



## **NUUSBRIEF | NEWSLETTER**

**DECEMBER 2013**

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### **President's message**



We have come to the end of another year but yet we are looking forward already with excitement to 2014 when SAIAE will be celebrating its 50th anniversary. Ironically how the years 1963 (when the founding meeting of SAIAE was held) and 1964 (when the first Council meeting of SAIAE was held) have lately been prominent in the news for an entirely different reason – the start of the Rivonia trial (1963) and the first year of Nelson Mandela's prison sentence at Robben Island (1964). History has shown that it is often during times of greatest uncertainty that significant change takes place, and when the founding dates of SAIAE is considered in perspective of South African politics, it must have been very volatile times indeed. We are however grateful for Messrs G S Bartlett, P J C Vorster, P Meiring, J J Bruwer, C D Feldman, C T Crosby, J A Vorster and R Corte, the first Council members, for setting SAIAE off on the right course, and we strive to build on the foundations that had been laid by the Councils that followed.

The year 2014 will be a year of celebration and a number of initiatives will be taking place to mark the golden jubilee event. The first thereof is the 2014 SAIAE calendar, of which we have changed the format from a desk calendar to a wall calendar, and it will be making its way to each member during December.

Furthermore, the Council is planning an evening function to take place on 27 February 2014 in Pretoria, and the celebrations will be concluded with a CPD event taking place towards the end of the year. Details of both events will be communicated to members in January 2014. In addition, the regular SAIAE activities such as radio talks, newsletters and branch activities will also be used to celebrate our rich history of agricultural engineering in South Africa.

We look forward to meeting you at one or more of the events to take place next year - may you have a blessed holiday season with your loved ones, and return safe and rested in 2014.

**Isobel van der Stoep**  
**SAIAE President**

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## **SAIAE celebrates international Connections**

**By Felix Reinders**

The South African Institute of Agricultural Engineers (SAIAE) not only celebrates its 50th anniversary but is also affiliated to two International organisations with rich histories that gave us excellent opportunities to network with fellow Agricultural Engineers worldwide.

The first one is the International Commission of Agricultural Engineering that was already founded in 1930 in Liège, Belgium, by a small group of farsighted European agricultural engineering scientists from Belgium, France, Germany, The Netherlands, Spain, Switzerland, and the UK. SAIAE became a member on 23 November 1974 which means we are also affiliated 40 years with CIGR in 2014. The 18th World Congress of the International Commission of Agriculture and Biosystems Engineering (CIGR) will be from September 16th to 19th, 2014 in Beijing, China. Under the energetic guide of the General Assembly of CIGR, this Congress will remain faithful to the pattern established in past CIGR World Congresses, while incorporating innovative new elements to promote exchange and collaboration among agricultural engineers, and to offer a unique opportunity to present the results of research and to discuss important issues from a global perspective. For more information visit [www.cigr.org](http://www.cigr.org)

The second one is the International Commission on Irrigation and Drainage (ICID), which was established in 1950. ICID, through its network of professionals spread across more than a hundred countries, has facilitated sharing of experiences and transfer of water management technology for over half-a-century. ICID supports capacity development, stimulates research and innovation and strives to promote policies and programs to enhance sustainable development of irrigated agriculture through a comprehensive water management framework. South Africa received international membership on the 1st January 1993, of the ICID and SAIAE was one of the founder members of the regional body, the South African National Committee on Irrigation and Drainage (SANCID). SAIAE is there for indirectly affiliated 20 years with CIGR in 2013. The 22nd International Congress on Irrigation and Drainage will take place from 14-20 September 2014, Gwangju Metropolitan City, Republic of Korea. For more information visit [www.icid.org](http://www.icid.org)

# Professionele Advieskomitee Aktiwiteite

Deur Johann Murray

Een van die dienste wat SAILI lede op 'n vrywillige basis lewer is om te dien op ECSA (Engineering Council of South Africa) se Professionele Advieskomitee (PAK) vir Landbou-Ingenieurswese. Hierdie PAK's (daar is nege – een vir elk van die nege hoof ingenieursdisiplines waaronder registrasie as professionele ingenieur gedoen kan word) word saamgestel uit Professionele Ingenieurs wat deur die relevante vrywillige assosiasie (in ons geval SAILI) genomineer en dan deur ECSA genooi word om vir 'n termyn van vier jaarop die PAK te dien. Die PAK moet saamgestel word uit minstens een verteenwoordiger van die akademiese personeel by 'n universiteit in Suid-Afrika, minstens twee wat betrokke is in private ingenieurspraktyk en minstens vier wie buite bogemelde twee velde aktief is. Hierdie minstens sewe lede moet almal spesifieke kennis en ervaring in die relevante ingenieursdisipline hê, ten einde reg te laat geskied aan die eweknie-evalueringsbeginsel. Alle aansoeke om professionele registrasie vanaf landbou-ingenieurs, word dus deur professionele landbou-ingenieurs ge-assesseer.

Die funksie van die PAK is kortliks die volgende:

- Oorweeg of aansoeke om registrasie as professionele ingenieur voldoen aan ECSA se Beleidsdokument R2/1A.
- Maak aanbevelings aan die ECSA Registrasiekomitee: Professionele Ingenieurs, insake aansoeke om registrasie.
- Skakel met die bedryf insake aspekte rakende die PAK se funksies.
- Gee aandag aan sodanige aspekte wat volgens die PAK se mening noodsaaklik is om sy funksies te vervul.

Dit word aanbeveel dat ingenieurstudente by afstudering onmiddelik by ECSA aansoek om registrasie as kandidaat-ingenieur doen. ECSA voorsien dan volledige dokumentasie (ook beskikbaar op ECSA en SAILI se webwerwe) wat vir die volledige opleidingsperiode benodig sal word. Dit sluit riglyne oor die volgende in: verantwoordelikhede van die werkgever; mentorskap en toesig; die byhou en opstel van opleidingsverslae; disipline spesifieke kern- en bykomende tegniese elemente waaraan voldoen en per opleidingsperiode oor verslag gedoen moet word; en die projekverslag wat uiteindelik saam met die aansoek om registrasie as Pr Ing ingedien moet word.

Die prosedure soos deur ECSA goedgekeur behels dat kandidaat-ingenieurs slegs na minstens drie jaar toepaslike ervaring opgedoen onder opleiding en toesig van een of meer geregistreerde professionele ingenieurs aansoek om registrasie kan doen. Dit word op gestandaardiseerde forms en teen betaling van die voorgeskrewe gelde gedoen. By ontvangs van die aansoek kontroleer ECSA of die aansoeker se akademiese kwalifikasie geakrediteer is en verwys dit daarna na die toepaslike PAK. By ontvangs daarvan word minstens vier lede deur die PAK toegewys om onafhanklik die aansoeker se ervaring te evalueer. Dit verg dat bepaal word of die aansoeker die vereisde bevoegdheidsvlak en professionele eienskappe soos gespesifiseer in Beleidsstuk R2/1A ontwikkel het, en indien wel, dan verklaar dat die kandidaat geskik is vir Professionele Onderhoud. Indien bevind word dat die kandidaat nie hiervoor gereed is nie, kan aanbeveel word dat die aansoek geweier word, of alternatiewelik dat uitstel verleen word vir die kandidaat om addisionele inligting te verskaf, of addisionele gepasde ervaring op te doen. Indien minder as drie gunstige of meer as een ongunstige aanbeveling van PAK lede ontvang word, word die aansoek na 'n vergadering van die PAK verwys. Andersins teken die PAK Voorsitter die aansoek af en word 'n Professionele Onderhoud gereël. Laasgenoemde behels 'n omvattende oorsig van die kandidaat se ingenieurservaring deur minstens twee PAK lede tydens 'n persoonlike onderhoud met die kandidaat. Na afloop van die onderhoud stel die onderhoudspan 'n verslag op wat saam met al die relevante aansoek dokumentasie aan al die PAK lede gestuur word vir moderering en 'n besluit tydens 'n PAK vergadering oor die registreerbaarheid van die kandidaat. Indien die meerderheid by hierdie vergadering saamstem met 'n aanbeveling dat die kandidaat geregistreer word, mag die PAK die kandidaat registreer en gee ooreenkomstig kennis aan die ECSA Registrasiekomitee. Dieselfde PAK vergadering oorweeg en bekragtig ook besluite ten opsigte van afkeurings al dan nie en toestaan van uitstel vir die indien van addisionele inligting, of opdoen van aanvullende ervaring, na gelang van wat die PAK se bevinding is.

Huidig is die tien lede van die PAK vir Landbou- Ingenieurswese Johann Murray (Voorsitter), Felix Reinders (Ondervoorsitter), Marna de Lange, Pieter de Witt, Dirk Lotter (tot Oktober 2013), Adriaan Louw, Dr Moses Marenya, Prof Jeff Smithers, Chris Stimie en At van Coller. In 2013 is 16 aansoeke oorweeg (die hoogste getal in baie jare), waarvan 12 geregistreer en die balans terugverwys is: twee vir addisionle ervaring en twee vir die indien van addisionele inligting.

Dit is interessant om daarop te let dat Landbou-Ingenieurswese tans die derde kleinste van die nege ingenieursdisiplines is met 197 geregistreerde professionele ingenieurs (insluitend nege vroue). Wat geregistreerde kandidaatingenieurs betref, is landbou-ingenieurswese die tweede kleinste ingenieursdisipline met 77 kandidaatingenieurs (insluitende vier vroue) wat by ECSA geregistreer is.

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## **News from ECSA**

**By Felix Reinders**

At its meeting on 22 November 2013, the ECSA Council approved the Policy for Identification of Engineering Work and the draft Identification of Engineering Work (IDoEW) regulations.

The purpose and objectives of ECSA's POLICY for the Identification of Engineering Work (IDoEW) includes but is not limited to:

- i. comply with legislative requirements;
- ii. protect the health and safety of the public by defining the engineering work that must be undertaken only by competent persons in each registration category and in a recognized engineering discipline of the Engineering Profession;
- iii. protect the natural environment;
- iv. provide for the IDoEW and the demarcation of work between categories of registration and engineering disciplines in the Engineering Profession,
- v. provide an effective and efficient mechanism for regulating the carrying out of work which occurs in areas of overlap between and duplication in the work identified as being reserved for Registered Persons in the different built environment professions;
- vi. ensure that there are clear and transparent ways for determining which identified work in engineering may be performed by Registered Persons in different categories of registration or in different engineering disciplines;
- vii. ensure the transparency of and accountability for the process of identification of work in engineering, and
- viii. achieve the economically, socially and technically most appropriate and efficient use of the various categories of registration in the built environment professions in South Africa with a view to attaining maximum benefit for the public.

The two documents are currently being reviewed by the Council for the Built Environment (CBE). As soon as the CBE has arrived at a decision, an update will be placed on the ECSA website. Further information can be accessed on [www.ecsa.co.za](http://www.ecsa.co.za)

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# Agricultural Engineering Final Year Design Projects at UKZN

By: Professors Jeff Smithers and Tilahun Workneh

Five design projects were undertaken by the 2013 Final Year Agricultural Engineering students from the discipline of Bioresources Engineering in the School of Engineering at the University of KwaZulu-Natal. These are summarized below.

## **1. Design, Construction and Performance Evaluation of a Sugarcane Moisture Content Detector**

Once cut, sugarcane stalks experience a loss of sucrose and moisture. This project was undertaken by Nosipho Gumede and Awonke Pikwa to design, construct and evaluate the performance of sugarcane moisture content detector. After experimentation, it was determined that the moisture content could be determined by measuring the electrical resistance between two probes, which are inserted into a sugarcane stalk. As shown in Figure 1, a frame was designed to clamp the cane stalk in place and for the probes to be inserted into the cane at user selected locations and depths and for the resistance to be measured between the probes. During evaluation, it was found that the electronic measuring system took longer than anticipated to stabilize, but a good relationship was obtained between the electrical resistance of sugarcane which had been burnt prior to harvest and the moisture content of the sugarcane. However,, the relationship between electrical resistance and moisture content was much weaker for green harvested sugarcane and hence no universal calibration equation was determined.



**Figure 1 - Sugarcane moisture detector**

## **2. Design, construction and Performance Evaluation of Thermoelectric Cooling**

Morapeli Mohapi and Donald Zulu investigated environmentally friendly cooling technologies to enhance the shelf life of milk. The objectives of their project were to design, construct and measure the efficiency and performance of a thermoelectric cooling system for cooling milk, which is to be used for demonstration purposes. Ten litres of product (milk) was to be cooled from of 37<sup>0</sup>C to 2<sup>0</sup>C in 3 hours. The system designed and constructed is shown in Figure 2. From the assessment it was determined that cooling could be achieved in 1.5 hours and the calculated efficiency of the Peltier device was 9.14% of the Carnot efficiency.



Figure 2 - Thermo-electric cooling demonstration system

### 3. Development of a Portable On-farm Bio-char Manufacturing Unit

The application of bio-char can improve soil productivity and reduce the need for fertilizer. The objectives of the project undertaken by Maesela Kekana and Khayelihle Zungu were to design, construct and evaluate the performance of a portable on-farm bio-char manufacturing unit which could process sugarcane trash from 1 ha in 30 days. The system designed is shown in Figure 3. The need to control the rate of burning in the combustion chamber which provides heat to the pyrolysis chamber was evident during the evaluation and the required pyrolysis temperature of 400 °C could not be sustained using the calculated volume of trash, but a thermal efficiency of 68% was achieved after controlling the rate of combustion.



Figure 3 - Biochar manufacturing unit

#### 4. Design, Construction and Performance Evaluation of a Three-point Hitch Dynamometer

The objectives of the project undertaken by Robyn Johnson and Jac Aldous were to design, construct, calibrate and evaluate a three-point hitch dynamometer for use on Category II tractors. The dynamometer is necessary to measure forces between a tractor and a semi or fully mounted implement and should allow operation of the PTO during measurement, as shown in Figure 4. Both the frame and L-shaped transducers were designed for 130 kN horizontal forces. Due to limitations in the available equipment to load the design forces, calibration of the dynamometer was not successfully achieved.

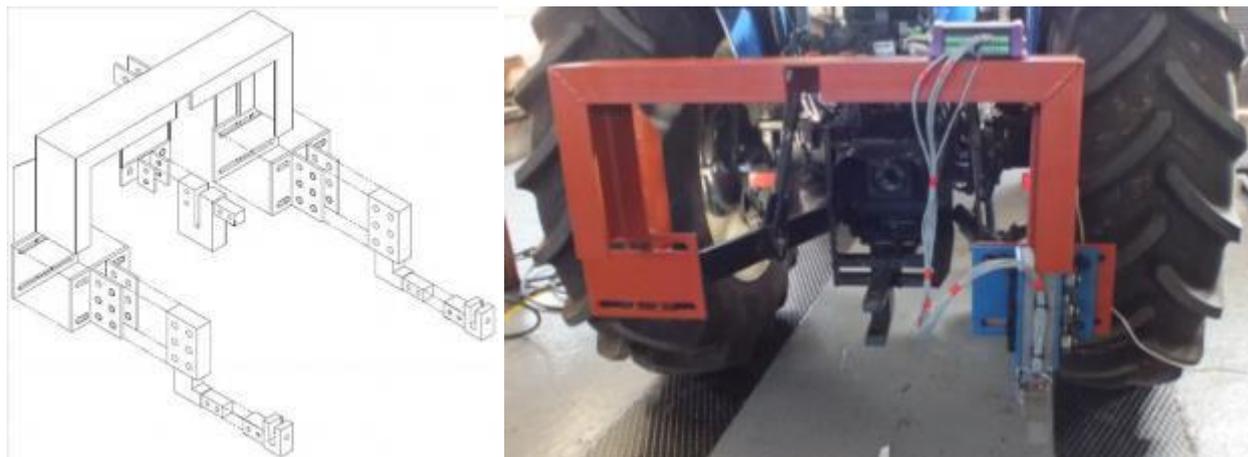


Figure 4 Schematic diagram and constructed 3 point hitch dynamometer

#### 5. Development of a Small Scale Dryer for Fruit and Vegetables Dehydration with a Hybrid Energy Source

Kgaugelo Morake and Sellwane Mofokeng undertook the design, construction and evaluation of the efficiency of a hybrid dryer and to determine the drying characteristics of *amadumbe*. The solution adopted and constructed is shown in Figure 5. The evaluation of the system indicated that the solar collector increased the temperature by 18.96 °C and the biomass stove increased the temperature by 22.8 °C. This resulted in the drying of the *amadumbe* from a moisture content of between 65-70% to a moisture content of 10-15% in 12.5 hours which was 8.3 hours shorter than the time required for sun drying and the drying characteristics of the produce was also assessed after drying.

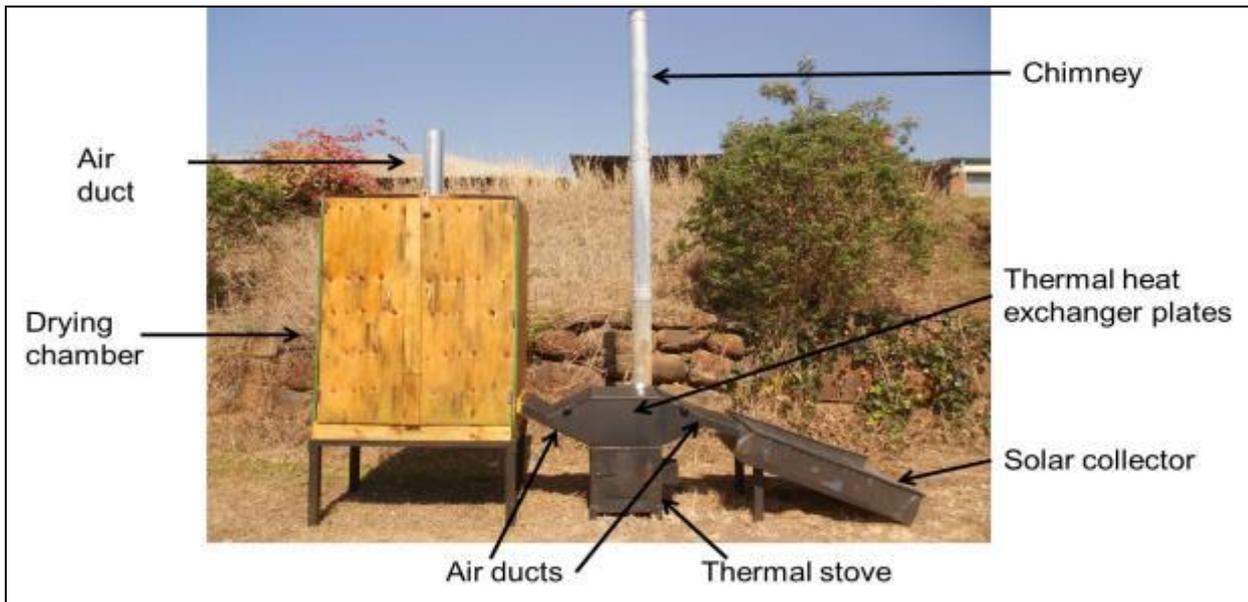


Figure 5 Hybrid-dryer

**Awards Made to Agricultural Engineering Students in the School of Engineering at the University of KwaZulu-Natal**

SAIAE made awards to the following students based on their academic performance in 2012:

Award	Student
Best 1 <sup>st</sup> year Agricultural Engineering student at UKZN in 2012	Jonathan Kirkman
Best 2 <sup>nd</sup> year Agricultural Engineering student at UKZN in 2012	Nathan Bernstein
Best 3 <sup>rd</sup> year Agricultural Engineering student at UKZN in 2012	Robyn Johnson
Best final year Agricultural Engineering student at UKZN in 2012	Bryan Rees

The awards for the best final year design project in 2013 were made to:

Award	Students	Project
MBB prize for the best final year design project	Robyn Johnson and Jac Aldous	Design, construction and performance evaluation of a three-point hitch dynamometer
SAIAE shield for the best final year design project		

**Congratulations to these students!**



## Establishing a SIAIE branch in the Western Cape

**Western Cape Branch becomes active  
by Kobus Oosthuizen**

The Western Cape branch of SIAIE has been inactive for more than 5 years. The need for such a gathering of approximately 42 registered Engineers in the Cape Town area were still evident and to keep a link with SIAIE on several issues that affects the Agricultural Engineering profession. The requirements for CPD points and re-registration of professional engineers also fuelled the need. Such an event was launched again on 12 November 2013 when the Western Cape branch of SIAIE was re-instituted by the President Isobel van der Stoep.

The event was attended by 14 members and a new Brach Committee was elected. Peter Keuck (Chairperson), Kobus Oosthuizen and Matthys Saaiman will form the new Committee. The event was also blessed by the attendance of Mr Charles Crosby, now 88 years young, but still actively supporting the SIAIE activities and a mind as sharp as ever. Several well-known members of SIAIE, now residing in Cape Town area attended.

Two presentations were made the one was done by Kobus Oosthuizen on the rollout and strategies employed for the rollout of the Governmental Mechanization scheme in the Western Cape. Kobus is employed by **Casidra**, an implementing agent for the Western Cape Department of Agriculture and were responsible for the distribution and management of the 72 tractors and implements. The other one was made by Felix Reinders on the recent First World Irrigation Forum that was held in Mardin, Turkey. The evening was closed off with a, now traditional, wine and snacks and enthusiastic conversations on the activities of members over the 50 years of SIAIE, leading to the much anticipated celebrations in 2014.



**Western Cape Branch meeting with SIAIE President Isobel van der Stoep**

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## KZN Branch Report

**By Ashiel Jumman**

The KZN branch of SIAIE/SAILI held its fourth branch meeting on 23 October 2013. The Agenda included the AGM and presentation of design projects by the final year UKZN Agricultural engineering students. The student design projects has become the flagship event for the KZN branch and attracted 103 attendees, including KZN branch members, members of SIAIE/SAILI National council, parents and fellow UKZN students.

The five projects presented this year included:

Project title	Project team
Design, construction and performance evaluation of a sugarcane moisture content detector	Nosipho Gumede Awonke Pikwa
Design, construction and performance evaluation of thermoelectric cooling	Morapeli Mohapi Donald Zulu
Development of a portable on-farm biochar manufacturing unit	Maesela Kekana Khayelihle Zungu
Design, construction and performance evaluation of a three-point hitch dynamometer	Robyn Johnson Jac Aldous

SAIAE/SAILI president, Isobel van der Stoep, was on hand to deliver the best Final Year Design Project award to Miss Robyn Johnson and Mr Jac Aldous for their project titled “*Design, construction and performance evaluation of a three-point hitch dynamometer*”. The following SAIAE/SAILI Council awards were made as well: Best 1<sup>st</sup> Year Agricultural Engineering student in 2012 to Mr Jonathan Kirkman, Best 2<sup>nd</sup> Year Agricultural Engineering student in 2012 to Mr Nathan Bernstein, Best 3<sup>rd</sup> Year Agricultural Engineering student in 2012 to Miss Robyn Johnson, and the Bronze medal for Best 4<sup>th</sup> Year Agricultural Engineering student in 2012 to Mr Bryan Rees. The best Final Year Design Project team also received an award from MBB Consulting Engineers (Pietermaritzburg) presented by Mr Mark Zartmann.

The KZN branch reflected a healthy state and also welcomed two new members to the, now, 10 strong committee.

Ashiel Jumman	SASRI	Chairperson
Pranesh Moodley	MBB	Treasurer
Alaika Kassim*	UKZN (MSc Student)	Secretary
Aidan Senzanje	UKZN	
Tilahun Seyoum Workneh	UKZN	
Gareth Lagerwall	UKZN	
Samantha Moodley	Jeffares and Green	
Alain Marechal	LIMA	
Chikondi Dlamini	UKZN (Student Rep)	
Mervyn Hansen**	UKZN	

\*New members

\*\*Nominated shortly after the AGM

The evening was once again an overwhelming success for the KZN branch. Finally, the KZN committee would like to acknowledge and offer their gratitude to the sponsors, Illovo Sugar, Delaval and Bosch Stemele, for supporting the event.

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## **Membership matters**

### **New members**

**We would like to welcome the following new members to the Institute:**

Dr EYH Bobobee	Member
Mr MS Frezghi	Member
Mr SM Mabyo	Graduate
Mr MF Monyepao	Graduate
Mr TK Onkay	Member
Mr EK Black	Member
Mr SE Buthelezi	Graduate

Mr R Chihwehwete	Member
Me K Mugodo	Graduate
Mr M Maripa	Member
Mr D Tagwi	Member

## Resignations

**The following Members and Fellows have resigned from SAIAE:**

Dr MS Basson	Fellow
Mr PR Lotz	Member
Mr PP Potgieter	Member
Mr FD Swart	Fellow

**The following Fellow has retired from SAIAE:**

Mr TJA Willems	Fellow
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## Deceased

Mr A Rennie	Fellow
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It was with great sadness that we received the news of Alick Rennie's tragic death in an airplane accident on 4 December 2013. Alick (54) was a senior engineer with MBB Consulting Engineers in Pietermaritzburg and had extensive experience in the design, construction and safety evaluation of earth dams. He had worked widely in the sugar industry and on numerous large projects undertaken in Africa. He held a commercial pilot's license and was a flying instructor, an interest which was put to good use with his involvement in the development of a number of aviation related activities such as the development of an aerial photography and videography system for various uses such as project control, information mapping and GIS base images. Our sincere condolences go out to his family and colleagues.

## General

Members are reminded to send through proof of payment of membership fees. When making payments, please use the invoice number, or the first three letters of your surname together with the number as shown under "Rekening/Account" on the invoice, as reference for the transaction, as this makes it possible for the secretariat to trace payments from the bank statement.

The secretariat wishes to remind members that when they reach retirement age, they are welcome to apply to change their membership to the Pensioner category which has lower annual fees than the active member and fellow categories.

For any administrative or financial queries, please contact Rika Reinders in the SAIAE office on (012) 842-4043 (Mon & Fri 09:00-13:00).

## CPD Event – Making sense of complex and messy problems

Engineers and practitioners in many disciplines often encounter ill-defined and messy problems that involve a large number of complex and interconnected issues. This creates the risk that the problem may be inappropriately understood and solved. This CPD will draw from a wealth of knowledge concerning complexity theory, graph theory and

studies done in technology adoption and sugarcane supply chains. The aim is to equip delegates with a full suite of problem solving tools, which will include:

1. The correct learning philosophy,
2. Powerful software (which will be distributed to delegates free of charge), and
3. A tool box of approaches, such as theme maps and domain maps that will help practitioners to deal with complex problems.

The CPD event is well suited for people who need to find working solutions in an environment where soft social issues and environmental trade-offs need to form part of the solution. During the CPD event delegates will be given the opportunity to work through their own problem areas under the guidance of the facilitators.

Programme:

1. An introduction to graph theory, complexity and problem solving within complex systems
2. Exploratory interviews and data analyses (including exercises)
3. An introduction to domain maps and theme networks
4. Exercises in domain maps and theme network compilation
5. Pajek network analyses software training
6. An exercise on delegates' own data and interpretations

Date: 18 March 2014 (full day)

Venue in Pietermaritzburg to be announced

Cost: R770 per delegate

Questions can be directed to Carel Bezuidenhout:

bezuidenhoutc@ukzn.ac.za

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