

## Message from the President - Alfred Schroder

We live in challenging yet exciting times. All over the world there are significant social, political and economic upheavals taking place, some for good, others perhaps not so, however the one positive note in these difficult times is the growth in the automation industry and development of new technologies and solutions; and the Automation and Control industry is a significant beneficiary of these innovations.

Much has been said and written about Artificial Intelligence, Machine Learning and Robotics over the past centuries, but never before have these ideas and concepts come to life and been demonstrated as much as they are being deployed and demonstrated right now; indeed, their ability...

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and performance have vastly exceeded our wildest expectations and have in some instances become superior to that of humans. No wonder that people like Hawkins have warned against the potential AI world domination.

It was also predicted, and is coming to pass, that many traditional careers, roles and tasks previously performed by humans, would be gradually replaced by machines and robots, and understandably that has been very concerning to those who have been trained, and who have committed their entire lives to affected legacy professions.

However for us in the Control industry, these developments are great news since the demand for STEM qualified individuals and especially AI and ML specialist has been increasing exponentially, which really excites me about being in this industry and being at the helm of an organization like SACAC that is dedicated to the support, development and proliferation of Automation and Control.

Together with our affiliation to the IFAC (International Federation of Automatic Control), the SACAC and its members are looking forward to great advancements in technology and our industry, especially in the RSA, and many more STEM graduates joining the profession and doing fantastic things to improve the way we do life, travel, re-invent, grow and improve the world.

Let 2019 be the year for us to really Innovate and Automate!

## Past SACAC events



### AGM and Welcome to the new EXCO

On 8 March 2019 SACAC hosted their annual AGM and Luncheon at the Forum Homini and Roots Restaurant in theCradle of HumanKind. As with the last few years we were blessed with an amazing five star lunch following our successful AGM.

Upcoming plans for 2019 were discussed, the highlight of which is of course the IFAC MMM2019, and we welcomed returning EXCO members to the Executive Committee as well as a few new faces. We look forward to the year ahead and thank the EXCO in advance for their valuable inputs and hard work.

We welcome Alfred Schroder (previously Vice President) as the incoming president and John Burchell as our new Vice President from Industry. Derik le Roux has returned as our Honourary Secretariat and Treasurer.

From an **academic background**, we are pleased to announce the following:

Kenny Uren – NWU

Murray Bwalya – Wits

Margret Bauer – UP and

Robyn Verrinder – UCT

Lidia Aurret – Stone Three

Andre Hoffman – My Techie

Loutjie Coetzee – Mintek

Ricardo Paddy – Scibotron

Dean Redelinghuys – Optinum and

Nirmal Narotam - PAS Automation from **industry**.

## **Functional Design Specification Workshop, Pretoria**

SACAC is proud to say that the revitalized Function Design Specification documentation workshop held at the Aurecon offices in Lynwood, Pretoria on 10 July 2019 was well received by attendees.

The course that was based on the ISA standard 5.06.01 has been augmented with the new ISA 101 Advanced HMI standard. ISA 101 seeks to fill a gap in the industry where no HMI standards have existed before, and practitioners have defaulted to HMIs that emulate their legacy hardware components, or worse, Piping and Instrumentation Diagrams.



## **African Automation Fair**

The African Automation Fair is bi-annual event that brings together buyers and sellers of industrial automation technology. This year the event was held at the Ticketpro Dome in Johannesburg from the 4th to the 6th of June.

The event combines industry expertise and brings together all the key players and themes in the industry.

Africa Automation Fair is the premier focused platform for the Automation and Smart Control Industry in Africa; working closely with industry associations including the Industrial Instrumentation Group (IIG) Society for Automation, Instrumentation, Measurement and Control (SAIMC) and Technews Publishing making it the leading event in the African market.

With the growing scope of the show and changes in the industry, the 2019 exhibition saw the inclusion of IIoT, Industry 4.0, AI, VR, Robotics, Disruptive Technologies and an expanding focus on Infosecurity to name a few and SACAC was pleased to be offered a stand to promote its presence, with Alfred Schroder giving a presentation on SACAC's purpose and relevance within the industrial automation sector.



Delegates attending this workshop will therefore not only learnt how to write Control System Functional Specs in a simple and efficient manner , but also how to design and specify their HMI's so that they are more operator friendly, efficient and situationally aware.

As always, SACAC members enjoyed a discount for attendance.

The course was revalidated for ECSA for CPD points.



## Future SACAC events

### FDS October 2019, Cape Town

The popular SACAC FDS will also be presented in Cape Town this year. The content has been revitalized to include ISA5.06.01 requirements as well as the new ISA 101 Advanced HMI guidelines. Delegates attending this workshop will therefore not only learn how to write Control System Functional Specs in a simple and efficient manner , but also how to design and specify their HMI's so that they are more operator friendly, efficient and situationally aware.

Details for the Cape Town workshop can be found on the SACAC website and interested members and non-members are encouraged to register with the SACAC secretariat to attend the course. SACAC members are as always offered a discount for attendance, and the course has been revalidated for ECSA CPD points.

### Motorcycle Evening Talks (Johannesburg, Pretoria, Cape Town and Durban)

When you claim you can beat the multiple MotoGP World Champion Valentino Rossi in a race, you need to know what you are doing. Especially if you say you will do it while seated at your desk. But this is exactly what the engineers at Yamaha Motors and SRI International are doing. They are training their robot Motobot to beat Valentino around a track. Although they have not yet been successful, their progress to automate a motorcycle has been impressive. The automation and control of motorcycles is



considerably more challenging than cars, something with which Prof David Limebeer is most familiar. With his experience working with both Ferrari and Ducati, he will present these challenges in an open lecture in Pretoria and later in Cape Town.

Prof Limebeer will discuss the progression of motorcycle designs and different modelling strategies especially as it relates to various control features of two-wheeled vehicles. He will use this as a foundation to discuss bar-room myths about the challenge to balance a motorcycle and how to manage a “death-wobble” or “fish-tail”. The final part of the lecture will deal with optimal control of closed-circuit motorcycle racing. This event is ideal for those interested in the dynamics and optimal control of motorcycles and those who simply enjoy going fast!

Please visit the SACAC [website](#) for more information on these exciting free evening talks.

## IFAC News

### **IFAC Industry Committee Update - Initiative to Increase Industrial Participation in the Control Community**

The need for more and better industry engagement has been a common refrain in the control research community for as long as many of us can remember! Numerous initiatives have been launched toward this goal, but, while we can point to occasional successes, the theory/practice gap in our field continues to yawn wide . . . witness indicators such as the (poor) recognition of the importance of advanced control in industry, industry attendance in control conferences, and the participation of industry representatives in IFAC.

At the 2017 World Congress in Toulouse, IFAC took a major step to redress this problem. An amendment to the IFAC Constitution established a permanent Industry Committee, the objectives of which “include increasing industry participation in and impact from IFAC activities”. The committee is chaired by a new Vice Chair of the Technical Board, who is an ex officio, non voting member of the IFAC Council. For the 2017-2020 triennium, Tariq Samad (US) was appointed the Industry Committee chair by the Council and thus serves on the TB and IFAC Council. It’s worth noting that the establishment of the committee was preceded by extensive planning.

The process started two triennia ago in response to the strategic planning activity undertaken by Ian Craig (ZA, IFAC President 2011-2017). A task force was established in 2013, which was led by Roger Goodall (UK), and a pilot phase of the Industry Committee was operational from 2014-17.



### **Industry Committee Membership and Structure**

The Industry Committee has now been running for over a year and a half. Our membership roster is about 80 strong. The vast majority of the members are currently in or have spent most of their careers in industry, and all sectors with significant control relevance are represented. Members are nominated by IFAC NMOs, Technical Committees, and current committee members.

Five workstreams have been set up and are active, as follows:

- WS1: Industry/academia/government collaboration (Silvia Mastellone (CH), chair)
- WS2: Industry Engagement in IFAC TCs and Events (Philippe Goupil (FR), chair)
- WS4: Gleaning the “Voice of the Industry” (Alex van Delft (NL), chair)
- WS5: Educating control engineers for industry roles (Atanas Serbezov (US), chair)
- WS6: Industry Committee communication (Kevin Brooks (ZA), chair)



Another workstream, WS3 on Industry Engagement in IFAC Publications, is currently dormant. However, aspects of publications are covered under other WSs.

An Executive Subcommittee (ExCom) has also been established to oversee the workstreams, manage membership, serve as a liaison to the Technical Board and the Council, and provide general direction to the committee. In addition to the WS chairs, the ExCom roster includes Roger Goodall (UK), Steve Kahne (US), Carlos Eduardo Pereira (BR), and Tariq Samad (US).

## Current and Future Activities

The Industry Committee continues to forge ahead on several fronts. Our primary objectives for the remainder of this triennium are outlined below.

- Collect and promote industry success stories. As noted above, even within the control research community the practical successes of control are not appreciated. We need to be better at patting ourselves on our collective backs!
- Better connect control with “hot topic” technologies of industry interest. Control science is a key discipline for furthering the development of emerging technologies such as deep learning, autonomous systems, internet of things, and quantum computing.
- Develop recommendations for IFAC Technical Committees and IFAC events. A few TCs are reasonably successful at attracting industry participation, including for their conferences and other events, but most of them (including most of the application-oriented TCs) are not. An important goal of the Industry Committee is to help all TCs enhance industry participation in their activities.
- Disseminate the industry perspective to interested control researchers. Why is industry interested in advanced control? What challenges are faced by control researchers in different industry sectors in commercializing control technology? Every industry sector brings its own requirements and intricacies, including regulatory oversight, commissioning processes, supply and value chains, and modeling and identification methodologies.
- Increase awareness of “innovation” ecosystems. In addition to targeting positions in academia and established corporations, engineers and scientists are increasingly embarking on entrepreneurial ventures as well. Several control scientists have had notable successes with start-up companies, but many in our community are unaware of opportunities or how best to pursue them.
- Develop recommendations for an industry-relevant first course in control for undergraduate students. Most engineering undergraduates are not specializing in control, yet they should all be exposed to the discipline. We are coming up with guidelines for a “first and only” control course (this activity is in collaboration with IFAC TC 9.4, Control Education).
- Enhance industry content and relevance for the 2020 IFAC World Congress in Berlin. This event should provide a good

target for some of the first outputs of the Industry Committee. We also encourage submission of industrial invited sessions, industry papers, and open industry benchmark problems from the broader IFAC community.

## **Reminder: IFAC Council & Related Meetings 2019**

The 2019 IFAC Council & Related Meetings 2019 are scheduled to take place in Vienna, Austria from 7-9 September 2019. If you will be attending please submit your reply form, which is available at:

<https://www.ifac-control.org>

The meetings are being held in conjunction with NOLCOS and Mechatronics 2019.

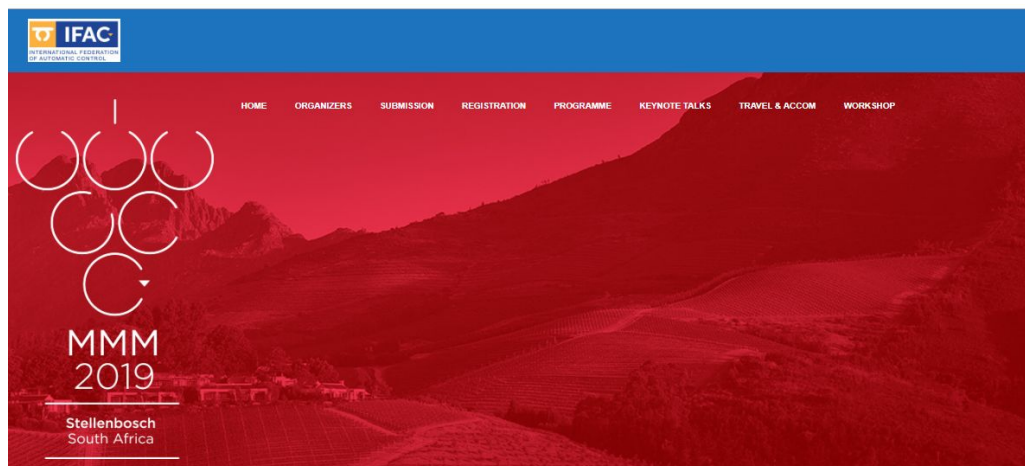
Our Council and Related Meetings are scheduled to take place at the Fleming's Selection Hotel Wien City.

## **IFAC MMM 2019 ... Just over two months to go!**

***Kevin Brooks and John Burchell***

Registrations for the 18th IFAC Symposium on Control, Optimisation and Automation in Mining, Mineral and Metal Processing (IFACMMM2019, [www.ifacmmm2019.org](http://www.ifacmmm2019.org)) are proceeding well. This IFAC sponsored event, hosted by SACAC, will be held from - 28th to - 30th August 2019 in the university town of Stellenbosch surrounded by the vineyards of the Cape Winelands and the mountainous nature reserves of Jonkershoek and Simonsberg. The venue will be STIAS (Stellenbosch Institute for Advanced Studies) conference centre, in the town centre.

The first call for papers was issued at the end of September 2018, with an eventual submission deadline of 14th March 2019. The final paper submission date was 7th June. Sixty-six papers were received, of which fifty-four were accepted for the conference. Fifty-one papers will be presented, four of these are industrial contributions.



The papers will be presented in two parallel tracks, with the following topics:

- Milling and Flotation (2 sessions)
- High-Temperature Processing (2 sessions)
- Artificial Intelligence and Machine Learning (2 sessions)
- Control and Optimisation (2 sessions)

- Fault Detection and Monitoring (2 sessions)
- Transportation
- Women in MMM

We are honoured that five excellent plenary speakers are presenting:

- Joe Qin (University of Southern California) – Inferential Monitoring of Quality and Process Faults with Supervised Learning
- Chris Aldrich (Curtin University) - Recent Advances in Multivariate Image Analysis in the Mineral Processing Industries
- Osvaldo Bascur (OSIsoft) – Process Analytics: Transforming Mineral Process Plant Data into Actionable Insights
- Jan Cilliers (Imperial College) - Flotation optimisation using Peak Air Recovery: Past, present and future
- Kathryn Hadler (Imperial College) – Flotation Flowsheet Design And Optimisation

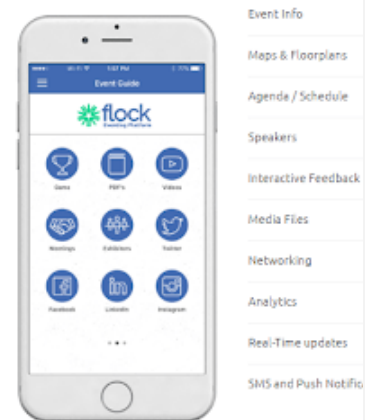
Keen to attend? Then register on <https://www.ifacmmm2019.org/event/registration/> - we look forward to seeing you at this prestigious event.

Merinda Westcott ([merinda.westcott@bluesp.co.za](mailto:merinda.westcott@bluesp.co.za)) has kindly agreed to manage the sponsorship process, and you should have received a prospectus for the conference. The following sponsorship packages are available:

- One Diamond Sponsorship - R50,000 -This sponsorship is for the conference banquet.
- Four Platinum Sponsorships – R25,000 - Four sponsorships are available for the Welcome Reception and the Conference Lunches.
- Two Silver Sponsorships – R15,000 - Two sponsorships are available for a conference mobile app to enhance the delegate experience.

We are excited that the Flock App will be used for the event. No bags or paper will be handed out – instead, the app has the program, papers, events and other items needed. A green initiative which also saves on the budget.

We need our industrial members to step up to the plate and sponsor the event. If one of the above sponsorships does not appeal please speak to us about alternatives. At the very least please send a delegate to this world-class event!



## MMM 2019 WORKSHOPS

Prior to the conference the SACAC will host a hands-on workshop on “Modern Data Analytics for Control”. This workshop will take place on the 26th and 27th of August, with presenters representing a selection of local industrial and academic experts.

On day one participants will be introduced to popular analytic methods used in the development of soft sensors. Using these methods, participants will create a soft sensor to estimate the size distribution of the product from a simulated grinding circuit.



On day two participants will be introduced to linear and non-linear model predictive control (MPC). They will then use their soft sensors from day one to develop an MPC solution to optimise the grinding circuit's performance.

The workshop will emphasise practical considerations while still providing theoretical insight. It has been provisionally approved for 2 CPD points.

## Member update

SACAC would like to warmly welcome our new EXCO members, as well as those returning for a second term.



Dean Redelinghuys is co-owner and a Director of OPTI-NUM solutions. Dean's responsibilities include the management of educational sales, marketing and office administration staff, and IT systems and business process implementation and support. Dean also provides technical sales support for the process industries.

Dean completed a Bachelor of Science in Engineering at the University of Witwatersrand in 1991, and a Masters of Science in Engineering at the same university in 1994. During his postgraduate studies, Dean worked as a lecturer at the University of Witwatersrand, where he was involved with undergraduate and postgraduate level courses on introductory engineering programming, electric circuits, control and system identification theory.

### ***Dean Redelinghuys***

During his career Dean has been involved in a wide variety of projects in a broad range of industries, including identification and control studies for minerals processing plants, control design and PLC implementation for pilot plants, development of software test beds and simulation models for aerospace and defence systems, and software development projects for automated analysis systems.

Dean has also worked on teams where he has been actively involved in all phases of software engineering for MATLAB and Simulink products marketed and distributed worldwide by The MathWorks, Inc.



Murray Bwalya studied at Cardiff University to obtain a BSc in Mineral Processing and worked as a metallurgist at a concentrator in Kitwe Zambia before going back to the UK to obtain an M.Phil in Mineral processing at Leeds University. He joined the Copperbelt University as lecturer before coming to South Africa in 1998 to do a PhD in the application of Discrete Element modelling to the prediction of milling rate. During his PhD research and after, he was involved in consultation projects that included clients such as Eskom, Anglo American, Mintek and Bayswater in Australia. These projects mostly involved the application of modelling to solve industrial problems. In 2013, Murray joined the Witwatersrand academic staff and started lecturing process control and solid fluid systems.

### ***Murray Bwalya***

As an academic he has been involved in the introduction of many courses including Postgraduate Diploma Courses that help many from industry to obtain qualifications that are equivalent to a University Degree. Murray's research pursuits remain in the optimisation and development of new crushing and grinding equipment as these continue to be major energy cost sectors which need to come down for the future sustainability of the Mining Industry.

## Stop Press

### **Dr Kevin Brooks appointed as Visiting Adjunct Professor at Wits**

*Alfred Schroder, President SACAC*

SACAC is pleased to announce that an ex SACAC president, Dr Kevin Brooks, has been appointed Visiting Adjunct Professor in the School of Chemical and Metallurgical Engineering at the University of the Witwatersrand.

Kevin hopes that this will enable him to make a greater contribution in his role as Exco member of the IFAC Industry Committee. This is also a return to his alma mater, where he studied for his Ph.D, and taught for a number of years in the eighties.



***Dr Kevin Brooks***