

2019 ANNUAL REPORT

Entity Name: CENTER FOR RESEARCH IN INFORMATION AND CYBER SECURITY (CRICS)

Entity Leader: PROF RA BOTHA

Faculty: ENGINEERING, THE BUILT ENVIRONMENT AND TECHNOLOGY

This annual report and the audited financial statement were approved by the Faculty Board on the _____ day of _____ 2020.			
	Print name	Signature	Date
Entity leader	Reinhardt Botha		
Finance	Rheinard van Onselen		
Chairperson of Advisory Board (If applicable)	Prof Dalenca Pottas		
Chairperson: Faculty Board/ Faculty RE Committee	Prof Dalenca Pottas		
Dean	Dr Oswald Franks		
DVC: RII (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 cybersecurity in general. 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 cybersecurity in the community, the government, corporates, etc. will take place. 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 Nelson Mandela University (NMU)

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

2. Governance structures

The **CRICS Advisory Board** consists 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 (changed jobs during 2019, now with ABSA)
- Mr Agbor Kandeh – 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 Gcaza – Cybersecurity Researcher, CSIR. (changed jobs during 2019, now with TUT)
- Dr Jackie Phahlamohlaka – Competency Area Manager, DPSS, CSIR.
- Mr Nick Hall – Senior Security Engineer, Dimension Data

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

- No CRICS Advisory Board meetings were held during 2019.

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 Kerry-Lynn Thomson
- Prof Mariana Gerber
- Prof Lynn Futcher
- Mr Luzuko Tekeni

- Mr Phumezo Ntlatywa
- Mr Vuyolwethy Mdunyelwa
- Mr Timothy Speckman

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

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

3.1 Human resources issues

CRICS' consist of 8 staff members whose primary research interests are information and cyber-security. Four of the eight is yet to obtain their PhDs. 2 senior staff members left during 2018, and while they remain involved as Emeritus and Honorary professors respectively, they left a big void in CRICS and the School of IT.

The creation of new programmes and the shift over to a new qualification structure put a heavy burden on staff in CRICS, who receive no support (or incentive) to be involved in CRICS. It comes as no surprise then that CRICS activities often are moved to the wayside as they are considered secondary. Furthermore, lecturing load on team members, specifically those who need to complete their PhDs, makes it extremely challenging to show progress.

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 cybersecurity;
- 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 cybersecurity 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 cybersecurity;
- 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 Nelson Mandela University as well as from outside the Nelson Mandela University (mostly part-time students);
- To create a favourable 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 cybersecurity research groups, both nationally and internationally (e.g. at UNISA, UJ and Plymouth).

4.3 Outputs generated

The output of CRICS mainly comprise:

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

Please see Annexures 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: 7 journal papers, 5 conference papers, 5 Masters graduates and 1 PhD graduate.

4. **Highlights and special achievements**

Some other **activities** worth mentioning:

- Prof von Solms wrote a series of short Afrikaans articles (“Veilig in die Kuber-wêreld”) that has been published in the Mosselbay Advertiser, and the George Herald. He has also recorded the series, and these were played through the following community radio stations: Radio Namaqua (Vredendal), Med FM (Bloemfontein) & Luister FM (Port Elizabeth).
- On 19 June 2019 we hosted an ISACA Chapter meeting in PE.
- On 22 October 2019 Prof Wim von Grembergen an world-renowned expert in IT Governance that has been involved in the development of COBIT presented a talk entitled “What’s New with COBIT 2019: a Critical Review” as part of a joint IITPSA & ISACA event.
- Mr Vuyo Mduyvelwa was invited to present his research at the 4th BRICS Young Scientist Forum.
- Prof Lynn Futchter is chair of the IFIP Working Group 11.8 on Information Security Education
- Prof Kerry-Lynn Thomson is chair of the IFIP Working Group 11.12 on Human Aspects of Information Security and Assurance

In addition CRICS members received the following **awards**:

- Prof Rossouw von Solms received the Distinguished Service in ICT Award for 2019 from IITPSA for “Outstanding contribution in the field of information security and determination to instill a culture of e-safety through education.”
- Profs Mariana Gerber and Reinhardt Botha received a 2019 ISACA Contribution Award on behalf of CRICS.

5. Finances

5.1 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 Nelson Mandela University rules & regulations.

Entities applicable are:

Prof Mariana Gerber: H248 & M011
Prof Reinhardt Botha: H232, H254 & M038
Prof Kerry-Lynn Thomson: G470 & L243
Prof Lynn Fletcher: 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 2019 with an amount of 20124.90 that was mostly used for student assistance. The amount of R 744.75 remained at the end of 2019.

5.2 Financial statements

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

6. Additional information

N/A

7. Mandatory Summary for Senate

CRICS primarily contribute through post-graduate supervision and research publications . In total 7 journal publications and 5 conference papers were published during 2019. During 2019 5 Master's and 1 PhD graduated.

The annual report must be DATED AND SIGNED by the Chairperson of the Advisory Board (if applicable), Faculty Board, Dean, and Director of the research entity.

**ANNEXURE A
RESEARCH OUTPUTS/ACTIVIES (2019)**

OUTPUTS/ACTIVITIES	NO	DETAILS	STAFF INVOLVED	OTHER (Specify)
JOURNAL ARTICLES				
International indices (ISI & IBSS)	7	See App B	4	
DoE list of South African Journals				
Other Peer-reviewed Journal Articles				
CONFERENCES				
International Conferences (Published Papers)	4	See App B	3	
National Conferences (Published Papers)	1	See App B	1	
International Conference (presented but not published papers)	1	See App B	3	
National Conference (presented but not published papers)				
International Conferences (only attended)				
National Conferences (only attended)				
BOOKS AND BOOK CHAPTERS				
Books				
Book chapters				
RESEARCH REPORTS				
CREATIVE OUTPUTS				
POST-GRADUATE QUALIFICATIONS COMPLETED				
MASTERS COMPLETED				
Masters by Coursework and Treatise	2	See App B	2	
Masters (full research)	3	See App B	3	
DOCTORAL DEGREES COMPLETED				
	1	See App B	2	

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

ANNEXURE B DETAILS OF RESEARCH OUTPUTS

Journal outputs:

Sibanda, M. and von Solms, R. (2019) *Devising a strategy for IT governance implementation in municipalities. A case study of South Africa*. Electronic Journal for Information Systems in Developing Countries, 85(2)

Tsokota, T., von Solms, R. and van Greunen, D. (2019) *The reticent effect of ICT on tourism: A case study of Zimbabwe*. African Journal of Hospitality, Tourism and Leisure, 8(3)

K Renaud, K., von Solms, B. and von Solms, R. (2019) *How does Intellectual Capital align with Cyber Security*. Journal of Intellectual Capital, 20(5), 621 - 641.

Mdunyelwa, V., Futchter, L. and van Niekerk, J. (2019) *An Educational Intervention for Teaching Secure Coding Practices*. L. Drevin and M. Theocharidou (Eds.): WISE 2019, IFIP AICT 557, pp. 3–15, 2019. https://doi.org/10.1007/978-3-030-23451-5_1

Bishop, M., Dark, M., Futchter, L., van Niekerk, J., Ngambeki, I., Bose, S. and Zhu, M. (2019) *Learning Principles and the Secure Programming Clinic*. L. Drevin and M. Theocharidou (Eds.): WISE 2019, IFIP AICT 557, pp. 16–29, 2019. https://doi.org/10.1007/978-3-030-23451-5_2

Coetzee, B. and Botha, R.A. (2019) *The Internet of Things: The Disclosure Paradox*. Journal of Engineering and Applied Sciences, Volume 14, No 6, pp. 9321 – 9325.

Thomson, K., Futchter, L. & Gomana, L. (2019) *Towards a Framework for the Integration of Information Security into Undergraduate Computing Curricula*. South African Journal of Higher Education, pp. 155-175, 33(3)

Conference papers

Von Solms, R. (2019) *MPhil in IT Governance – A postgraduate qualification for all*. IST-Africa 2019, Nairobi, Kenya, May 2019.

Koekemoer, S & von Solms, R. (2019) *Deficient Governance Practices, Adverse Audit Findings, Financial Vulnerable Municipalities and Service Delivery Protests – Does the 4th Industrial Revolution hold the Solution to Sustainable Basic Service Delivery in South Africa?* 19th Annual Conference of the South African Association of Public Administration and Management (SAAPAM), Nelspruit, May 2019.

Scholtz, B. & Futchter, L. (2019). *An Investigation into Best Practice Approaches for Computing Research Programmes in South Africa*. Proceedings of the 48th Annual Conference of the Southern African Computer Lecturers' Association (SACLA 2019),

Manjezi, Z. and Botha, R.A. (2019) *From Concept To Practice: Untangling The Direct-Control Cycle*, Proceedings of ICICM 2019, Prague, Czech Republic, 23 – 26 August 2019.

Mxoli, A., Mostert, N. and Mariana Gerber *Guidelines for secure cloud-based Personal Health Records*. Proceedings of the Conference on Information Communications Technology and Society (ICTAS 2019), 6-8 March 2019, Durban, South Africa

Abstract Presented

Mdunyelwa, V., Futchter, L. and J van Niekerk, J. *A Framework for the Technology Enhanced Teaching of Secure Coding Practices to Address Web Application Vulnerabilities in the .Net environment*. 4th BRICS Young Scientist Forum, Rio De Janeiro, Brazil, 2019.