



## Message from the President – John Burchell



The SACAC had a busy start to the year. Our first virtual annual general meeting (AGM) happened on 26 February. Thank you for all who attended, we managed a quorum and could continue with official business. We voted in a number of new executive members, whom I would like to thank for their commitment to lead the organisation this year. Later in this newsletter you will find a short bio on our new executive members.

The SACAC increased its efforts this year to promote science, technology, engineering, and mathematics (STEM). This focus on STEM is aligned to the national agenda, and allows us to leverage established platforms and networks to reach a wider audience among the students and learners of our country. Continued ..pg 2

## In this edition

### Past Events

On 25 February 2021 SACAC hosted their annual AGM on an online platform for the first time in SACAC history.

(.. Continues on page 3)

### Future Events

Upcoming events include:

- Practical guide to the management of “Bad Actor” alarms
- Observer Design Workshop
- Motorcycle Evening Talks

(.. Read more on page 4)

### IFAC News

Include:

- Proceedings of the 21st IFAC World Congress are published
- Mechatronics Journal changes

(.. Read more on page 5)

### Member Updates

Welcome to our new SACAC EXCO members, read about some of the new faces.

(.. Continues on page 10)

**Reminder:** CCA 2021, Muldersdrift, SA | 7-8 December 2021

[More info](#)

Cont...

An increase in the uptake of STEM is key to ensure job creation and job retention, as is emphasised by the Presidential Commission on the Fourth Industrial Revolution (4IR) in their summary report\*\* published late last year. I encourage you to have a look at this report, which outlines the opportunities and risks associated with 4IR for South Africa and puts forward a recommended response.

To promote STEM, the SACAC has joined the National Science and Technology Forum (NSTF), a non-profit company that represents organisations in science and technology, as one of their proSET members. This proSET sector of the NSTF consists of professional bodies and learned societies in science, engineering, and technology (SET), all with a focus on SET education. A key initiative we are supporting is the e-learning platform STEMulator, which promotes an interested in STEM among learners, and provides career and study guidance.

We also reached out to IEEE – Robotics & Automation / Control Systems (IEEE RA/CS) on opportunities to collaborate. At this stage we are co-promoting our activities and are planning a seminar on Control and Automation in Robotics. In a later segment of this newsletter the chair for IEEE RA/CS gives some background on the organisation and goals of this joint chapter of the IEEE.

Clearly the surge in awareness or interest in the 4IR is not subsiding. In recent months, the SACAC was approached by the Capital City Business Council (CCBC), a chamber of commerce for the Tshwane municipality. We are now acting in an advisory capacity for the CCBC on matters related to the adoption of 4IR technologies. We were also approached for a segment in Engineering News, a Q&A on the SACAC's role in SA as it relates to 4IR. I expect the segment to be published in the issue that comes out end of this month. Of course, the term 4IR is very broad. It can be defined as the accelerated, technology driven transformation of industries, and the way we live our lives. Not any single person can be an expert on all the technologies or the outlook for the various industries affected by the 4IR. The SACAC, however, is well positioned to provide guidance on 4IR, with its diverse membership developing its theory in academia, and driving its transformation of a number of local industrial sectors.

I would like to take the opportunity to support the highlight of the SACAC calendar this year, our 2nd Control Conference Africa (CCA 2021). This conference aims to promote the exchange of ideas and developments in control engineering in Africa. On the back of the success of CCA 2017, and the efforts of the current organising committee, this conference was officially adopted into the IFAC calendar. A great achievement. I would like to thank the organising committee, led by Dr Kevin Brooks, for their efforts in this regard, for pushing through the extra challenges that organising such an event faces under COVID, and for pulling together such a stellar plenary line-up. I encourage all our members to support this event. Please consider submitting an article on your research or industrial applications.

As I'm writing this, a new COVID strain is responsible for an aggressive wave of infections and fatalities in India. This strain is likely to make its way to our shores, which is a worrying prospect with a potential seasonal effect likely to drive a third wave in South Africa soon. I urge you to stay vigilant and to practice the now familiar control measures of wearing a mask and social distancing.

I sincerely wish you and your families good health.

Best regards,

**John Burchell – SACAC President**

\*\* Published in the Government Gazette No.43834 on 23 October 2020.

## Past SACAC Events



### AGM and Welcome to the new EXCO

On 25 February 2021 the SACAC hosted their annual AGM online for the first time in its history. Although all those that attended, I am certain, missed the usual five star lunch at Roots Restaurant, with the current risks of face to face meetings the outgoing EXCO felt that this was the best compromise.

Despite the unusual forum, the AGM was a success and upcoming plans for 2021 were discussed, the highlight of which is of course the IFAC CCA2021.

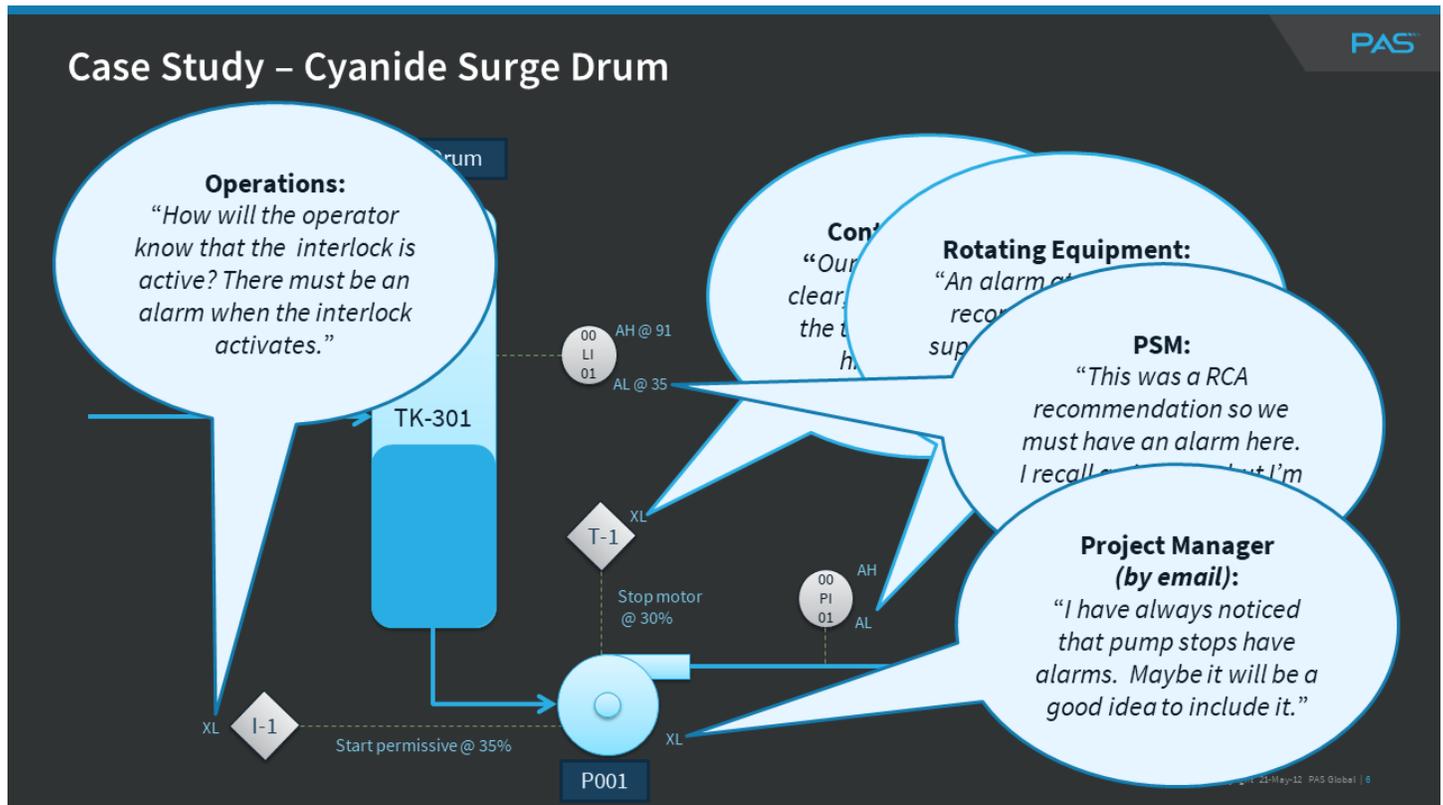
We welcomed some returning members to the Executive Committee (EXCO) as well as a few new members. We look forward to the year ahead and thank the EXCO in advance for their valuable inputs and hard work.

We welcome John Burchell of Sibanye-Stillwater (previously Interim President) as the President, and Loutjie Coetzee from Mintek as our new Vice President. Derik le Roux has returned as our Honorary Secretariat and Treasurer from the University of Pretoria.

<p>From <b>academia</b>, we are pleased to welcome the following EXCO members:</p>	<p>From <b>industry</b> we welcome the following EXCO members:</p>
<p>Robyn Verrinder – University Cape Town Antony Higginson – University Witwatersrand Kenny Uren – North West University Syamala Krishnannair – University Zululand Tobi Louw – Stellenbosch University</p>	<p>Ricardo Paddy – Scibotron Lidia Auret – Stonethree Dean Redlinghuys – Opti-num Solutions Daniel Rabopape – Anglo American Platinum</p>

## Practical guide to the management of “Bad Actor” alarms

The South African Council for Automation and Control hosted a webinar on the management of “bad actor” alarms on 30 July 2020. This webinar was presented by Nirmal Narotam, the Managing Director of PAS Automation Service South Africa and was previously principle engineer in industrial control systems at SASOL.



Although this webinar was the first online webinar SACAC as an organisation have hosted, it was a success with many attendees from industry and academia in attendance (virtually). Of the most value, as expected, was the Q & A session following the presentation. We hope to continue offering virtual webinars to our members in the coming months and return to face to face engagements as soon as we are able to.

## Future SACAC Events

### Observer Design Workshop

The workshop will be presented by Dr Derik le Roux from the University of Pretoria during the second half of the year. The course

will again be accredited for 1 CPD point through SAIEE.

The workshop is intended for practitioners and academics involved with model-based design and implementation of observers. The workshop will have a strong theoretical component, but with adequate examples and problems.

A background knowledge of linear system theory, statespace models and linear algebra is recommended.

Details for the workshop will be published 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.

## Bad Actor” Alarms

We are pleased to confirm that we will again be hosting a “hybrid” version of last year’s management of “bad actor” alarms seminar in June 2021. This webinar will again be presented by Nirmal Narotam, the Managing Director of PAS Automation Service South Africa.

Please visit the SACAC [website](#) for more information on this exciting hybrid event.

## 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

### **Proceedings of the 21st IFAC World Congress are published**

IFAC is happy to announce that the proceedings of the 21st IFAC World Congress have now been published, and is proud making these available as an open access resource to the control community!

These, as well as all earlier IFAC World Congress proceedings, are available through IFAC PapersOnLine at <https://www.sciencedirect.com/journal/ifac-papersonline/vol/53/issue/2>.

Due to the unusual circumstances we all find ourselves in due to the pandemic it took much longer than usual and anticipated for these proceedings to be published.

### **Mechatronics Journal Changes**

Following extensive consultations, IFAC have decided to make two important changes to Mechatronics that our IFAC community should be aware of.

Mechatronics now accepts four types of submission. We continue to accept regular papers, review papers and book reviews, as we did in the past. In addition, we now accept contributions for a new section of the journal dedicated to Robotics and Mechatronics Letters. These are short manuscripts that report time-sensitive results. They go through a rapid review process overseen by a dedicated Co-Editor-in-Chief.

The second change is related to the new structure of our editorial board. We now have three topical Co-Editor-in-Chiefs, with each responsible for handling manuscripts in their specialized area and making the final decision on each manuscript suitability for publication, or otherwise. Dong-Il (Dan) Cho (KR) is serving as the Co-EIC for Robotics, Tsu-Chin Tsao is the Co-EIC for Mechatronics and Christian Ott the Co-EIC for Robotics and Mechatronics Letters.

Source: IFAC April 2021 newsletter Author: Reza Moheimani, Mechatronics Journal EIC

### **Making practice publishable – An IFAC Industry Committee Discussion**

The IFAC Industry Committee, chaired by Tariq Samad (US), arose out of a pilot committee formed in 2014. At that time one of the workstreams was entitled "Enhancing Industry Participation in IFAC". Amongst other work this workstream asked the question "Does your organisation support publishing in journals, via conferences, or both? Is IFAC-PapersOnLine useful?" Various opinions were received:

- Some companies are vendors of technology and value their technological reputation
- Peer reviewed articles provide credibility, whereas “snake oil salesmen” cannot publish in good peer reviewed journals.
- In other companies, publication is accepted but not especially encouraged.
- Other companies tend to avoid publishing in journals perhaps because “there aren’t really any high impact industrially relevant control journals”. IFAC is not highly visible to some industries.
- Some organisations have their own tools for technology surveillance.
- PapersOnLine (POL) is mostly considered useful.

There is general agreement that publishing practice is a good idea, and on what the impediments are to do so. Is it time to resurrect our dormant workstream WS3: “Industry engagement in IFAC publications”? Are there Industry Committee members who would like to be involved? We would also like to hear from the broader control community! The author (Kevin Brooks), as well as Industry Committee Chair (Tariq Samad) welcome comments at [kevin.brooks@wits.ac.za](mailto:kevin.brooks@wits.ac.za) and [tsamad@umn.edu](mailto:tsamad@umn.edu).

Source: IFAC April 2021 Newsletter Author: Kevin Brooks (ZA)

## Future IFAC Events

There are many upcoming IFAC events, please see the full calendar at: [IFAC Events Page](#)



## Preparations for CCA 2021 are well underway – get your paper in now!

Preparations for Control Conference Africa (CCA) 2021, a conference hosted by the South African Council for Automation and Control (SACAC) are well underway. CCA2021 aims to promote the exchange of ideas and developments in control engineering in Africa., and in keeping with the times will be a hybrid conference. The conference will be held on the 7th and 8th of December. The physical conference will be held at Misty Hills Hotel and Conference Centre in Muldersdrift outside of Johannesburg. At the same time, we will run a virtual conference where people unable or unwilling to travel can record their presentations, and have them broadcast together with the presentations of attendees in mixed sessions. In this way the confer part of the conference will still take place during the sessions.



Misty Hills, Muldersdrift, South Africa

An impressive array of plenary speakers have been arranged by the International Program Committee.

**Robert Bowyer**

**Technical Director, Flylogix, UK**

Robert has a DPhil in Control Engineering from the University of Oxford and a B.Sc (Eng) in Electrical & Electronic Engineering from the University of Cape Town. He is responsible for ensuring that the engineering design and solutions at Flylogix are able to deliver low-cost unmanned air services that are able to operate globally. He is a Chartered Engineer and a Fellow of the IET.



**Michael Cantoni**

**University of Melbourne, Australia**

Michael Cantoni received the Ph.D. degree from The University of Cambridge, and the B.E. (Hons. I) and B.Sc. degrees from The University of Western Australia. He is currently a professor in the Department of Electrical and Electronic Engineering. His research interests include mathematical systems theory, robust and optimal control, and water/power network applications.



**Farai Nyabadza****University of Johannesburg, South Africa**

Farai received the M.Sc degree in Mathematics from the University of Zimbabwe and a PhD in mathematical modelling of infectious diseases from the University of Botswana. He is currently a Professor of Applied Mathematics and Head of Department at the University of Johannesburg. His research interests include the application of dynamic systems to infectious disease dynamics, substance abuse, crime dynamics, and other biological systems.

**Joe Qin****City University of Hong Kong, Hong Kong, China**

Joe Qin is currently Chair Professor, Dean of the School of Data Science, and Director of Hong Kong Institute for Data Science at City University of Hong Kong. Dr. Qin's research interests include data analytics, machine learning, process monitoring, fault diagnosis, model predictive control, system identification, smart manufacturing, and predictive maintenance.

**Sigurd Skogestad****NTNU, Norway**

Sigurd Skogestad received his Ph.D. degree from the California Institute of Technology, Pasadena, USA. He has been a full professor at Norwegian University of Science and Technology (NTNU), Trondheim, Norway since 1987 and he was Head of the Department of Chemical Engineering from 1999 to 2009. His research interests include the use of feedback as a tool to reduce uncertainty (including robust control), change the system dynamics (including stabilization), and generally make systems more well-behaved (including self-optimizing control).

SACAC has taken this opportunity to arrange a workshop on the Monday before the conference. |The topic will be around data analytics and machine learning, possibly involving a popular beverage.

The organization of this event involves two bodies – the National Organising Committee (NOC) and the International Programme Committee (IPC). The IPC has the important role of ensuring the quality of the papers presented at the conference. This is chaired by Professor Eric Kerrigan Eric with co-chair Dr Derik le Roux, current SACAC treasurer, and who is very experienced with IFAC and the Papercept system used for the reviewing. The editor will be Dr Murray Bwalya of the University of the Witwatersrand. The IPC vice-chair for industry is Dr Loutjie Coetzee of Mintek, current SACAC vice-president. Some 24 experienced professionals have agreed to serve on the IPC, thus helping to ensure that the reviewing process results in world-class papers being presented and

published.

The NOC is chaired by Dr Kevin Brooks, who was co-chair of the IFAC MMM 2019 conference recently held in Stellenbosch. The co-chairs are Professor Sayed Hassen of the University of Mauritius and Professor Steven Bradshaw of Stellenbosch. Also on the NOC are Dr Laurentz Olivier of Moyo, Dr Lidia Auret of StoneThree, and Dr Anshu Mordan of the University of Mauritius. The latter two have the big job of organizing the virtual side of the conference – something SACAC has not done before. The NOC is ably assisted by the Office Executives team headed by Keri.

SACAC has signed an MOU with IFAC, covering all future CCA events – a great pat on the back for us. IFAC has appointed Professor Maria Prandini, who is IFAC Conference Board Chair, as our liaison person. We are honoured to have her involved.

We have also been awarded a €5,000 grant by the IFAC Activity Fund. This will be used to assist three academics and three graduate students from the rest of the world to attend the conference. In addition, SACAC will be offering grants for SACAC members to attend.

How can SACAC members help? We have a prospectus setting out the diamond, platinum and bronze sponsorships that are on offer. Most of all we want your papers; either six-page papers that will be presented and published in IFAC PapersOnline, or two-page abstracts that will be presented. The deadline for submissions is the 9th of May.

We look forward to yet another great conference organized by SACAC that reflects the African voice in control. See our website [www.cca2021.org](http://www.cca2021.org) or write to us at [info@cca2021.org](mailto:info@cca2021.org).

## SACAC joins Robotics initiatives network within South Africa

Robotics has been a buzz-word for years. People often get excited about the topic and think it is possible to make with general knowledge, yet it is a topic that requires high level studying and understanding. There are platforms that have been developed over the years to simplify robotics for STEM education, to allow children to get a feel of the higher level topic. There are groups within South Africa that are pursuing a means to support the country with robotics.

The IEEE Robotics and Automation (RA) and Controls Systems (CS) societies have a joint chapter in South Africa. Membership to these chapters are as an addition to the IEEE membership, focused on the tertiary education, research and industry sector. IEEE RA/CS have supported numerous robotics related conferences in the past, and are excited about the RAPDASA (Rapid prototyping and additive manufacturing) conference that is joining with the RobMech (Robotics and Mechatronics) and PRASA (Pattern Recognition) conferences later this year. Details about IEEE South Africa can be found at: <http://www.ieee.org.za/> and IEEE RAS at: <https://www.ieee-ras.org/>.

The Robotics Association of South Africa (RASA) was started by Andre Hoffmann in 2009. The membership with RASA is for a wider audience, and to inspire all levels of robotics and artificial intelligence. It is a forum and network to make people aware of what is happening with robotics around the country, and to inspire youngsters to get excited, especially with the world-first

technology being currently developed within South Africa. More details of the association can be found on the RASA Facebook page: <https://web.facebook.com/Robotics-Association-of-South-Africa-298753050143370/> and the linked Facebook group: <https://web.facebook.com/groups/170499019675770/>.

Both of these groups are run by a handful of volunteers, whenever they have the spare time to assist. Yet, more volunteers with spare time are needed (especially for RASA), to assist with administrative duties and promoting of robotics activities within the country. Joining forces within the country, will allow us to find ways to improve the knowledge and technology of robotics.

**Riaan Stopforth- Chair of IEEE South Africa Joint Control Systems (CS) / Robotics and Automation (RA) chapters**

## EXCO Member Profiles

Tobi Louw is currently an Associate Professor and the Undergraduate Programme Coordinator at the Department of Process Engineering at Stellenbosch University, South Africa. His interest in the mathematical modelling and analysis of dynamic processes starting during his PhD at the Department of Chemical and Biomolecular Engineering at the University of Nebraska-Lincoln, where he simulated the mechanotransduction of ultrasonic stimulation on cartilage cells in the context of tissue engineering.

Tobi currently focusses on the use of mathematical modelling and machine learning techniques for process modelling, monitoring, and control. He is particularly interested in the combination of fundamental mathematical descriptions and statistical predictions in a hybrid modelling approach.



*Tobi Louw*

Dr Syamala Krishnannair is a senior lecturer in the Department of Mathematical Sciences at the University of Zululand. Dr Krishnannair's research interests include process data analytics, statistical machine learning, latent variable methods, high-dimensional time series latent variable modelling, process monitoring and fault diagnosis and data-driven statistical control and optimization. A major focus of her research is on the development of advanced multiscale multivariate statistical methods to detect faults in chemical process systems. This multidisciplinary research overlaps with areas such as applied statistics and data science.

Dr Krishnannair has published articles in peer reviewed journals and conference proceedings. Her work has been recognized through the award of research grants that she received from National Research



Foundation (NRF) of South Africa for Thuthuka Programme and Capacity Development Grant from SASOL South Africa.

***Dr Syamala Krishnannair***

Daniel Rabopape currently heads up the advanced process control (APC) team at Anglo American Platinum. The APC team is responsible for upkeep of advanced solutions, roll out of new solutions, investigation, testing and tryouts of advanced sensors.

Daniel has over 16 years of professional experience across industries such as engineering consulting, petrochemicals, manufacturing, pulp and paper, as well minerals processing. Daniel is a registered professional engineer with the engineering council of South Africa (ECSA). Daniel holds a BSc. Engineering (Electrical) from the university of the Witwatersrand, as well as a B. Eng. Hons in Control Engineering and Masters in Engineering Management, both from the University of Pretoria.



***Daniel Rabopape***