chumisa Ndlazi

**Contact:** Chumisa Ndlazi, [cndlazi@csir.co.za](mailto:cndlazi@csir.co.za)

**Venue:** Tour departs from the CSIR International Convention Centre to building 46 A

**Duration:** 1 hour

Maximum number of participants for this tour: 30

## Industrial development and climate change: Opportunities and responsibilities under the Paris Agreement

South Africa has ratified the Paris agreement reached at the United Nations Framework Convention on Climate Change Conference in 2015. The agreement seeks to drastically reduce greenhouse gas emissions and restrict the global temperature increases to 2 °C. This is needed to avoid dangerous climate change from occurring, also in South Africa.

### A new global industrial revolution?

Through the Paris Agreement, the world may well be undergoing a global industrial revolution, induced by the need to combat climate change. Key to this revolution is the need to systematically and swiftly change the way in which we generate energy on the planet – fossil fuels need to be replaced increasingly by nuclear and renewable forms of energy. What will the implications of this revolution be for industries globally, and what are the opportunities and challenges South Africa will face in this environment of change?

This session will explore scientific-based responses to these questions and also compare a Paris Agreement future to a low mitigation future, within the context of industrial development in South Africa.

**Host:** Prof. Francois Engelbrecht

**Contact:** fengelbrecht@csir.co.za

**Venue:** Ruby

## SIDE EVENTS

### DAY ONE

**THURSDAY** 5 OCTOBER 2017 | 11:30 (By invitation only)

---

**A CNBC panel discussion: Industrial innovation and Industry 4.0**

### DAY ONE

**THURSDAY** 5 OCTOBER 2017 | 13:00 (All welcome)

---

**Media launch of the second edition of the Southern African Climate Risk and Vulnerability handbook**  
See page 39

### DAY ONE AND TWO

**THURSDAY AND FRIDAY** | 13:30 - 14:30 (All welcome)

---

**CSIR research, development and innovation in support of growing South Africa's Oceans Economy (See page 40)**

## SIDE EVENTS

---

### **Climate Risk and Vulnerability - A handbook for Southern Africa, 2nd edition**

Reliable and accessible climate information is an important tool in responding to the impacts of climate change and the development of robust response strategies.

The 2nd edition of the Climate Risk and Vulnerability Handbook for Southern Africa builds on the critically acclaimed 1st edition and presents the latest available scientific knowledge on the nature of climate change and its implications for the region. The handbook serves as an important guide for policy makers, climate and development practitioners, students and researchers.

The 2nd edition presents:

- Evidence of recent changes in climate and projected climate futures over Southern Africa;
- Potential impacts across sectors; and
- Responses required to reduce risk.

The handbook is accompanied by a concise executive summary (available in English and Portuguese) that will support decision-makers in Southern Africa as they implement their Nationally Determined Contributions under the United Nations Framework Convention on Climate Change Paris Agreement as well as national climate change policies and strategies.

**Host:** Claire Davis-Reddy

**Contact:** [cdavis@csir.co.za](mailto:cdavis@csir.co.za)

**Venue:** Emerald

---



## CSIR research, development and innovation in support of growing South Africa's Oceans Economy

**Venue:** CSIR ICC Exhibition Hall

South Africa's coastal ocean and shelf sea waters support thousands of jobs and contribute millions of rands to the economy each year, with coastal and ocean goods and services estimated to contribute 35% to South Africa's gross domestic product. South Africa's Exclusive Economic Zone (EEZ) places the country at a strategic advantage to extract economic potential from our oceans. This is recognised through Operation Phakisa: Ocean Economy – a major South African policy initiative, expected to contribute R20 billion to the economy by 2019.

CSIR research, development and implementation support marine and maritime environmental activities in the EEZ across several sectors, including environmental management, safety and resources, fisheries and aquaculture, marine transport, offshore oil and gas, climate and weather forecasting. This is achieved through improving our ability to observe, model and predict the 3D ocean state, thereby advancing our quantitative understanding of ocean processes affecting the marine and maritime environment.

Furthermore, the CSIR, in partnership with the South African International Maritime Institute (SAIMI), has developed the Research, Innovation and Knowledge Management Road Map for the South African Maritime Sector, which identifies and directs RD&I priorities. The Road Map is currently being implemented through close collaboration between the CSIR, SAIMI and key local and international partners.

The CSIR conference exhibition will incorporate a technology demonstration, coupled with lunch-time presentations on our research, experience and capabilities in the oceans domain.

**Contact:** Dr Björn Backeberg [bbackeberg@csir.co.za](mailto:bbackeberg@csir.co.za)

**Times:** 13:30 – 14:30 on 5 and 6 October 2017





# CSIR SPEAKER PROFILES

## The CSIR and bringing smart systems to industry



### LEE ANNAMALAI

Annamalai manages the CSIR's smart systems area. He has a Master's in engineering from the University of Pretoria and a wide technology capability ranging from electronic engineering and systems in defence, the Internet of Things and space systems to big data spatial information systems.

### About the talk .....

Manufacturers and producers, whether in agri-production or high-tech components like batteries and consumer electronics, all stand to gain business value from the huge expansion in wireless sensing connected devices and embedded computing. These technologies create an environment of digitisation in areas that have remained elusive and now open up opportunities for streamlining operations, reducing costs, deepening customer experiences and engagement, as well as creating new revenue streams.

This talk highlights the CSIR's work in connected devices and their associated digital systems, their current areas of impact in industries and sketches a future world in which smart systems improve industrialisation and manufacturing.

---

## Overview of the CSIR Product Lifecycle Management Technology Centre



### RENTIA BARNARD

Barnard has more than 30 years of experience in engineering, enterprise architecture and management, including extensive international industrial experience within various industries such as aerospace and defence, infrastructure, rail, ports, energy and nuclear, covering private, public and state-owned entities. She has a Bachelor of Science (Physics and Computer Science) from the North-West University and a Master of Information Technology Management from the University of Pretoria.

Barnard has been instrumental in establishing a national industrialisation support initiative. She views engineering capabilities as being essential for South African industry and small, medium and micro enterprises (SMMEs) to become globally competitive in product development and manufacturing.

She played an instrumental role in an agreement with the Department of Trade and Industry (**the dti**), Rheinmetall AG and Siemens to obtain the required Siemens solutions as a first building block for the Product Lifecycle Management (PLM) Technology Centre. The PLM Technology Centre was announced in the dti's Industrial Policy Action Plan 2017 – 2020.

Barnard's interests include advanced manufacturing, Industry 4, Internet of Things, big data, predictive engineering analytics, cybersecurity, product lifecycle management and architecting the engineering enterprise.

---

## Localisation for industrial development



### ASHLEY BHUGWANDIN

Bhugwandin is the manager of the Technology Localisation Implementation Unit, an initiative funded by the Department of Science and Technology and hosted by the CSIR. He completed his industrial engineering studies at the Durban University of Technology and spent 13 years working within a variety of manufacturing industries, including some of the larger manufacturers such as Toyota South Africa, South African Breweries, Volkswagen SA and Behr SA.

### About the talk .....

In the next seven years, the South African government plans to invest about R650 million in infrastructure-related projects through state-owned enterprises. This investment provides an opportunity for the manufacturing industry to be revitalised and developed and for South African companies to participate. The goal is to develop a competitive South African manufacturing sector that can integrate into the supply chain of the original equipment manufacturers that are the main contractors in the state procurement projects. This relationship will ideally equip local suppliers to grow into export-ready companies.

However, localisation is not easily achievable in the South African context, with a high volume of the inputs required in state procurement projects and other mega projects being imported into the country. Value addition is minimal as a consequence of the manufacturing sector not being adequately equipped to take advantage of the opportunities. Some of the other reasons include lack of competitiveness, lower volumes when compared to global sourcing, the inability to manufacture to internationally recognised standards and lack of skills.

The presentation unpacks how industrial development can be achieved through localisation.

---

# Overview of the CSIR Product Lifecycle Management Centre of Technology



## RIAAN COETZEE

Coetzee has been with the CSIR for more than 25 years. He has an MBA from Bond University, Australia and experience in systems engineering, technology management, technology roadmapping, product lifecycle management, product development and futures research. Coetzee was instrumental in the establishment of a mechatronics and micromanufacturing research unit at the CSIR with a focus on mechatronics and robotics, automation and control, micro-manufacturing and microsystems, as well as medical devices and systems. He was also part of the team that established the National Product Lifecycle Management Centre of Technology, as well as the National Nano-Micro Manufacturing Facility.

# Research and development aimed at enabling Industry 4.0 from a cybersecurity perspective



## DR JABU MTSWENI

Mtsweni holds a PhD in computer science from the University of South Africa (Unisa). He is a research group leader for cyber defence at the CSIR and research fellow at Unisa. He is also a member of the International Telecommunication Union (ITU)-study group on cybersecurity in South Africa. His research interests and technical expertise are in secure software development, software and firmware reverse engineering, malware analysis, threat intelligence, web security and general cyber warfare. Mtsweni has over 15 years' academic and industry experience and has published over 50 peer-reviewed conference and journal papers both in local and international forums. He has also presented and actively contributed at various local and international technology forums over the years, such as the ITU World Summit on the Information Society 2017, ITWeb Security Summit, TEDx, Southern African Development Community Cybersecurity Conference, International Information Security South Africa, and the NextGeneration Threats Conference. Over the years, Mtsweni has received a number of research and excellence awards for his work, leadership and community engagement.

## About the talk .....

Today, the devices we use are mostly categories of computers, referred to as the Internet of Things (IoT) and these devices range from the small to the industrial scale, leading us to a smart world enabled by smart connections.

Industry 4.0 is a name for the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the IoT, cloud computing and cognitive computing. The common denominator in this growing interconnectedness is information and communications technology and cyberspace. In this heavily wired revolution, Industry 4.0 is of significant interest as it impacts on the socio-economic aspects of nations, including employment, safety, security, health, environment and law. The vision for Industry 4.0 can therefore be found in various use cases where widely distributed (yet highly interconnected and integrated) cloud services, sensor networks, IoT, embedded systems, and other cyber-physical systems transcending different domains are converging and transacting with minimal human involvement. This is done to enable innovative operations that are increasingly automated and robotised where machine-to-machine and machine-to-human communications are central. This convergence, whilst beneficial, is also creating complex safety and security challenges that both public and private organisations are not prepared to, or ready to combat. To enable a secure and safe Industry 4.0, the CSIR is embarking on a number of national capability-building initiatives, which in turn contributes towards the vision of the country to build safer communities.

In this talk, Mtsweni will share how the full potential of the Industry 4.0 vision could be enhanced. He will highlight some of the research, development and innovation building blocks that the CSIR is already working on with different stakeholders and partners.

---

## CSIR research and development in aerospace



### DR KAVEN NAIDOO

Naidoo is the manager for aeronautic systems at the CSIR. He has a PhD from the University of the Witwatersrand, specialising in supersonic aerodynamics and has been active in the field of computational and experimental aerodynamics since 1999. Naidoo has been involved in various military programmes for the South African Air Force and industry. He also completed the Executive National Security Programme at the South African National Defence College. Naidoo's current interest is in expanding South Africa's global aerospace footprint through innovation that arises from harnessing

core capabilities across the CSIR and South African industry.

### About the talk .....

The CSIR is home to leading aerospace research and development in South Africa with a track record of technological advances and achievements in support of the country's military industrial complex, built over many decades.

The need for strategic military independence resulted in the establishment of a wide range of capabilities and significant infrastructure for vertical product integration for a number of aerospace systems, including weapons systems, unmanned aerial systems, helicopters, satellites and fighter aircraft.

The CSIR and industry have multiple capabilities in the aerospace sector, including design, development, advanced manufacturing, integration, testing, industrialisation and production, amongst others.

A recent industry study highlighted the growth provided by the industry in the past and its ability to be the engine of future economic growth. The study also indicated that industry has to export and innovate more for sustainability. This is an area in which the CSIR can play a significant role.

The talk highlights the broad range of CSIR aerospace capabilities in aeronautics systems, materials, manufacturing, radar, optronic sensor systems, electronic warfare and earth observation, as well as recent programmes, initiatives and advances in these areas in pursuit of innovation for industrial development.

---

## **Towards a transformed defence industry that contributes to the growth of the South African economy**

---



### **ERLANK PIENAAR**

Since joining the CSIR in 1988, Pienaar has contributed to the development of cutting-edge radar and electronic warfare components and systems that have found their way to international markets – and created significant international research and development collaborations that continue to contribute to the CSIR’s knowledge and client base.

Pienaar holds a BEng (Electronic) degree from Stellenbosch University and a BEng (Hons) (Electronic) degree from the University of Pretoria. He has published numerous papers in his field and has presented training courses locally and internationally. He has a strong interest in utilising technology commercialisation as a mechanism to stimulate industrial development in South Africa.

### **About the talk .....**

Pienaar’s talk will reflect on the status of research and development and product innovation in the defence industry, opportunities created by the national defence industry strategy and the CSIR’s intent to be a catalyst for the establishment of a transformed, highly successful defence industry which makes a significant contribution to the growth of the South African economy.

# CSIR technologies and interventions to maximise the availability of water for scenarios of industrial growth



## DR HARRISON PIENAAR

Pienaar is responsible for managing water research and development at the CSIR. He obtained a PhD in hydrogeology from the University of the Western Cape. He has a keen interest in applied water research, with a particular focus on aspects relating to integrated water resource management. Pienaar has previously steered a number of key water initiatives and programmes such as Water for Growth and Development in South Africa, Water Resource Directed Measures, South African Water Sector Response to Climate Change, Systematic Conservation of South Africa’s Freshwater Biodiversity, and Sustainable use of South Africa’s Inland Waters.

### About the talk .....

South Africa is a semi-arid country with a mean annual rainfall half of the world average at 490mm. To compound the scarcity, evaporation rates exceed rainfall in a large area of the country. Based on current usage trends, South Africa is expected to face a water deficit of 17% by 2030. This will have a significant impact on the rate at which strategic sectors can grow and create the economic and social benefits expected. Except for mining and some major industrial users, most other industrial water supplies are provided by municipalities and their allocations are classified as urban uses. A key requirement for industrial user sectors is a sustained supply of good quality water.

The CSIR’s multidisciplinary nature perfectly positions the organisation to intervene in the area of water sustainability, where many of the organisation’s competences can be applied in the areas of water infrastructure; water resource management; adaption to and mitigation of climate change, industrialisation and urbanisation; water and human health; mine, industrial and waste water treatment; and water quality monitoring. The organisation’s involvement in water sector activities and initiatives include research, development and innovation, implementation support, operational efficiency optimisation, network management and skills development support. Global trends in water innovation and technology can be categorised into three areas: Reduce, Remediate, and Reuse (3-Rs). In response to the 3-Rs of water, this presentation outlines several innovations by the CSIR in its science, engineering and technology portfolio to reduce raw water dependence and achieve discharge compliance, to treat wastewater (remediation), reuse water, and beneficiate recovered nutrients.



# Industry 4.0: The next industrial revolution



## MARTIN SANNE

Sanne is Executive Director of CSIR Materials Science and Manufacturing. He hails from an industry background of information technology (IT), telecommunications, electrical engineering and energy.

In his role as Executive Director, Sanne drives research and product development in the National System of Innovation to solve science, engineering and technology (SET) challenges in collaboration with stakeholders, funders, as well as research and development industry partners in the areas of nanotechnology, micro-manufacturing, robotics, health, water, infrastructure, light metals – particularly titanium beneficiation – energy materials (batteries and energy storage), polymers, composites, textiles and Industry 4.0.

Sanne headed up the Siemens Africa Smart Grid Energy business, providing solutions for utilities such as Eskom, the mines, a broad range of industry sectors and municipalities. He was part of the IT/Internet start-up SEACOM as General Manager of SEACOM South Africa (Pty) Ltd and Global Head of Sales of SEACOM Ltd Mauritius.

Sanne is a registered Professional Engineer in South Africa. He holds a BSc in electrical engineering from the University of the Witwatersrand and an MSc in digital systems from abroad. He is currently a board member of the Mandela Bay Composites Cluster.

## About the talk .....

The next industrial revolution is characterised by a convergence of digital technologies, advanced materials and new manufacturing techniques. New and emerging technologies are fundamentally changing our world. Technology is advancing at a pace never experienced before. Disruptive change enabled by emerging technologies is happening in the global manufacturing sector as much as (if not more than) in any other sector. This poses a major survival threat to manufacturing firms that do not adapt quickly. However, firms that prepare for and embrace the new opportunities can become global players and grow exponentially. Specific technologies that have potential to fundamentally change the nature of business, work and society include, inter alia, cloud technology, big data, predictive analytics, cognitive computing, artificial intelligence, mixed reality, agile robots, biosensors, 5G, wearable electronics, LIFI, the Internet of Things and many more.



# The CSIR’s role in mining



## NAVIN SINGH

Singh holds a Master’s degree in mining engineering from the University of the Witwatersrand. He has 20 years of working experience in the mining and minerals sector and his interests lie in mechanised mining. Singh is responsible for driving the South African Mining, Extraction Research, Development and Innovation strategy developed by the CSIR in partnership with government and the private sector. In previous roles, he led the research programme for occupational health and safety in South Africa and also developed a strategy for implementation of mechanised mining

that served as a technology roadmap that was utilised by local mining operations towards mechanising their mining operations.

## About the talk

The South African mining industry has made a significant contribution to the country’s economy for more than a century. Changes in legislation for mining licences, stricter health and safety targets, and a stronger focus on reducing the impact on the environment, coupled with increasing labour and electricity costs, are some of the factors that significantly changed the landscape in which the mining industry now operates.

Further to this, low commodity prices force South African mines to seek new, more technically advanced, cost-effective ways of increasing production without compromising occupational health and safety. Research, development and innovation in the mining sector are therefore required to find solutions that are cheaper, safer and more efficient. Alternative programmes must be developed and put in place to transform South Africa’s comparative mineral endowment advantages into more sustainable and globally competitive strengths. This talk discusses the recently developed South African Mining Extraction Research, Development and Innovation strategy, which focuses on productivity-related issues to ensure that mineral resources can be converted into mineable reserves – economically, safely and with minimal impact on the environment.

# The CSIR’s contribution to maximising the value of industry waste



## PROF. BRUCE SITHOLE

Sithole is a chief scientist leading research in biorefinery and forest products at the CSIR and a professor in chemical engineering at the University of KwaZulu-Natal. He holds a PhD in industrial chemistry from Dalhousie University, Canada. His key competencies are in biorefinery technologies, as well as the valorisation of waste biomass and his research interests lie in integrated forest products biorefinery.

Sithole's research contributes to the revitalisation and resilience of the pulp and paper industry by diversifying into biorefinery activities that will add more value to the bottom lines of the mills. He also has a research interest in the valorisation of waste chicken feathers.

**About the talk .....**

The South African National Development Plan 2030 and associated national and sector-based strategies prioritise a global imperative towards a green economy development path. Transition to a green economy requires research that engages across various sector value chains. The processing of biomass and waste sectors are priorities considering the multitude of opportunities for the development of new value chains from them. The CSIR undertakes research and development to help industry unlock the value chains. The research activities have been enhanced by the establishment of a world-class Biorefinery Industry and Development Facility that provides pilot facilities, chemistry and chemical engineering expertise to develop high-value chains from biomass and organic waste. In his presentation, Sithole will highlight case studies in which the CSIR has successfully worked with industry to derive maximum value from wood biomass and organic waste.

---

**The contribution of high-performance computing and modelling for industrial development**



**DR HAPPY SITHOLE**

Sithole is the director of the Centre for High Performance Computing at the CSIR. He completed his PhD in materials science at the University of Limpopo, focusing on the electronic and atomistic simulation of iron sulphides. He has applied high-performance computing to solve problems in mining industries and nuclear power plant designs. Sithole also sits on the steering committees of high-performance computing meetings in Germany, Russia and Singapore. He is the Chairperson of the ICT Committee of the National Library Board.

**About the talk .....**

High-performance computing is a tool that can be used by industries to accelerate the route from concept to product. It affords them a competitive advantage through the use of virtual prototypes. Industries all over the world have started using high-performance computing. With the emergence of machine learning and artificial intelligence in big data analysis, high-performance computing is gaining traction, especially in newly-emerging industries. This talk will focus on the CSIR's high-performance computing offerings and its role in industrial development.

# The scientific assessment of shale gas development



## LUANITA SNYMAN-VAN DER WALT

Snyman-van der Walt works as a CSIR environmental scientist focusing on Geographic Information System (GIS) analyses for environmental assessment. She has been involved in two national strategic environmental assessments for shale gas development in the Karoo and the development of aquaculture. These assessments ultimately seek to provide government with frameworks for responsible decision-making on development. Snyman-van der Walt holds an MSc in environmental science from North-West University, and she is enrolled for an MSc GISc at Vrije Universiteit Amsterdam in The Netherlands. She is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions.

### About the talk .....

The exploration of shale gas in South Africa’s Karoo basin has been viewed with significant scepticism by some, while others believe it could potentially be the answer to energy security in the country. To provide evidence-based guidance to decision-makers, the CSIR collaborated with other science councils, research institutions, public- and private sector, and government to assess the viability and potential impact of shale gas development in the region. This talk outlines the assessment process and some of the findings.

# CSIR work on improving cybersecurity for the South African industry



## DR BAREND TAUTE

Taute is an electrical engineer with a PhD in electromagnetics from the Ohio State University in the USA. He has been with the CSIR in South Africa since 1983 as a researcher and technology manager working on radar, antennas, remote sensing, microwave heating, safety and security, crime combating, border control, cybersecurity and information and communications technology (ICT).  
Currently, he leads ICT contract research and development at the CSIR Meraka Institute. His recent focus has been on local, African and European collaboration in ICT and cybersecurity-related strategy, policy, research, development and innovation.

### About the talk .....

Taute will present a view of the CSIR’s capabilities, research and development related to the improvement of cybersecurity for the South African industry.

# CSIR research and development in emerging manufacturing technologies



## DR NEIL TROLLIP

Trollip has a PhD in chemistry from the Nelson Mandela University in Port Elizabeth and an MBA from the Henley Management College that has merged with the Henley Business School of the University of Reading in the United Kingdom. He has led various national initiatives, most recently the development of advanced manufacturing technology roadmaps. Trollip lectures MBA students in the management of technological innovation and is a national contact point for the European Union’s Horizon 2020 programme in the field of materials and manufacturing. In 2016, he led a team that

developed the CSIR’s advanced manufacturing strategy.

Trollip is responsible for overseeing and reviewing a large portfolio of research and development projects in the field of materials science and manufacturing.

## About the talk .....

Disruptive change enabled by emerging technologies characterises the global manufacturing sector. These emerging technologies include advanced robotics, artificial intelligence, machine learning, additive manufacturing, photonics, advanced materials, new sensors, data analytics, cloud computing and the Internet of Things. The rapid rise and convergence of such technologies is driving the next industrial revolution, also known as Industry 4.0. Under this new manufacturing paradigm, value chains will be completely integrated at a global level, bringing significant opportunities to companies of all sizes. However, mastering the new and emerging technologies driving this revolution will be a key requirement.

The CSIR has developed capabilities in key enabling technologies that drive the next industrial revolution, and develops and transfers solutions that equip manufacturing firms to compete successfully in the rapidly emerging future. The talk describes these main areas of research development and innovation in the CSIR, and provides examples of successful innovations and technologies still under development. The organisation’s approach to research development and innovation in emerging manufacturing technologies will be explained. This includes conducting open innovation (not limited to activities within an organisation) and facilitating uptake by industry through technology upscaling and demonstration. The plan to establish a smart factory aimed at the next industrial revolution to integrate and demonstrate technologies and principles, and to develop solutions together with industry, is also presented.

# Enabling local production of biopharmaceuticals in South Africa



## DR TSEPO TSEKOA

Tsekhoa is a principal researcher and research group leader for biomanufacturing technology demonstration at the CSIR. He holds a PhD in applied biotechnology from the University of the Western Cape and his main expertise is in the combined fields of applied biochemistry and the recombinant production of biologics, including reagent proteins, vaccines and antibodies. In recent years, Tsekhoa has focused on developing production processes for the manufacturing of biologics at bench and pilot scale, with an emphasis on downstream processing aspects. The aim is to develop technology demonstrators in partnership with industrial and other partners.

### About the talk .....

Biopharmaceuticals is one of the fastest growing sectors of the pharmaceutical industry, mainly driven by a rapid expansion in the manufacture of recombinant protein-based drugs. The CSIR has identified opportunities in partnership with industry and other stakeholders to develop and ultimately manufacture several novel biopharmaceutical drugs locally in an effort to improve the cost and access to medicine in South Africa. This includes a proof of concept for the fermentation-based production of a vaccine carrier protein in recombinant *E.coli*, the genetic engineering of the micromachinery of a leafy tobacco plant to produce a significantly cheaper rabies antidote, called Rabivir™ and, also using a species of tobacco plant, the successful production of HIV antibodies at levels that bring the health industry a small step closer to an economically viable preventative treatment against this infection. Future emphasis will be on supporting industry to grow the local biopharmaceutical sector.

# The CSIR's work in infrastructure innovation as an enabler for industrial development



## LLEWELLYN VAN WYK

Van Wyk holds a Bachelor of Architecture from the University of Cape Town. He is a principal researcher at the CSIR, guest lecturer and designer with extensive international experience. His research interests focus on sustainable building and construction methods and technologies and their applications. He is a leading scholar of 21st-century green building and green infrastructure design discourses, in particular, the contemporary innovative building technology movement in South Africa. Van Wyk holds a number of awards, including the Doing Business Award of Excellence by the World Bank, 2007.

**About the talk .....**

The industrialisation of construction activity has been a global research and development topic for some time and some instances of the application of this philosophy has been seen. In essence, this implies increased off-site manufacturing of most of the components for infrastructure and on-site assembly.

For this reason, a global trend is emerging to align the design and delivery of infrastructure – the fundamental facilities and systems serving a country, city or area, including the services and facilities necessary for its economy to function – with manufacturing sector processes.

The talk outlines some CSIR-led infrastructure projects with an industrial development impact and sheds light on new sectors or trends that the organisation has identified for industrial development in infrastructure design and delivery.

---

**CSIR research, development and innovation initiatives for the medical device and diagnostic industry**

---



**DR BUSISIWE VILAKAZI**

Vilakazi is a senior researcher in the field of medical device development at the CSIR. She completed an MSc in engineering at the University of the Witwatersrand in 2007. This was followed with a DPhil in biomedical engineering in 2012 as a Nelson Mandela Scholar from the University of Oxford in the United Kingdom.

Vilakazi's current research interests include development of signal processing techniques and their application to diagnostic systems, especially in the context of medical problems.

**About the talk .....**

South Africa's medical device market is worth about R12.1 billion, comprising 4.2% of all health expenditure. Yet, 94% of products are imported with only a few local manufacturers employing a small number of people. Barriers to entry in the medical device industry include a lack of incentives, too few skilled and semi-skilled workers, as well as the prohibitive cost of raw materials. In addition, the regulatory environment is uncertain with the cost of regulatory compliance including the setting up of quality management systems, certification and regular compliance testing. The CSIR has developed a number of medical devices and sensors to improve test turnaround time, quality of care and health information for primary healthcare facilities. The organisation has also proposed a solution to optimise medical device lifecycle management.

# Developing South Africa’s biomanufacturing industry through a hub for open innovation: Experiences from the Biomanufacturing Industry Development Centre



## DR DANIEL VISSER

Visser is the research and development strategy manager for the CSIR and holds a PhD (Biochemistry) from Rhodes University. He joined the CSIR in 2003 as a student researching recombinant expression of commercially relevant enzymes. Between 2004 and 2011, Visser was involved in enzyme-based technologies including discovery, recombinant production, process development and application of enzymes to the production of fine chemicals and pharmaceuticals. Other research interests include metagenomics and high-throughput screening. He has published more than 25 peer-reviewed articles, patents and conference proceedings in the fields of biocatalysts, biochemistry and enzymology. Visser was one of the initial architects of the CSIR’s Biomanufacturing Industry Development Centre (BIDC). In the initial stages of the programme, he was involved in strategy and business development as well as the design of the facility and its business models. He has since moved to the CSIR research and development office but remains involved in the strategic direction of the BIDC.

## About the talk .....

Globally, bio-based manufacturing processes and products are increasingly replacing traditional chemical manufacturing. Bio-based manufacturing generally requires lower energy inputs, generates less harmful waste and can often produce highly specific products not possible through chemical synthesis. The CSIR is supporting the establishment of this sector and increasing the competitiveness of existing companies through providing technology development, piloting and formulation services to small, medium and large enterprises in an open innovation model. The BIDC does this by providing access to infrastructure, expertise and skilled human capital. The initiative is also in line with the Department of Trade and Industry’s Industrial Policy Action Plan and the Department of Science and Technology’s Bioeconomy Strategy.



# CSIR research and development in information and communications technology as an enabler of industrial development



## DR QUENTIN WILLIAMS

Williams focuses on the formulation and implementation of research strategy within the information and communications (ICT) domain and in particular, he facilitates data science skills programmes across the national ICT research and development ecosystem for the CSIR. He completed a BEng in electronic engineering at Stellenbosch University, followed by a PhD in engineering from the University of Oxford in the United Kingdom with emphasis on using artificial intelligence and analytics to understand cardiac disease.

### About the talk .....

New technologies, such as artificial intelligence, robotics, the Internet of Things and big data collected from physical things with automated devices and sensors, will mark a fourth industrial revolution. It is predicted that this will have a significant impact on business models, products and the nature of jobs, therefore businesses will have to adapt to remain sustainable.

Williams will show how local digital innovations within the fourth industrial revolution can bring new wealth and jobs for South Africa’s ICT industry, changing its current net importing status.





# EXTERNAL SPEAKER PROFILES

## Digitalisation in South Africa: Opportunities and challenges



### **BRIAN ARMSTRONG**, PROFESSOR IN THE CHAIR OF DIGITAL BUSINESS, WITS BUSINESS SCHOOL

Armstrong is one of the foremost information and communications technology industry leaders in South Africa, with over 30 years of top level management experience in telecommunications, information technology, technology research and development and systems engineering, both in South Africa and abroad. He is widely regarded as a thought leader in digitalisation, convergence and business strategy.

In July 2017, Armstrong joined the Wits Business School in the role of Professor in the Chair of Digital Business. His focus is on building a comprehensive knowledge base on the diverse dimensions of digital business, and developing more scientifically rigorous models for and an academically sound underpinning of core concepts in digitalisation.

Previously, he was a key part of the leadership team that has been credited with turning Telkom around, in the capacity of Group Chief Operating Officer and Group Chief Commercial Officer. In his time with Telkom, he also revived the ailing Telkom Business unit, and conceived and led the acquisition of BCX and its integration into the group. He was also responsible for the group's retail unit, as well as leading group strategy and transformation activities.

Before joining Telkom, in 2010, Armstrong was BT's Vice President for Middle East and Africa with overall responsibility to oversee and grow BT's activities across the region. Before that his work experience includes South Africa's CSIR, ultimately as the Director of the Division for Information and Communications Technology; and South African listed ICT services group AST (now Gijima), as Managing Director of AST Networks.

Armstrong completed his BSc (Eng) and MSc (Eng) at the University of the Witwatersrand in 1982 and 1984 respectively, and obtained his PhD from University College London in 1992.

## The security of embedded devices and Internet of Things security from an industry perspective



### **JACO BOTHA, SENIOR PRODUCT MANAGER, PARSEC**

Botha holds an Honours degree in Electronic Engineering from the University of Pretoria and started his career in process control at Eskom before joining Nanoteq in 1989. He has extensive experience in the design, development and product management of information security products for networks, personal computers and embedded environments.

In 2000, Botha founded Trispen Technologies, a developer of secure virtual private networking products. He then joined Xiplink, a Canadian developer of advanced wireless network optimisation products as Chief Technology Officer in 2008.

At Xiplink, Botha was responsible for leading the development team that designed ground-breaking multi-link ground-to-air and satellite link optimisation systems, deployed on hundreds of commercial aircraft in the USA.

Botha joined Parsec, a subsidiary of the JSE-listed group Ansys, as Senior Product Manager in 2016. He is passionate about combining the principles of Lean Start-up (business-hypothesis driven iteration and validated learning) and Design Thinking (human-centred approach to solving problems) into the product development and product management process.

## Innovating transformative medical devices and growing the local medical device manufacturing sector



### **DR TONY BUNN, PATH HEALTH INNOVATION CONSULTANT**

Bunn has a PhD in medical science (physics) and has been involved in health technology research and development, and specifically medical device innovation, for nearly 40 years. Whilst a researcher at the Stellenbosch Medical School in 1984 his spin-out company developed and commercialised the world's first, portable lung function system. He was subsequently professor and acting head of the department of biomedical engineering at the University of Cape Town and extra-ordinary professor at the Central University of Technology in the Free State. Bunn started the Innovation

Centre at the Medical Research Council in 2004 that became the Strategic Health Innovation Partnership in 2013. His academic research (in addition to scientific publications and postgraduate supervision) led to five successful, start-up health technology companies and one international company all based on novel medical technologies that he was instrumental in developing. He also co-founded the Southern African Research and Innovation Management Association in 2001.

He is currently a health innovation consultant to PATH (SA) to help grow PATH's health technology impact in Africa, as well as the MRC-PATH global health innovation accelerator for advancing transformative maternal and child health technologies with concomitant growth of the local medical device manufacturing sector in South Africa.

---

## Keynote address



### **DR ROB DAVIES, MINISTER OF TRADE AND INDUSTRY**

Davies is serving his second term as the Minister of Trade and Industry, having been appointed to this portfolio in May 2014.

During his first term, which was from 2009 – 2014, he oversaw the development and implementation of three-year rolling industrial policy action plans, as well as steering South Africa's participation in important trade relations, including the Tripartite SADC-COMESA-EAC Free Trade Area, BRICS, Economic Partnership Agreement with the EU, the US Africa Growth and Opportunity Act and the World Trade Organisation Bali

Package. Between 2005 and 2008, he was the Deputy Minister in the same Department. Davies has been an ANC MP since 1994 and has served as the Chairperson of the Portfolio Committees of Finance and Trade and Industry, as well as the Constitutional Assembly Sub-Committee, which is responsible for drafting Charter 13 (Finance).

Before entering Parliament, Davies was a professor and co-director of the Centre of Southern African Studies at the University of the Western Cape and before that, he was a Professor Auxiliar at the Centro de Estudos Africanos at Eduardo Mondlane University in Maputo, Mozambique. An anti-apartheid activist for many years, Davies joined the ANC and the SACP while in exile in Mozambique. He is currently a member of the Central Committee of the SACP and of the National Executive Committee of the ANC. Academically, he holds an Honours degree in economics from Rhodes University, a Master's in international relations from the University of Southampton in the UK and a Doctorate in political studies from the University of Sussex, also in the UK.

## Industry and funding challenges: Playing for both teams

---



### **PIETER DE BEER, SENIOR INDUSTRY DEVELOPMENT MANAGER, INDUSTRIAL DEVELOPMENT CORPORATION**

De Beer holds an MBA and a BSc (Chemistry, Operational Research and Computer Science) from the North-West University.

He has extensive experience in the medical imaging industry (strategic, design, development and maintenance) and an excellent understanding of the business of clinical care in emergency and forensic medicine. During his 22-year employment at the Industrial Development Corporation of South Africa Limited (IDC), De Beer gained a wealth of business, finance and management experience, specifically in the venture capital and business turnaround management industries. He was seconded from the IDC as the CEO of Lodox Systems for the past nine years and returned to the IDC in March 2017 to facilitate the development of new, high-impact industries.

De Beer served senior roles in many IDC departments, including the IDC's Venture Capital Business Unit that supports technology-focused entrepreneurs and businesses in their early stage of development (seed and start-up) in high-margin, high-growth market segments. This is done through equity investments to finance the development, commercialisation, industrialisation, growth and globalisation of their products, services and businesses. De Beer also served in the IDC's Workout and Restructuring Business Unit that focuses on the financing and business improvement of financially distressed businesses.

As CEO of Lodox, De Beer used his expertise to blend Lodox's financial, technology and business strategy. By applying his strong people transformation skills, he led the business to grow from a R1 million turnover in 2009 to R70 million in 2015, maintaining profitability for the past four years.

---

## Consumer credit, big data: What this means for businesses

---



### **WENDY DENT, DIRECTOR OF FINANCIAL SERVICES RESEARCH AND CONSULTING: TRANSUNION AFRICA**

Dent leads the Financial Services Research and Consulting Africa team, supporting the local South African market, as well as the rest of Africa. She is responsible for industry insights and driving relevant research studies.

Prior to joining TransUnion, she worked at Deloitte Consulting focusing on customer strategy, analytics and big data, as well as consulting for financial services, telecom and other industry clients.

Dent has worked in various roles in credit, namely at Nedbank where she was responsible for credit policy, originations and impairments. She also worked at Edcon focusing on financial services and analytics.

Dent started her career in the mining sector as a metallurgist for Anglo American and whilst at Deloitte, was involved in organisational redesign of several mines, cost optimisation and strategic sourcing projects.

Dent has a BEng degree in chemical engineering from the University of Pretoria and a Bachelor of Accounting Sciences from the University of South Africa.

---

## How the next industrial revolution will reshape South African manufacturing

---



### **JOHANN DU TOIT, CEO, SIMERA TECHNOLOGY GROUP**

Du Toit has a BEng and an MScEng in mechanical engineering, structural design and simulation from Stellenbosch University. He is the co-founder of SIMERA Group and responsible for company growth.

Previously, he was Technical Director: CTS Trailers where he was responsible for the set up and management of technical systems for manufacturing of large flat deck and refrigerated semi-trailers, tippers and manufacturing processes. From 2001 to 2007, Du Toit was Optical Group Lead: SunSpace and Information Systems. He joined SunSpace as a structural design engineer, then specialised in structural vibration testing and went on to become group leader of the space optics team. Du Toit founded his own structural analyses start-up (Fem-Aided Designs) in 1997 where he did consulting work in the field of structural design and simulation ranging from transport, marine, space and medical fields until 2000.

He also lectured design for final-year mechanical engineering students at Stellenbosch University on a part-time basis between 1999 and 2000.

Du Toit believes that by aptly managing, guiding and empowering a great team, one will be far prouder of the outcome than what your own limited contribution could have fashioned.

---

## The impact of advanced manufacturing technologies: An SMME perspective



### **PETER ERASMUS, CHIEF EXECUTIVE OFFICER, DIRECTECH GROUP**

Erasmus is the chief executive officer of the Directech group of companies. He founded the first Directech company in 1993. Erasmus started his career with a working bursary from Anglovaal where he studied electronics systems. After 10 years, he left Anglovaal to join Staro Process Control where he was one of four founding partners. Erasmus has a passion for engineering and technology and is an engineering specialist with over thirty years of experience.

Under his leadership, Directech has grown to a company employing more than 100 people. Over the years, the company has been recognised by industry and customers with awards from the Department of Science and Technology and Toyota.

Erasmus is passionate about South African business opportunities and firmly believes that the only way that South Africa can ensure continued prosperity for its citizens is to ensure the country can compete economically with its neighbours and competitors on equal grounds. He believes the way to achieve this is through quality education and development programmes for citizens. Erasmus supports the mentorship method of education and development where members learn while doing and he has assisted the company in establishing an internship programme, which has started many successful careers.

---

## IDC perspectives on biotech small, medium and micro enterprise development



### **CHRISTO FOURIE, HEAD: NEW INDUSTRIES, THE INDUSTRIAL DEVELOPMENT CORPORATION**

Fourie qualified as a chartered accountant in 1993. He joined the Industrial Development Corporation in 1994 and currently leads the New Industries SBU. Previously, Fourie was head of the IDC's Workout and Restructuring Department, its Corporate and Structured Finance Department and its Venture Capital SBU. This SBU invested around R932m from 2007 until 31 March 2015 into 39 technology-focused start-up businesses. The objective of the New Industries SBU, which was established in April 2015, is to support the development of new industries that have the potential to make a significant contribution to economic growth and job creation in South Africa.



## The role of macrologistics in industrial development: Infrastructure and policy



### **PROF. JAN HAVENGA**, LOGISTICS PROFESSOR: STELLENBOSCH UNIVERSITY

Havenga is a leading researcher in the field of macrologistics that he co-established. Macro-logistics researches the cost and structure of national logistics systems and suggests solutions in order to reduce the total cost of ownership of economies. These solutions could relate to policy, infrastructure or systemic changes (i.e. broader than the freight transport industry). His work stretches from South Africa, to sub-Saharan countries and over the last year, India, Vietnam and China.

He is part of a niche global network of researchers that is sponsored by the World Bank and endeavours to improve the sustainability and affordability of freight logistics worldwide.

---

## The role of technology in unlocking the possibilities of shale gas



### **RUDI HEYDENRICH**, SENIOR VICE PRESIDENT, SASOL RESEARCH AND TECHNOLOGY

Heydenrich holds a Bachelor of Engineering (Chemical) from the University of Pretoria as well as a Master's in Chemical Engineering from North-West University. He has over 25 years of experience in chemical engineering.

He joined Sasol Group Technology in 1988 after spending six years as a chemical engineer with the South African Atomic Energy Corporation and a short stay with Armscor. Sasol Group Technology manages Sasol's research and development, technology innovation and management, engineering services and capital project management portfolios.

During his career at Sasol, he has been involved in the design and commercialisation aspects of many of Sasol's technologies. He also led a multi-disciplinary team responsible for the development of a new gas-to-liquids venture in Alberta, Canada.

Heydenrich assumed the role of Senior Vice President: Research and Technology in Sasol Group Technology in July 2014.



## Integrated and sustainable transport systems to support industrial development in South Africa



### **CHRIS HLABISA, DEPUTY DIRECTOR-GENERAL: ROADS AND INFRASTRUCTURE, DEPARTMENT OF TRANSPORT**

Hlabisa was appointed Deputy Director-General (DDG) Road Transport in April 2013. His key responsibilities include managing road engineering standards, road infrastructure and industry development, road regulation, driving license card entity, public entity oversight and strategic integrated projects.

Prior to his appointment as DDG, Hlabisa spent five years providing leadership, planning, overall management and strategic direction in line with the department's vision of 'Prosperity through Mobility' to the KwaZulu-Natal Department of Transport, as their Head of Department. His responsibilities included road construction, maintenance, management of resources, as well as ensuring and promoting road and public safety.

With more than 30 years of road and infrastructure development experience across South Africa, Hlabisa has held some of the most senior positions within the private and public sector, including being a board member of the South African National Roads Agency Limited, former president of the South African Road Federation and council member of the Engineering Council of South Africa. He is a registered professional under the South African Institution of Civil Engineering.

Hlabisa holds a Bachelor's degree in technology (Civil) specialising in road and rail, traffic engineering, geometric design, pavement and transport technology, as well as transport, urban and design planning from the then Natal Technikon in Durban, which has since merged with ML Sultan Technikon to form the Durban University of Technology. He also completed a Management Development Programme in Business Management from the then University of Durban Westville, now part of the University of KwaZulu-Natal.

---

## Accessing global aerospace supply chains from South Africa



### **JAY ISAAC, HEAD: STRATEGY AND OFFSET, SAAB GRINTEK DEFENCE**

Isaac holds a BEng in electrical engineering (Light Current) from the then University of Durban-Westville, as well as an MSc (Electronic Engineering) and an MBA from the then University of Natal, institutions that have merged to form the University of KwaZulu-Natal.

He is a registered Professional Engineer and currently the Head of Strategy and Offset at Saab Grintek Defence (a member of the Saab Group of Companies). His responsibilities include compiling the company's strategic business plan, focussing on the four product areas, including electronic warfare, acquisition and communication systems, command and control and training and simulation, and lead systems integration. He also compiles industrial offset plans and ensures the successful execution thereof.

He was previously the Head of Civilian Business at Thales South Africa Systems (a member of the Thales Group of Companies) and was responsible for the management of a number of civilian mission critical projects in air traffic management, rail signalling and safety and security in South Africa, Nigeria, Zambia, Namibia and Saint Helena.

Isaac has considerable experience in strategic management, including 10 years on the executive committee of Thales Defence Systems in various executive management positions including Head of the Technical Business Unit, Head of Manufacturing and Support and Head of Projects. These roles mandated responsibility for the successful execution of a number of defence mission critical projects for the South African National Defence Force, as well as other Defence Forces in Europe, the Middle East and South East Asia.

---

## **Africa, the sleeping giant: E-waste as a resource**

---



### **RUBEN JANSE VAN RENSBURG, SUSTAINABILITY MANAGER: AFRICA, THE HEWLETT-PACKARD COMPANY**

Janse van Rensburg has been at the Hewlett-Packard Company for over 10 years and is responsible for product market access and sales support. He conducts research on emerging recycling industries and advocates for the implementation of extended producer responsibility mechanisms throughout Africa. Janse van Rensburg is passionate about the establishment of a sustainable recycling ecosystem throughout Africa by applying sound social, environmental and economic principles.

His educational background includes a B-Tech degree and he holds various environmental management qualifications and industry-related certifications.

---

## Maximising the developmental impacts of South Africa's mineral endowment



### **DR PAUL JOURDAN, ACTING CEO: MINING EQUIPMENT MANUFACTURING OF SOUTH AFRICA**

Jourdan is an African integrated development expert specialising in resource-based and spatial development strategies. He has wide experience working on economic growth and development in the Southern African Development Community, West and East Africa. He spent 16 years in Mozambique and Zimbabwe during the struggle against apartheid, working as a geologist, geophysicist and minerals economist, before returning to South Africa in 1991. Subsequently, he worked for the African National

Congress (ANC) and the South African government in various positions including as the ANC's Minerals and Energy Policy Coordinator, President of Mintek, and Deputy Director-General in the Department of Trade and Industry. He was a major contributor to the African Union's "Africa Mining Vision" (2009) and "Country Mining Vision" (2014). He currently chairs or sits on the board of three economic development agencies, and participates in tertiary education through short lecture series and post-grad supervision. Currently he mostly advises on resource-based equitable growth and mineral value chains. He has a BSc (Geology), a BA (African government), a PGDip (Geophysics), two MSc's (Mineral Economics) and a PhD (Politics).

## The reconfiguration of the South African defence industry in the post-2015 defence review environment: Prospects and challenges



### **DR MOSES KHANYILE, MANAGING DIRECTOR: MASHARPS COLLEGE**

Khanyile holds a PhD from the University of Pretoria, a Master of Business Leadership from the University of South Africa (Unisa) and a Master's degree from Stellenbosch University. He currently serves as a non-executive director at Armscor, a managing director at Masharps College, an external supervisor at Unisa's Graduate School of Business Leadership and project leader for the National Defence Industry Council's Strategy Development team. He was one of the members of the Defence Review

Committee that was tasked with writing the new Defence Review, which was approved by Parliament in 2015. Khanyile worked in the Department of Defence as Director: Planning and Programming before joining Barclays Africa as General Manager: Strategy and Business Sustainment. In addition to his keen interest in defence strategy, value extraction and executive project management, he is an active rural community development volunteer. He is also a qualified Chartered Director from the Institute of Directors in Southern Africa.

## A state-owned enterprise perspective on the growth and transformation of the South African defence industry

---



### **THEO KLEYNHANS, GROUP EXECUTIVE: STRATEGY, DENEL**

Kleynhans has more than 34 years of experience at Denel in engineering and management, including extensive industrial experience within the state-owned enterprises. He has a Bachelor of Engineering (Electronic) from Stellenbosch University and a Master of Business Leadership from the University of South Africa (2003)

In the 1990s, Kleynhans was the mission systems development manager on the Rooivalk combat support helicopter and the Cheetah front-line fighter aircraft.

After a year at the Department of Public Enterprises and two years at Denel Corporate with the 2005 turnaround strategy of Denel, Kleynhans joined the then Denel SAAB Aerostructures business as Chief Operating Officer.

He worked on the Airbus A400M industrialisation and manufacturing programme and was Chief Executive Officer at Denel Aerostructures before joining Denel Corporate as the Group Executive: Strategy in 2016.

---

## Insider threats to cybersecurity



### **DARSHAN LAKHA, HEAD: VODACOM GROUP TECHNOLOGY SECURITY**

Lakha started at Vodacom in 1996 and has held key positions with Vodacom Technology in the Enterprise Business and Mobile Network Engineering groups. He has experience in various technologies including SDN, NFV, 4G, Cloud, Internet of Things and cybersecurity. He has 20 years of telecommunications experience and managed the design and build of Vodacom's IP/MPLS Network and Security Services. Lakha has also been part of the broader technology security team in the planning and execution of technology security in Vodacom SA. He is responsible for the strategy and tactical capability of Vodacom Group's Technology Security, including the operations of Vodacom's Cyber Intelligence Centre. He holds a BSc in electrical engineering from the University of the Witwatersrand and an MBA in strategic management from the University of Southern Queensland, Australia. He is also the recipient of the Vodacom Managing Director's Roll of Honour Award and group winner of the Vodacom Advanced Executive Programme VII.

## Industrialisation and transformation through procurement: The Eskom experience



### **HENK LANGENHOVEN, CORPORATE SPECIALIST: SUPPLIER DEVELOPMENT AND LOCALISATION, ESKOM**

Langenhoven was originally trained as an electronics technician and later obtained his Master of Commerce from the University of KwaZulu-Natal with a focus on black economic empowerment (BEE).

During his 35-year career, he gained experience in research and development, power station construction, quality auditing and power line refurbishment before becoming the first BEE manager in Eskom's transmission group. During the formation of a new sourcing function in 2007, Langenhoven played an active role in the creation of the Eskom strategic sourcing model and training material. He has been recognised for his role in facilitating a number of strategic sourcing and industrialisation boot camps. Eskom hosted these boot camps internally and through the Department of Public Enterprises and other state-owned enterprises.

Over the last nine years, Langenhoven has been actively involved in influencing and implementing the Competitive Supplier Development Programme at Eskom. He is passionate about the opportunities created by his role to promote industrialisation and transformation of the South African industry.

---

## Driving the digital enterprise in product development and manufacturing



### **RALF LEINEN, VICE PRESIDENT: DIGITAL FACTORY AND PROCESS INDUSTRIES AND DRIVES: SOUTHERN AND EASTERN AFRICA, SIEMENS**

Leinen is Vice President: Digital Factory and Process Industries and Drives – Southern and Eastern Africa at Siemens. He studied engineering and business administration at the University of Applied Sciences Cologne (Rheinische Fachhochschule Köln) and is an experienced senior level manager in various industries related to manufacturing and processes. Leinen joined Siemens in 1990 has been in international sales and management roles at the company's headquarters and regions in Germany, the USA and South Africa. His experience includes profit and loss management, organisational management, sales and marketing.

## Industrial policy: Where does innovation fit in?

---



### **SAUL LEVIN, EXECUTIVE DIRECTOR, TRADE AND INDUSTRIAL POLICY STRATEGIES**

Levin is the executive director of Trade and Industrial Policy Strategies, a not-for-profit economic research institute. Levin has previously worked as a chief director in the Economic Development Department (EDD) with oversight over the development finance institutions reporting to the EDD. Prior to that, he spent two years as a senior manager at Standard Bank, working as a business operations manager. Levin previously worked as the chief of staff for the Minister of Water Affairs and Forestry, as well as the Minister of Minerals and Energy. He has also worked as an economist at the Department of Trade and Industry and spent several years working in small business development at Ntsika Enterprise Promotion Agency. Levin holds a Master's degree in sociology and a BCom degree from the University of the Witwatersrand.

---

## Building API manufacturing capabilities in South Africa

---



### **GLAUDINA LOOTS, DIRECTOR: HEALTH INNOVATION, DEPARTMENT OF SCIENCE AND TECHNOLOGY**

Loots is the Director for Health Innovation at the Department of Science and Technology and responsible for the implementation of the health components of the Bioeconomy strategy for South Africa. She concentrates on enabling research and innovation that leads to discovery and evaluation of new drug and treatment regimes, the development of new vaccines and new robust diagnostics for the identified diseases or conditions, as well as the development of medical devices.

The range of research activities that Loots encourages as part of her portfolio, include the interrogation of indigenous knowledge, basic molecular science and genetics, chemistry and biochemistry, biotechnology, nanotechnology, nuclear physics, information communication technology, manufacturing processes and engineering.

Amongst others, Loots serves on the South African National Health Research Committee; the South African National AIDS Council and is a member of the Ministerial Committee on Antimicrobial Resistance. Loots is also a board member of The Biovac Institute, a public-private-partnership aimed at the local manufacturing of vaccines and biologics.

---



## Perspective from a new entrant in biopharmaceuticals



### **MARTIN S. MAGWAZA, CO-FOUNDER AND CEO, BGM BIOPHARMACEUTICALS**

Magwaza is a technology entrepreneur with an extensive track record in the local and international biopharmaceutical industry. He has worked for several multinational pharmaceutical and biotechnology companies in various commercial roles. Magwaza is a microbiologist by training, has postgraduate training in pharmaceutical business from the UK's Chartered Institute of Marketing as well as an MBA from the Gordon Institute of Business Science. He has a keen interest in facilitating development and commercialisation of South African technologies with regional and global potential.

## Trends in and outlook for the global and South African economies



### **JORGE MAIA, HEAD, RESEARCH AND INFORMATION, INDUSTRIAL DEVELOPMENT CORPORATION**

Maia holds a Master of Arts degree in economics from Simon Fraser University in Vancouver, Canada. This was preceded by a Bachelor of Economic Science with Honours from the University of the Witwatersrand.

Maia joined the Industrial Development Corporation of South Africa Limited (the IDC) in 1995 as a manager in the Department of Economic Research and Development. He was mainly responsible for the department's macroeconomic and international

economics sections, as well as for policy-related research pertaining to the Southern African Development Community (SADC) region.

In mid-1999, Maia was appointed to the position of Senior Project Manager in the IDC's newly created SADC Department and, approximately one year later, to head of this department. Early in 2003, the department was renamed Africa Unit.

In January 2004, Maia was seconded to Dynasty Textiles (Pty) Ltd, a cotton spinning operation based in Cape Town, to implement a merger between this company and Prilla 2000 (Pty) Ltd, a major cotton spinning company based in Pietermaritzburg. Subsequent to the successful merger of these companies, Maia returned to the IDC in September 2004 as Head of the Risk Management Department, a position which he held until 31 April 2005.

In May 2005, Maia was appointed Head of the Research and Information Department of the IDC. This department plays a key supportive role to the IDC by: analysing trends and forecasting movements in key

macro-economic variables and in specific sectors of economic activity; undertaking sector/industry specific analysis; identifying development areas and financing/investment opportunities for the IDC in South Africa and in the rest of the African continent; providing strategic research support to the South African government; and, among others, assessing country risk, particularly with respect to African countries.

---

## Simultaneous energy and water optimisation in design, synthesis and optimisation of chemical plants

---



### **PROF. THOKOZENI MAJOZI, SCHOOL OF CHEMICAL AND METALLURGICAL ENGINEERING, UNIVERSITY OF THE WITWATERSRAND AND CSIR BOARD CHAIRPERSON**

Majozi is a full professor at the School of Chemical and Metallurgical Engineering of the University of the Witwatersrand, where he also holds a National Research Foundation/Department of Science and Technology Chair in Sustainable Process Engineering. To date, his major contributions to research are the development of a continuous time framework for the synthesis of batch plants, a novel technique for near-zero effluent batch

chemical facilities and a process integration technique for integrated water and membrane network systems. All these contributions have been adopted by industry. Prior to joining the University of the Witwatersrand in 2013, he was a professor at the University of Pretoria for almost 10 years and an associate professor in computer science at the University of Pannonia in Hungary, from 2005 to 2009. A chemical engineer by profession, Majozi completed his PhD in process integration at the University of Manchester Institute of Science and Technology in the United Kingdom. He is a member of various international scientific committees and a Fellow of the Academy of Sciences of South Africa, Academy of Engineering of South Africa, Water Institute of Southern Africa and African Academy of Sciences. He spent the early years of his career working for Unilever, Dow AgroSciences and Sasol Technology.

Majozi has received numerous awards for his research including the Zdenek Burianec Memorial Award (Italy, 2005). He has been a recipient of the National Science and Technology Forum Award (2006, 2011 and 2016) and a recipient of the National Research Foundation President's Award (2007 and 2008). In 2009, he won the prestigious S2A3 British Association Medal (Silver) and in 2010 was awarded the South African Institution of Chemical Engineers Bill Neal-May Gold Medal. Recently, he received the AU-TWAS Award in Basic Sciences, Technology and Innovation (2012) and ORSSA Category III Award. Majozi is an author and co-author of more than 150 scientific publications, including a book titled "Batch Chemical Process Integration" published by Springer in January 2010, "Synthesis, Design and Resources Optimization", published by CRC Press/Taylor and Francis in 2015 and a book titled "Understanding Batch Chemical Processes", also published by CRC Press/Taylor and Francis in 2017. Majozi is an NRF B1 rated researcher.



## The IDC's role in stimulating and supporting infrastructure innovation: Past, present and future

---



### **LIZEKA MATSHEKGA, DIVISIONAL EXECUTIVE: AGRO, INFRASTRUCTURE AND NEW INDUSTRIES, INDUSTRIAL DEVELOPMENT CORPORATION**

Matshekga is the divisional executive responsible for infrastructure, agro-processing and agriculture, as well as new industries at the Industrial Development Corporation of South Africa Limited (IDC). She has 23 years of experience in the financial services sector, more than half of that in development finance institutions. Matshekga has a Master's in development finance from Stellenbosch University, a BCom (Honours) from

the University of Cape Town and a BCom from the University of the Western Cape. She sits on numerous boards of the IDC's investee companies.

---

## Industrial symbiosis: A means to power regional growth and the green transition

---



### **DR PER MØLLER, HEAD OF SYMBIOSIS CENTER, DENMARK**

Møller has a Master's degree in marine biology from the University of Aarhus and a PhD degree in chemical engineering from the Technical University of Denmark.

He is an expert in the field of industrial symbiosis, circular economy and blue biomass. Møller has a special interest in how large-scale test and demonstration, targeting blue biomass (e.g. microalgae), can assist in the up-scaling of low-value residual streams to high-value bioproducts.

He has managed national and international projects and cluster initiatives, is a co-founder of Sustainable Biofuels Network and was a case study and work package leader at a microalgae production facility in Kalundborg. Møller is experienced in commercial neutraceutical and pharmaceutical research, production and process optimisation, as well as the commercialisation of aquatic biomass production, building on concepts of sustainability and industrial symbiosis.

His previous positions include those of senior project manager at the Kalundborg Kommune's Department of Development, academic adviser at Cluster Biofuels Denmark, founder and director of Ecolipids, quality control engineer at Pronova Biopharma, commercial researcher at Fluxome Sciences and scientific researcher at the National Environmental Research Institute in Denmark.

---

## International collaboration tools for industrial development

---



### **DAN NAGY, MANAGING DIRECTOR: INTELLIGENT MANUFACTURING SYSTEMS INTERNATIONAL, USA**

Nagy oversees activities related to the Intelligent Manufacturing Systems (IMS) international programme, including general management, strategy, marketing, finance, project portfolio and outreach activities.

The IMS is an industry-led, international business innovation and research and development programme established to develop the next generation of manufacturing and processing technologies through multi-lateral collaboration.

Nagy assists in the planning, programme and speaker search activities for IMS manufacturing research workshops, the World Manufacturing Forum and other events held in various countries.

Nagy was a former corporate accounts manager for Apogent Technologies, where he guided sales and the marketing of scientific equipment and supplies to large accounts, major group purchasing organisations and large commercial and government laboratories. In his early career, he worked as a medical technologist and laboratory manager.

Nagy holds a Bachelor of Arts from Lycoming College in Pennsylvania in the USA, a Masters of Business Administration degree from Baker University in Kansas and a certification in medical laboratory technology.

---

## Cyber 4.0 - The evolution of cybercrime

---



### **KOVELIN NAIDOO: CYBERSECURITY OFFICER, FIRST NATIONAL BANK**

Naidoo is the cybersecurity officer at First National Bank (FNB), where he facilitates strategic and tactical planning, development, evaluation and coordination of information technology security systems for the organisation. Since joining the company, Naidoo has lead the development and implementation of an enterprise-wide cybersecurity programme leveraging his in-depth experience in critical infrastructure security, privacy and risk management. Prior to joining FNB, he guided many private and public sector

organisations to implement similar solutions so that they meet regulatory and security requirements.

Naidoo has been a finalist in the Titans - Building Nations awards that recognise men who play a significant role in the sustainable development of the economy and has over 21 years of experience in the technology and cybersecurity space across Africa and Asia Pacific.

---

## The importance of international cooperation towards mutual benefit

---



### **DR JEAN MARC NASR, HEAD: EUROPE, MIDDLE EAST AND AFRICA, AIRBUS DEFENCE AND SPACE**

Nasr is the Managing Director of Airbus Defence and Space SAS and Head of France, UK, Middle East and Africa for the Airbus Defence and Space division.

His career began 1986 at Aerospatiale, where he was in charge of developing the Image Processing Business, which he led beginning 1990.

He was named Chairman and CEO of Fleximage in Paris in 1997, which specialised in image analysis software for intelligence services. Under his leadership, Fleximage's turnover was increased fivefold.

Nasr was promoted to President and CEO of Spot Image in 2001, which handles the commercial distribution of Spot satellites imagery.

In July 2005, he joined European Aeronautic Defence and Space (EADS) Defence and Security as President of EADS Secure Networks, and then as CEO of the Integrated Systems unit.

He then became President of Cassidian SAS and Head of Cassidian France and Security Solutions, including secure communications and cybersecurity.

Born in 1961, he graduated from the Ecole Supérieure d'Electricité in 1985 with a degree in engineering. In 1989, he obtained a PhD in physics. Nasr has been awarded the Chevalier ordre national de la Légion d'Honneur and ordre national du Mérite, French orders of merit for military and civil merits. He holds a pilot license.

---

## Understanding trade-offs between development and resources

---



### **XOLISA NGWADLA, INDEPENDENT EXPERT**

Ngwadla holds a Master of Science (Agricultural Economics) from the University of Fort Hare and a Master's in Business Administration from Rhodes University with training in plant breeding and agricultural economics. He has led climate change research at the CSIR and advised the South African Minister of Environmental Affairs on climate change. He was the lead negotiator for the African Group on the Paris Agreement on climate change that was adopted in 2015 and continues to lead the work of the modalities for operationalising the agreement. He has written papers and policy briefs on equity, adaptation, and architecture of the global climate regime. Ngwadla is currently working

as an independent expert. His area of interest is national and international climate change policy discourse and negotiations, with a particular interest on the economic, trade and development aspects. He has experience in agricultural research, environmental consulting, corporate business development, and multilateral climate change negotiations.

---

## Building a world-class, globally competitive pharmaceutical business out of South Africa

---



### **STAVROS NICOLAOU, SENIOR EXECUTIVE (STRATEGIC TRADE), ASPEN PHARMACARE GROUP**

Nicolaou is currently responsible for strategic trade at the Aspen Pharmacare Group. Aspen is Africa's largest and the world's ninth largest generic pharmaceutical company by revenue ranking. Nicolaou has been instrumental in introducing the first generic antiretroviral medicines in Africa. These were developed by Aspen and saved many lives in South Africa and Africa.

Nicolaou has over 27 years of experience in the South African and international pharmaceutical industry and is a previous winner of the SA Institute of Marketing Management Healthcare Marketer of the year award, the most prestigious of its kind at the time. He was recently inducted as one of the youngest Fellows of the Pharmaceutical Society of South Africa (PSSA), which is one of the highest honours bestowed by the PSSA.

Nicolaou is the chairman of the Public Health Enhancement Fund, a collaboration between the private health sector and the Ministry of Health. He is also the chairman of Pharmaceuticals Made in South Africa, an industry association of local pharmaceutical manufacturers that is made up of local South African producers and black empowerment companies.

---

## Skills and innovation as a driver for industrial development in South Africa



### **SIZWE NXASANA, FOUNDER OF FUTURE NATION SCHOOLS AND CHAIRPERSON OF NATIONAL STUDENT FINANCIAL AID SCHEME AND NATIONAL EDUCATION COLLABORATION TRUST**

Nxasana holds BCom, BCompt (Hons) degrees and a CA (SA) qualification. He started his career at Unilever. In 1989, he established Sizwe & Co, the first black-owned audit practice in KwaZulu Natal. In 1996, he became the founding partner of Nkonki Sizwe Ntsaluba now called SizweNtsalubaGobodo which is the fifth largest audit firm in South Africa. In 1998, he joined Telkom SA as Chief Executive Officer (CEO) and was responsible for its listing on the JSE and New York Stock exchanges. Nxasana was the CEO of FirstRand Banking Group since 2005 until he retired in September 2015. Nxasana serves as chairman on various foundations and trusts. He is the co-founder and chairman of the National Education Collaboration Trust. He was appointed chairman of the National Student Financial Aid Scheme in August 2015 and chairman of the Ministerial Task Team developing a new funding model for students who come from poor and “missing middle” backgrounds.

Nxasana is now a social entrepreneur who recently founded Future Nation Schools which is a chain of affordable private schools in South Africa. He also founded Sifiso Learning Group which is involved in Edtech, academic publishing and real estate.

Nxasana has been conferred with honorary doctorates by the Universities of Fort Hare, the Durban University of Technology, the University of Johannesburg and the Walter Sisulu University.

---

## The Siemens vision and its effect on local industry



### **COBUS OOSTHUIZEN, CHIEF EXECUTIVE OFFICER: ESTEQ**

Oosthuizen holds an Honours Degree in Mechanical Engineering from the University of Pretoria and a Master's in Business Leadership from the University of South Africa. He is currently involved in strategic consulting, business process improvement, innovation management as well as high level product lifecycle management consultation and implementation. During his early career in engineering, he gained experience in the fields of experimental stress analysis, vibration analysis, modal testing, finite element analysis and fracture and fatigue analyses. Oosthuizen is an entrepreneur and businessman passionate about technology, problem solving in engineering and business and helping people to grow, develop and reach their full potential.

## The role of the Cybersecurity Hub in supporting industry

### **DR KIRU PILLAY, CHIEF DIRECTOR: CYBERSECURITY OPERATIONS, DEPARTMENT OF TELECOMMUNICATIONS AND POSTAL SERVICES**

Pillay has thirty years of experience in the ICT sector with the first 23 years as an ICT practitioner and has worked in various industry sectors and in various roles. He completed his PhD in information technology at the University of KwaZulu-Natal.

He has five years of experience in an academic and research environment and has been based at three South African universities in a teaching, supervision, research and operational capacity; he has also been a senior researcher at a national South African research institute.

Pillay is currently in the public sector as a Chief Director, Cybersecurity Operations at the Department of Telecommunications and Postal Services (DTPS) responsible for the national Cybersecurity mandate and the management of the national Computer Security Incident Response Team.

He is also a visiting academic attached to the Learning Information Networking Knowledge Centre of the University of the Witwatersrand, primarily responsible for supervising postgraduate students and some teaching.

---

## Responding to the changing environmental landscape: Using innovation to drive cost effective solutions



### **DR SARUSHEN PILLAY, ENVIRONMENTAL TECHNOLOGY MANAGER, SASOL**

Pillay is one of the leaders in the environmental sector in South Africa. He obtained his PhD at the Pollution Research Group of the University of KwaZulu-Natal, one of the leading water research centres in the world. He also worked as a consultant for the group carrying out projects for the Water Research Commission and the private sector. He was part of the team that advised the eThekweni Municipality on the provision of free basic water in eThekweni. His work on this subject has been presented at many international conferences, including the World Summit on Sustainable Development. He was a pioneer in the use of life cycle assessments in the water industry and was responsible for the development of an environmental performance indicator for water providers. Pillay was a co-author for the 2002 United Nations Environment Programme report on sustainable development in sub-Saharan Africa.

Pillay has worked as a consultant in the mining and metals sector before joining Sasol. In his role as the coal and environmental technology manager at Sasol, he is responsible for the development and introduction of new



technologies in this area. He has led the teams responsible for the new water and waste handling systems for new gas-to-liquid, coal-to-liquid and chemicals projects and driven the focus on improving the environmental performance of the current asset base. With the changing environmental landscape, there is a need for greater innovation in this space and Sasol is positioning to respond to these challenges.

---

## The modernisation of mining



### **DR EDWIN RITCHKEN, MINING PHAKISA**

Ritchken is the coordinator of the Mining Phakisa, a collaborative initiative between government, industry and civil society to address key challenges facing the mining cluster. Previously, Ritchken was Strategy Advisor to the Minister and Director-General of the Department of Public Enterprises. In this post, he has been responsible for the development of overarching shareholder strategy and the shareholder management model, directing the development of the Competitive Supplier Development policy and strategy for state-owned enterprises and for the development of the defence-related industry strategy. Prior to assuming this position, Ritchken was a transport industry specialist in the department responsible for assessing the strategies and structure of Transnet. He has many years of strategy experience and has written extensively on industrial policy, rural development and political economy.

Ritchken has a Bachelor of Economic Science (Computer Science), a Bachelor of Arts (Hons) and a PhD in political studies from the University of the Witwatersrand.

---

## Shell's use of and contribution to science in de-risking projects in South Africa: The case of shale gas



### **NIGEL ROSSOUW, ENVIRONMENTAL PLANNER, SHELL INTEGRATED GAS**

Rossouw is the environmental planner for Shell South Africa Integrated Gas and holds a Master's degree in Physical Geography from the University of the Western Cape and is currently completing a PhD focusing on environmental social and governance risks of large infrastructure projects. Rossouw has more than 20 years' experience, predominantly in the planning and implementation of large infrastructure projects. He worked at the CSIR for eight years as an environmental scientist and received the "Most Promising Young Scientist Award in 1997" and the "CSIR Achiever of the Year Award in 2002". Rossouw previously served as the president of the South African affiliate of the International Association for

Impact Assessment and was a board member of the Certification Board of the Environmental Assessment Practitioners of South Africa.

Rossouw has authored a World Bank best practice report, published six peer reviewed scientific papers, five book chapters, three professional guidance documents for the South African Department of Environmental Affairs, and five popular articles in non-technical magazines (such as Africa Geographic and Civil Engineering).

---

## Assessment in the global context: From ozone to ecosystems

---



**PROF. BOB SCHOLES**, DISTINGUISHED PROFESSOR OF SYSTEMS ECOLOGY, GLOBAL CHANGE INSTITUTE, UNIVERSITY OF THE WITWATERSRAND

Scholes is a distinguished professor of systems ecology at the Global Change Institute of the University of the Witwatersrand. He is among the top 1% of environmental scientists worldwide based on citation. He has led several high-profile studies, such as the Assessment of Elephant Management, Commission on Sustainable Agriculture and Climate Change and Strategic Assessment of Shale Gas Development, as well as large research campaigns, such as the SAFARI 2000 and Southern African Millennium Assessment. Scholes is the author of the Intergovernmental Panel on Climate Change, third, fourth and fifth assessments. He has been on the boards of the International Centre for Research in Agroforestry, the South African National Parks and South African National Space Agency. He is a foreign associate of the US National Academy of Sciences, fellow of the CSIR and the Royal Society of South Africa, a member of the South African Academy, a research associate of the CSIR, a National Research Foundation A-rated scientist and a winner of the National Science and Technology Forum Lifetime Contribution to Science Award.

---

## Water, job creation, industrial development and the implementation of the Sustainable Development Goals in Africa

---



**ALEX SIMALABWI**, EXECUTIVE SECRETARY: AFRICA COORDINATION UNIT, GLOBAL WATER PARTNERSHIP SOUTHERN AFRICA

Simalabwi is the Executive Secretary of the Global Water Partnership (GWP) Southern Africa and Head of GWP Africa Coordination Unit. He is GWP's global Lead on climate change and Global Coordinator of the Water, Climate and Development Program at GWP HQ, an international organisation set up by the World Bank, United



Nations Development Programme and government of Sweden. He is an international development professional with expertise in water resources, economic development, investment strategy design and public policy.

Simalabwi has extensive experience in climate change adaptation and water resources management. He co-chaired the World Bank Expert Group for climate resilience, advised the Bank where to invest their climate funds among 34 countries worldwide. He conceived, developed and leads a program for investments preparation, water security and climate resilient development across 60 countries, spanning four continents: Europe, Asia, Africa, Latin America and Caribbean. He has advised more than 20 countries and governments on integration of water into economic national development.

He is the lead author of the report “Water Security for Development in Africa” and also led the development of the African Union strategic framework for water security and climate resilient development. He holds postgraduate qualifications in business (MBA), civil engineering and a Master’s in public policy from Harvard University Kennedy School of Government.

---

## Implementing localisation programmes in South Africa

---



### **GARTH STRACHAN, DEPUTY DIRECTOR-GENERAL: INDUSTRIAL DEVELOPMENT, THE DEPARTMENT OF TRADE AND INDUSTRY**

Strachan is currently the Deputy Director-General of the Department of Trade and Industry responsible for industrial development. He chairs the Board of Directors of one of South Africa’s foremost non-government organisations - Trade and Industrial Policy Studies. Strachan holds a Master’s degree in Public Policy from the London School of Oriental and African Studies.

---

## Banking sector threats and responses

---



### **PAUL STRAUSS, CHIEF INFORMATION RISK OFFICER, STANDARD BANK**

Strauss started his career in 1975 as a signaller in the South African National Defence Force where he developed his interest in technology. He progressed through the ranks to become the senior staff officer responsible for information system security in 1991.

In 1999, he joined the National Traffic Information System as information security officer and after 17 months joined ABSA as information security manager. Strauss was responsible for the drive to elevate information security from a pure technology point

of view to a more strategic function. He created the Information Risk Steering Committee and trained 47 local security coordinators to extend information protection initiatives in the lines of business. After a short break as an independent consultant, between 2009 and 2010, he was approached by Standard Bank where he fulfilled the role of Head of Information Security Operations, Head of Cyber Security and Digital Forensics, Head of Group Information Risk and ultimately Chief Information Risk Officer. Strauss currently performs a second-line function, responsible for control assurance, governance, insights and analytics, research and awareness. He is also a firm believer that, no matter the technology, the focus needs to be on information as an asset and protection of the entire information lifecycle, regardless of location, whether in motion or at rest. Strauss also acted as a council representative of the South African chapter for the Information Security Forum for two years and chairperson of the cybersecurity steering committee at the South African Banking Risk Information Centre for three years.

---

## Video killed the radio stars

---



### **AUBREY SWANEPOEL, CHIEF EXECUTIVE, PFORTNER**

Swanepoel founded Pfortner in 2008. The company develops security-focused business solutions that deliver secure communications to its clients. From humble beginnings in his garage, the business has grown to serve customers in 15 countries. Pfortner secures the Internet of Things and messaging systems using the highest levels of encryption and its patented STEALTH technology.

---

## **Planning for water infrastructure to support industrial development: The Coega Special Economic Zone**

---

### **Spatial Planning to support water demand for long-term growth and short-term demand**

---



### **GRAHAM TAYLOR, SPATIAL DEVELOPMENT MANAGER, COEGA DEVELOPMENT CORPORATION**

Taylor has a MA in Sociology from the University of Port Elizabeth, which later merged with Vista University's Port Elizabeth campus to form the Nelson Mandela University. He also has an MSc in Geographic Information Science from the University of London in the United Kingdom. In 2005, he joined the Coega Development Corporation, which operates the Coega Special Economic Zone located approximately 25 km from Port Elizabeth within Nelson Mandela Bay. Taylor provides spatial planning services to the

Coega Special Economic Zone. Previously, he was responsible for nature conservation, environmental impact management, environmental policy, and special initiatives for the monitoring and delivery of infrastructure projects at the provincial government of the Eastern Cape.

---

## Infrastructure innovation as an enabler for industrial development: Case study of the Gautrain

---



### **JACK VAN DER MERWE, CEO, GAUTRAIN MANAGEMENT AGENCY**

Van der Merwe obtained his BSc (Engineering) and BSc (Engineering) (Hons) in civil engineering from the University of Pretoria. He is also a graduate of the Harvard Business School's Senior Executive Development programme.

He has worked in the public transport sector for more than 46 years. In 1994, he was appointed as the team leader of the strategic management team tasked with developing, structuring and establishing the new Department of Public Transport and Roads in Gauteng. He headed this department from 1995 to 2004.

During this period, Van der Merwe was also appointed as project leader for the Gautrain Rapid Rail Link project. He ensured that Gautrain became a project of national significance. Although the Gautrain Project was initiated long before the FIFA 2010 World Cup was awarded to South Africa, it soon became evident that it would be to the advantage of the country as a whole if the rail service between the OR Tambo International Airport and Sandton could be completed in time for the soccer. This was achieved on the 8th July 2010, three days before kick-off.

He was a member of the Civil Engineer Advisory Council, a board member of the former South African Rail Commuter Corporation and until recently, a board member of the South African Roads Board.

In 1998, the Transportation Engineering Division of the South African Institution of Civil Engineering awarded him the Chairman's Award for Meritorious Service to the Transportation Profession. He is a Fellow of the South African Academy of Engineers.

In 2010, Van der Merwe was awarded the University of Pretoria's Laureate Award for exceptional achievements and promoting the interests of the University of Pretoria by the Tuks Alumni Board.

In 2011, he was appointed by the MEC for Roads and Transport to head up a special team of experts tasked with developing an 25 year Integrated transport Master Plan for the Gauteng Province. He was also elected Africa President for the African Association of Public Transport, an African association of urban and regional

passenger transport operators, authorities, consultants and suppliers. Van der Merwe was also Vice-President of the International Association of Public Transport, the world-wide association of urban and regional passenger transport operators, authorities, consultants and suppliers.

In 2012, he was appointed as the project leader for the Ekurhuleni Aerotropolis project, which is part of Strategic Infrastructure Project 2 of the National Development Plan.

In February 2014 he was made an Honorary Fellow of the South Africa Institution of Civil Engineers.

He is currently the CEO of the Gautrain Management Agency tasked with overseeing the building and operation of the Gautrain, overseeing the implementation of the Concession Agreement with the Bombela Concession Company.

He has delivered countless papers on the development and execution of PPP contracts in South Africa and abroad. He has been asked by the World Bank to present the method, advantages and implementation of PPP's in Russia and the Philippines. Van der Merwe is recognised as an international expert in public transport and project management.

---

## The Siemens vision and its effect on local industry



### **BAS VAN DIJK, REGIONAL CHANNEL MANAGER FOR SIEMENS PLM SOFTWARE IN AFRICA**

Van Dijk is the regional channel manager for Siemens product lifecycle management (PLM) software in Africa. Siemens PLM Software is a leading global provider of product lifecycle management and manufacturing operations management software. Siemens helps manufacturers optimise their digital enterprise and realise innovation. Van Dijk started his Siemens career in 2006. Prior to this he worked as interim manager for franchise startups and he ran a business in programme management. He has worked in business development and sales for more than 20 years. Throughout his career, Van Dijk received several achievement awards for outstanding performance in business development and sales.

Since 2013, Van Dijk has been working in Middle East and Africa territory. In this role, he contributes to growing the African business with a special focus on academic and educational programmes and the development of the distributor community of Siemens PLM Software. Van Dijk is also key account manager for a customer in the aerospace and defence industry.

## Overview of the CSIR Product Lifecycle Management Centre of Technology



### **JOOST G.A. VAN GEMERT, VICE PRESIDENT CORPORATE OFFSET MANAGEMENT: RHEINMETALL AG, DUESSELDORF, GERMANY**

As Vice President Corporate Offset Management for Rheinmetall AG, Van Gemert is responsible for the execution of Rheinmetall's worldwide offset programs. In addition, he leads Rheinmetall's international offset team that comprises 12 offset professionals. Van Gemert advises Rheinmetall's defence business units on offset- and countertrade-related issues and reports to the Rheinmetall Defence board of directors at the head office in Düsseldorf.

Van Gemert joined Rheinmetall AG in 2007. From 1994–2006, he was part of the offset team of Lucent Technologies/AT&T. He gained his first experience in offset programmes in the Kingdom of Saudi Arabia as a result of AT&T winning a USD 4 billion GSM programme that comprised a 35% offset obligation in 1994. At Lucent/AT&T, Van Gemert widened his experience in offset programmes in most NATO countries, South Africa, the Middle-East and Far-East.

Prior to joining Lucent/AT&T, Van Gemert was part of Stork NV Netherlands, as export manager for the Eastern European market for seven years. He gained experience in marketing and selling capital equipment in challenging markets and actively pursued countertrade transactions with Eastern European clients.

Van Gemert has a MBA from Erasmus University in Rotterdam.

---

## Industrial innovation and Industry 4.0



### **JANEEN UZZELL, HEAD OF WOMEN IN TECHNOLOGY, GENERAL ELECTRIC (GE)**

In her role as Head of Women in Technology at General Electric (GE), Uzzell is developing and executing the company-wide strategy to accelerate the number of women in technical roles across GE's engineering, digital, manufacturing, and product management functions. Her scope includes identifying game-changing moves that all technical functions can benefit from, aligning metrics to measure progress and leveraging global best practices.

Prior to this leadership initiative, Uzzell was the Global Director for External Affairs and Technology Programmes with GE Global Research where she led a \$125m P&L, and all operational and business development models

for technology programmes. She and her team led portfolios of the GE core technologies (healthcare, aviation, energy, transportation), as well as new, innovative technologies funded by global commercial partnerships, external relationships and US and global governments.

During her 16 year tenure with GE, Uzzell has held a number of technical roles and is most proud of her time as an Ex-Pat where she led healthcare programmes for GE Africa, focused on building solutions for health in the world's most challenging and compromised environments.

As a pioneer with the \$6 billion "healthymagination" initiative since 2009, Uzzell spearheaded the design and positioning of the rural health platform for India and Asia, and in 2012 she extended her focus in Africa. Uzzell has been a lead advocate in positioning GE as a trusted advisor in rural health, strategising with ministries of health, heads of state, and global partners on how to best align GE's innovation to solve global health challenges and expand access to healthcare through 'disruptive' models. Her strategic focus on healthcare solutions in low-resource settings has earned her leadership roles on United Nations and Global Health councils. She also co-authored joint publications focused on maternal and new-born health.

Uzzell also served as an ambassador for GE's Developing Health Globally programme in Africa, leading sustainability for the company's donation efforts, collaborating with the country medical leaders on growth and key projects. As ambassador, Uzzell oversaw the redesign and construction of rural and district hospital wings, the installation of village water towers, and global community outreach efforts.

A recipient of numerous awards for her professional accomplishments, Uzzell was most recently recognised by The Network Journal as one of The 25 Most Influential Black Women in Business. She notably received The United Nations Global Leadership Award, the GE ICON Leadership Award, and The Network Journal's "40-Under-40" Business Leadership Award. Beyond her professional achievements, she is a member of the National Association of Female Executives, the National Society of Black Engineers, a Board Member of the International Black Women's Public Policy Institute, and an advisor for the National MBA/Believers in Business Ministry Organisation.

---



## Transforming the Southern African transport sector across the value chain for development impact



### **MOHAN VIVEKANANDAN, GROUP EXECUTIVE: ORIGINATION AND CLIENT COVERAGE, DEVELOPMENT BANK OF SOUTHERN AFRICA**

Vivekanandan is the Group Executive: Origination and Client Coverage at the Development Bank of Southern Africa (DBSA) and a member of the DBSA's Group Executive Committee. Vivekanandan is responsible for developing and maintaining new and current strategic relationships, as well as developing and originating new business that is aligned to the mandate of the DBSA. He is also a member of the Board of Trustees of the Southern African Development Community (SADC) Development Finance Resource Centre.

Vivekanandan is an advisor to a number of institutions and initiatives related to sustainable development and infrastructure financing. He advises the United Nations and SADC development finance institutions on financing the Sustainable Development Goals. He is a member of the World Economic Forum's (WEF) Global Advisory Council on Infrastructure and long-term investment and a leader of the WEF Sustainable Development Investment Partnership. He is also a member of the Business Day/Financial Mail editorial advisory committee on infrastructure.

Vivekanandan started his career as a management consultant with Bain and Company in Chicago. He has worked in South and West Africa and the United States of America (USA). He has expertise in corporate and business unit strategy development and execution, operational improvement and capital project planning. His previous work experience includes executive roles at South African Airways and Hollard Insurance.

Vivekanandan holds an MBA from the Kellogg School of Management and a Bachelor of Arts (Honours) in economics and applied mathematics from Northwestern University in the USA. He has also completed an executive management programme in Project and Infrastructure Finance from the London Business School.

---

## From concept to commercialisation: The European perspective



### **KRIS WADROP, (FELLOW OF THE INSTITUTE OF CHEMICAL ENGINEERS), DIRECTOR: INDUSTRIAL BIOTECHNOLOGY AND BIOREFINING, CENTRE FOR PROCESS INNOVATION, UNITED KINGDOM**

As the business unit director, Wadrop is responsible for the industrial biotechnology and biorefining area of the Centre for Process Innovation (CPI), which is a UK-based

technology innovation centre. He is a chemical engineer with international experience, as well as a Fellow of the Institution of Chemical Engineers, the global professional membership organisation for chemical, biochemical and process engineers and other professionals involved in the chemical, process and bioprocess industries.

Prior to joining the CPI, Wadrop spent four years as the Founder and CEO of technology development company, Solvert Ltd, leading the company through two funding rounds and taking the company's technology from concept through to pilot scale. Prior to Solvert, Wadrop was chief operating officer at GreenBiologics Ltd and a project manager at Vireol Plc; both companies were operating at the forefront of the renewable industry within the UK. Wadrop has also spent 12 years working around the world within the petrochemical industry with Imperial Chemical Industries PLC (ICI). Wadrop joined ICI as an undergraduate and his career took him from China to the United States of America, designing and managing chemical plants.

Wadrop has a BEng in chemical and process engineering from Newcastle University in the United Kingdom and has completed numerous training and development activities throughout his career.

---

## Reimagining industrial development in the digital age

---



### **HANS ZACHAR, MANAGING DIRECTOR: ACCENTURE TECHNOLOGY STRATEGY IN SOUTH AFRICA**

Zachar is the Managing Director of Accenture Technology Strategy in South Africa. In this role, his focus is on bridging the gap between business and technology and more recently on assisting organisations to chart a course to embrace new technologies in pursuit of transforming into digital businesses.

Zachar has experience across numerous industries in the development of technology strategies and architectures and has personally led the delivery of a number of highly complex technology transformation programmes. He has gained rich insights into the ways that organisations can better identify and execute on technology-enabled innovations. It is this insight that helps him work with numerous companies in crafting strategies that combine the latest technology developments, with a clear and pragmatic approach to their implementation, in the pursuit of business value realisation.

Zachar has a Bachelor's and Master's degrees in electrical engineering from the University of the Witwatersrand.

---





# Subscribe to Engineering News

Email us at [subscriptions@creamermmedia.co.za](mailto:subscriptions@creamermmedia.co.za)

## **CONTACT INFORMATION**

PO Box 395, Pretoria, 0001, South Africa

### **ENQUIRIES**

**Tel:** +27 12 841 2911

**Email:** [query@csir.co.za](mailto:query@csir.co.za)

**[www.csir.co.za](http://www.csir.co.za)**