


**2018 ANNUAL REPORT**

**CENTER FOR RESEARCH IN INFORMATION AND CYBER SECURITY  
(CRICS)**

**Faculty of Engineering, the Built Environment and Information Technology**

Entity Leader: Prof Reinhardt A Botha

This annual report and the audited financial statement were approved by the Faculty Board on the _____ day of _____ 2019			
	Print name	Signature	Date
Entity leader	Prof R A Botha		
Finance	Mr Rheinard van Onselen		
Chairperson of Advisory Board (If applicable)	Prof D Pottas		
Chairperson: Faculty RTI Committee	Prof D Pottas		
Dean	Prof O Franks		
DVC: RE (when applicable)			

## 1. Mission / purpose

The general objective/purpose of CRICS will be to address all types of activities that can assist in enhancing information and cyber security in general. Obviously one of the main goals is to be very academic and research inclined. Postgraduate research and research papers as outputs will play an important role. Along with this, activities to assist and enhance information and cyber security in the community, the government, corporates, etc. will take place. A number of projects are already taking place, such as; assisting schools to educate children, organizations to raise security awareness, policy proposals to governmental departments, etc. Thus, the goal of CRICS is to ensure all of these activities are taking place from one coordinating body, namely CRICS

### 1.1 Alignment with vision and mission of the NMMU

The security of information and cyber related services are truly multi-disciplinary in nature. CRICS functions in close relationship with the NMMU's Institutional Research Theme called "Cyber Citizenship". CRICS aims to focus primarily on the security aspects related to Cyber

## 2. Governance structures

During 2018 CRICS established a new Advisory Board consisting of;

- Dean/Deputy Dean – Dr Oswald Franks / Prof Dalenca Pottas
- DoS – Dr Sue Petratos
- Director of CRICS – Prof Reinhardt A Botha
- Mr Samrej Ramjith – Partner, Cybersecurity, E&Y
- Mr Agbor Kande – CIO, SA Postbank
- Ms Susan Potgieter – Head: Relationship Management, SABRIC
- Mr Gustav d'Assonville Manager, Technology Advisory: Eastern Cape, KPMG
- Mr Jaco Maass – General Manager Information & Communication Technology, BKB
- Dr Noxi Gciza – Cybersecurity Researcher, CSIR.
- Dr Jackie Phahlamohlaka – Competency Area Manager, DPSS, CSIR.
- Mr Nick Hall – Senior Security Engineer, Dimension Data

Similarly we broadened the Management Committee Structure to include senior staff member in CRICS.

CRICS Management Committee:

- Director of CRICS – Prof Reinhardt Botha
- DoS – Dr Sue Petratos
- Senior staff members in CRICS – Profs Lynn Futcher, Mariana Gerber and Kerry-Lynn Futcher

### 2.1 Governance Structure meetings

The previous Advisory Board was dissolved and nomination for the new Advisory Board accepted through a round robin e-mail process between 22 and 23 October 2019. The new Advisory Board held its first meeting on 23 November 2019 and was chaired by Prof Pottas.

The CRICS Management Committee met on 3 occasions:

- 29 Jan 2018
- 26 Feb 2018
- 16 July 2018

### 3. Staff Members

The following staff members are part of CRICS, but are full-time staff members in the School of ICT.

- Prof Reinhardt Botha
- Prof Johan van Niekerk (until 31 July 2018)
- Prof Kerry-Lynn Thomson
- Prof Mariana Gerber
- Prof Lynn Futcher
- Mr Luzuko Tekeni
- Mr Phumezo Ntlatywa (from December 2018)
- Mr Vuyolwethy Mdunyelwa (from October 2018)
- Mr Timothy Speckman (from October 2018)

The following Emeritus & HEAVA professors and Research Associates are involved with CRICS:

- Prof Rossouw von Solms, Emeritus Professor
- Prof Steve Furnell (University of Plymouth)
- Prof Johan van Niekerk (Noroff University College, Norway)
- Dr Noxi Gcaza (CSIR)
- Dr Renier van Heerden (CSIR)

#### 3.1 Human resources issues

The Director of CRICS, Prof Rossouw von Solms, retired at the end of January 2018. Prof von Solms will remain somewhat involved as an Emeritus Professor.

Prof Johan van Niekerk, resigned and emigrated to Norway in August 2018. He has been appointed as an Honorary Professor, and will remain active in supervisory capacity with students

Discuss any human resources matters, as appropriate – for example, staff turnover, resignations, appointments *etc.*

## 4 Goals / targets for the year under review

### 4.1 Statement of goals / targets

CRICS's objectives:

- To draw together and host the research efforts and endeavours related to information and cyber security;
- To conduct and disseminate research in the fields of Information and Cyber Security, and
- To engage with governmental, public and private organizations and society at large towards the implementation of safe and secure information and cyber security practices.

Typical outputs related to the objectives stated above:

- To operate, function and be known as an internationally renowned research group in the area of information and cyber security;
- To supervise and successfully graduate as many as possible post-graduate students in the aforementioned fields;
- To publish as many related research publications through: journal papers, conference

papers and contributions to books.

## **4.2 Strategies employed to achieve goals/target**

Typical strategies and actions employed to meet objectives:

- To attract quality post-graduate students, both from within the NMMU as well as from outside the NMMU (mostly part-time students);
- To create a favorable and stimulating on-campus atmosphere for post-graduate students (e.g. a modern laboratory/office environment);
- To ensure a healthy relationship exist between the supervisors and students (e.g. Café Gigabyte – post-graduate student and supervisor cafeteria);
- To build and maintain a healthy, pleasant and focused group culture between senior members of CRICS;
- To create opportunities for post-graduate students to grow and excel with respect to their research experience (e.g. weekly research colloquiums);
- To keep close relationships with other information and cyber security research groups, both nationally and internationally (e.g. at UNISA, UJ and Plymouth).

## **4.3 Output**

The output of CRICS mainly comprise:

- Publications in peer-reviewed outlets
- Graduation of post-graduate students

Please see Appendices A and B for details.

## **4.4 Self-assessment of achievement of goals/targets**

Studying Appendices A & B it is clear that CRICS did well from a quantitative point of view.

From a qualitative point of view it is also clear and noticeable that the full-time (on campus) post-graduate students related to CRICS are a happy group of students, enjoying their studies whilst progressing well. The underlying and mutual group dynamics amongst CRICS students and between students and supervisors are ensuring a healthy and productive atmosphere that enhances success.

With the departure of two senior staff member the remaining senior staff members are taking strain, but the appointment of new staff will in the long run hopefully address that. The new staff need to be brought to PhD-level to have the biggest impact.

## **5. Highlights and special achievements**

10 journal papers and 4 papers in conference proceedings were published in 2018 and submitted for DHET subsidy purposes.

## **6. Finances**

### **6.1 Financial review**

CRICS has no specific funding resources. The funding used to conduct the business related to CRICS all stem from research entities related to the members of CRICS.

In all cases the individual research, incentive funding (NRF rated members), Thuthuka and engagement entities were used to fund all CRICS related research and engagement-related

financial expenses. All of these expenses are dependent on normal NMMU rules & regulations.

Entities applicable are:

Prof Mariana Gerber: H248 & M011  
Prof Reinhardt Botha: H232, H254 & M038  
Prof Kerry-Lynn Thomson: G470 & L243  
Prof Lynn Futcher: H363 & L280

Prof R von Solms: H223, M037 & N263  
Prof Johan van Niekerk: H344, M027 & 3502

CRICS was allocated the cost centre H988. It started 2018 with an amount of 20124.90 that remained untouched for 2018.

## **6.2 Financial statements**

See attached financial statements for cost centre H988 as Appendix D.

## **7. Additional information**

N/A

## **8. Mandatory Summary for Senate**

CRICS primarily contribute through post-graduate supervision and research publications . In total 10 journal publications and 4 conference papers were published during 2018. Six (6) master's students that graduated in April and December 2018 were supervised by CRICS members.

The annual report must be DATED AND SIGNED by the Director, Manager or Head of the Entity, the Chairperson of the Governance Structure, and the Dean.

**ANNEXURE A  
RESEARCH OUTPUTS/ACTIVIES (2018)**

<b>OUTPUTS/ACTIVITIES</b>	<b>NO</b>	<b>DETAILS</b>	<b>STAFF INVOLVED</b>	<b>OTHER (Specify)</b>
<b>JOURNAL ARTICLES</b>				
International indices (ISI & IBSS)	10	Appendix B		
DoE list of South African Journals				
Other Peer-reviewed Journal Articles				
<b>CONFERENCES</b>				
International Conferences (Published Papers)	4	Appendix B		
National Conferences (Published Papers)				
International Conference (presented but not published papers)				
National Conference (presented but not published papers)				
International Conferences (only attended)				
National Conferences (only attended)				
<b>BOOKS AND BOOK CHAPTERS</b>				
Books				
Book chapters				
<b>RESEARCH REPORTS</b>				
<b>CREATIVE OUTPUTS</b>				
<b>POST-GRADUATE QUALIFICATIONS COMPLETED</b>				
<b>MASTERS COMPLETED</b>				
Masters by Coursework and Treatise				
Masters by Research	6	Appendix B		
<b>DOCTORAL DEGREES COMPLETED</b>				
	0			

<b>HUMAN CAPITAL DEVELOPMENT</b>				
Emerging (Staff & PG Students)	40	Appendix C		
Established Researchers	4			
<b>ACADEMIC ENGAGEMENT</b>				
<b>GRANTS RECEIVED</b>				
<b>KNOWLEDGE PRODUCTS</b>				
Intellectual Property				
IP Commercialisation				
Disclosures				
<b><u>OTHER</u> (Specify)</b>				

## Appendix B

### CRICS Outputs for 2018

(CRICS staff indicated in bold)

#### ARTICLES PUBLISHED IN DHET ACCREDITED OUTLETS

B von Solms & **R von Solms**. “Cyber Security and Information Security – What goes where?”, Information and Computer Security. Vol 26, Issue 1, pages 2 – 9, 2018.

P Delport & **R von Solms**. “Governing ICT: Why, What and How”, Advanced Science Letters. Vol 24, No 4, pages 2230 – 2234, 2018.

N Sohrabi Safa, C Maple, T Watson & **R von Solms**. “Motivation and opportunity-based model to reduce information security insider threats in organisations”. Journal of Information Security and Applications (JISA). Vol 40 (June 2018), pages 247 – 257, 2018.

M Sibanda & **R von Solms** “Criteria towards Sound Information Technology Governance”, Advanced Science Letters, Vol 24, No 12, pages 9274 – 9278, 2018.

W. Janse van Rensburg, **K Thomson & L. Futcher**, “Factors Influencing Smartphone Application Downloads” IFIP AICT 531, pp. 81–92, 2018. [https://doi.org/10.1007/978-3-319-99734-6\\_7](https://doi.org/10.1007/978-3-319-99734-6_7)

S von Solms & **L. Futcher**, L. “Identifying the Cybersecurity Body of Knowledge for a Postgraduate Module in Systems Engineering”, IFIP AICT 531, pp. 121–132, 2018. [https://doi.org/10.1007/978-3-319-99734-6\\_10](https://doi.org/10.1007/978-3-319-99734-6_10)

A.T. Kandeh, **R.A. Botha & L.A. Futcher**. “Enforcement of the Protection of Personal Information (POPI) Act: Perspective of data management professionals”, South African Journal of Information Management 20(1), a917. <https://doi.org/10.4102/sajim.v20i1.917>

**K. Thomson and J. van Niekerk**. “Towards Culturally Sensitive Policy: Africanising Approaches to Prevent Social Engineering”, Advanced Science Letters, 24, 2499–2503 (2018) <http://www.ingentaconnect.com/content/asp/asl/2018/00000024/00000004/art00077>

R.G. Leppan, **R.A. Botha** and **J. van Niekerk**. “Process Model for Differentiated Instruction Using Learning Analytics” South African Computer Journal, Volume 30, No 2.

Z Manjezi and **R.A Botha**. “Preventing and Mitigating Ransomware” In: Venter H., Looock M., Coetzee M., Eloff M., Eloff J. (eds) Information Security. ISSA 2018. Communications in Computer and Information Science, vol 973. Springer, Cham <https://doi.org/10.1007/978-3-030-11407-7>

#### CONFERENCE PAPERS PUBLISHED IN PEER-REVIEWED PROCEEDINGS

S Koekemoer & **R von Solms**. “Document Management Systems – Legislative Compliance, Good Governance and Municipal Practice”, IST-Africa 2018, Gaborone, Botswana, May 2018.

R Maharaj & **R von Solms**. “Social Networking: A Tool for Effective Cybersecurity Education in Cyber-Driven Financial Transactions”, 12<sup>th</sup> International Symposium on Human Aspects in Information Security and Assurance (HAISA 2019), Dundee, Scotland, August 2018.

W. Janse van Rensburg, **K Thomson & L. Futcher**. “An Educational Intervention Towards Safe Smartphone Usage” Proceedings of the 12th International Symposium on Human Aspects of Information Security & Assurance, August 2018, Dundee, Scotland

D. von Schoultz, **K Thomson** and **J van Niekerk**. “A Personal Informatics Approach for Academic Internet Self-efficacy in a South African University” IFIP TC 3 – Open Conference on Computers in Education, June 2018



## **2018 GRADUATES**

### **APRIL 2018**

#### **B Coetzee**

LESSONS FROM IMPLEMENTING FEDERATED IDENTITY MANAGEMENT WITHIN RESEARCH AND EDUCATION SECTOR

Supervisor: Prof RA Botha

#### **D Fredericks**

USERS' PERCEPTIONS REGARDING PASSWORD POLICIES

Supervisor: Prof L Futcher

Co-supervisor: Prof KL Thomson

#### **L Rheeder**

A FRAMEWORK FOR SELECTING NOSQL DATABASES: A NETFLOW USE CASE

Supervisor: Prof RA Botha

#### **Z Webster**

AN INFORMATION SECURITY GOVERNANCE MODEL FOR INDUSTRIAL CONTROL SYSTEMS

Supervisor: Prof RA Botha

### **DECEMBER 2018**

#### **N Scharnick**

GUIDELINES FOR THE P[ROTECTION OF STORED SENSITIVE INFORMATION ASSETS WITHIN SMALL, MEDIUM AND MICRO ENTERPRISES

Supervisor: Prof M Gerber

Co-supervisor: Prof L Futcher

#### **O Yekela**

TOPIC MAP FOR NETWORK SECURITY COMPETENCIES

Supervisor: Prof KL Thomson

Co-supervisor: Prof J van Niekerk

## Appendix C

### Student demographics for 2018

40 students were registered and under the supervision of CRICS staff. The demographic spread is as follows:

	MIT	MPhil	PhD	<b>Total</b>
Black	17	2	5	<b>24</b>
Indian	2	0	0	<b>2</b>
White	8	1	5	<b>14</b>

	Male	Female
MIT	21	6
MPhil	1	2
PhD	9	1
<b>Total</b>	<b>31</b>	<b>9</b>

## INCOME STATEMENT OF CRICS

ENTITY NAME : CRICS VON SOLMS

ENTITY LEADER : Prof R Botha

COST CENTRE(S) : H988

INCOME STATEMENT FOR PERIOD : 2018 2017

Opening Balance 20 125 20 127

**INCOME**

Private grants

-	-
-	-

**EXPENDITURE**

Salaries

Operating Expenses

-	2
-	2

Closing Balance 20 125 20 125

Signed off by Finance Dept.

Name :

Rheinard van Onselen  
Accountant Research and Third Stream Income

Signature :