

2021 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 _____ 20..			
	Print name	Signature	Date
Entity leader	PROF RA BOTHA		23 MARCH 2022
Finance			
Chairperson of Advisory Board (If applicable)	PROF D POTTAS		
Chairperson: Faculty Board/ Faculty R&E Committee	PROF D POTTAS		
Dean	PROF D POTTAS		
DVC: RII (when applicable)			

1. Mission / purpose

State the mission or purpose of the entity

1.1 Alignment with Nelson Mandela University Strategic Objectives

Discuss how the entity contributed to the following University strategic areas

a. The institutional research themes or Faculty strategic priorities

The increasing reliance of all spheres of life on digital technologies raises the awareness and need for information and cybersecurity. As such the research done within CRICS addresses important underpinning for the “Innovation and Digital Economy” research theme.

b. Contributions to trans-disciplinarity

Information and Cybersecurity touches many fields. Of particular interest to CRICS are psychology and law.

c. Revitalisation of the Humanities (where applicable)

N/A

d. International partnerships including the African footprint

The involvement of various staff members in international forums, led to fostering specific (albeit informal) ties with similar research groups at other universities, such University of Plymouth, Goethe University (Frankfurt), University of Nottingham, and University of California at Davis. On the African front relations mainly exist with South African Universities, in particular UNISA, University of Johannesburg and University of Pretoria.

e. Sustainable development goals

Goal 9 of the sustainable development goals has as one of its targets to “significantly increase access to information and communications technology”. The advantages this brings are obvious, but the increased risk receive less attention. Research in information and cyber security aims to recognise and reduce the risk associated these risks through both technical and behavioural interventions.

f. Public engagement, science communication and advancement

CRICS encourages members to be involved in community activities and communicate with the wider world through news media. CRICS also influence wider policy by contributing to international working groups.

g. Any other area of strategic importance

Through post-graduate supervision CRICS hopes to contribute significantly to human resource development in an discipline with serious shortages.

1.2 Executive Summary for Senate (no more than half a page)

This section highlights the achievements of the entity and draws attention to any strategic risks that the entity is facing.

CRICS primarily contributed through post-graduate supervision and research publications . In total 9 journal publications were published during 2021. During 2021, 11 Masters students graduated.

2. Governance structures

Indicate the governance structures that are in place (indicate with X)

Governance structure	YES	NO
Advisory Board	X	
Management Committee	X	
Other (please specify)		

List the names of the governing structure members and their affiliations. Mention any changes in the governance structures and changes in membership. **You may insert a table.**

The **CRICS Advisory Board** consists of:

- Dean/Deputy Dean – Prof Ben van Wyk / Prof Dalenca Pottas
- DoS – Dr Sue Petratos
- Director of CRICS – Prof Reinhardt A Botha
- Mr Samrej Ramjith – Deputy CISO, ABSA
- Mr Agbor Kandeh – Senior Information Technology Consultant, IntelliRisk
- 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.
- 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 Thomson

2.1 Governance Structure meetings

List meetings held during the year (attach minutes) and highlight any decisions that had a direct influence on the activities of the entity.

Governance structure	Date of meeting	Minutes attached (Yes/No)
No meetings took place in 2021		

3. Staff, Research Associates, HEAVA members, Postdoctoral Fellows and Research Fellows

Name	Gender	Department/Institution	Position
Prof Reinhardt A Botha	M	IT Management & Governance	Professor
Prof Kerry-Lynn Thomson	F	Network Engineering	Professor
Prof Mariana Gerber	F	IT Management & Governance	Associate Professor
Prof Lynn Futcher	F	IT Management & Governance	Associate Professor
Mr Luzuko Tekeni	M	Network Engineering	Lecturer
Mr Phumezo Ntlatywa	M	IT Management & Governance	Lecturer
Mr Vuyolwethu Mdunyelwa	M	Software Engineering	Lecturer
Mr Timothy Speckman*	M	Network Engineering	Associate Lecturer
Prof Steve Furnell	M	University of Nottingham, England	Honorary Professor
Prof Johan Van Niekerk	M	Noroff University College, Norway	Honorary Professor
Dr Renier van Heerden	M	CSIR	Research Associate
Prof Rossouw von Solms	M	Retired	Emeritus Professor
Dr Noxi Gcaza	F	CSIR	Research Associate
* Resigned during 2021			

3.1 Human resources issues

CRICS consists of 8 staff members whose primary research interests are information and cybersecurity. Four of the eight staff members have yet to obtain their PhDs. 2 senior staff members, Profs von Solms and Van Niekerk, left the university during 2018, and while they remain involved as Emeritus and Honorary professors respectively, they left a big void in School of IT, in general, and CRICS specifically, even in 2021 their positions remain unfilled. One of the junior staff member, Mr Timothy Speckman also resigned during 2021.

The creation of new programmes and the shift over to a new qualification structure, and the change in mode of delivery to online, 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, the lecturing load on team members, specifically those who need to complete their PhDs, makes it extremely challenging to sustain progress. Two of the staff members had sabbaticals in 2021, Mr Luzuko Tekeni and Prof Reinhardt Botha. This allowed Mr Tekeni to get to a stage where he should be able to finish his PhD during 2022.

4 Performance for the year under review

4.1 Statement of goals / targets

CRICS's objectives:

- To draw together and host the research efforts and endeavors related to information and cybersecurity.
- To conduct and disseminate research in the fields of Information and Cyber Security.
- 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 post-graduate students in the aforementioned fields.
- To publish 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 favorable and stimulating on-campus atmosphere for post-graduate students (e.g. a modern laboratory/office environment);
- To ensure a healthy relationship exists 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.

4.3 Summary of Research Performance at a glance

Provide information regarding the output of the entity: for example, research outputs, creation of new intellectual property, commercialisation of IP, patents registered, technology transfer, non-formal teaching, community service and engagement, human resource development and other significant outputs. e.g. number of patients counselled, events held, etc. **(See attached template for detailed reporting of research outputs/activities - Annexure A)**

Number of Masters students enrolled	56 (33 MPhil; 23 MIT)
Number of Masters students graduated	April 2021: 1 (MIT) + 7 (MPhil) December 2021: 2 (MIT) + 2 (MPhil)
Number of PhD students enrolled	11
Number of PhD students graduated	April 2021: 0 December 2021: 0
Number of journal articles published	9
Number of book chapters published	0
Number of books published	0
Number of conference proceedings published	1
Number of creative outputs produced	0
Other notable research outputs	0

4.4 Self-assessment of achievement of goals/targets

1. CRICS manages to provide a virtual home for students working in the fields of information and cybersecurity. The number of enrolments and graduating students attest to that. CRICS find it difficult to sustain quality supervision at the level of interest shown. The school recognised the interest and skills, and created qualifications that will boost this even more.
2. CRICS are successful at disseminating research. 9 journal publications attest to that.
3. The pandemic made it impossible to work on our on-campus presence and may have harmed the feeling of belonging and unity significantly. Only time will tell how much of an impact that had on our research productivity.

5. **Highlights and special achievements**

Prof Kerry-Lynn Thomson received an NRF C2 rating that will run from 1 January 2022 – 31 December 2027.

Prof Kerry-Lynn Thomson was elected as Vice-chair of SIGCyber, a special interest group of the IITPSA dealing with cyber security. She is joined on the Committee by Prof Lynn. Futchter.

Prof Lynn Futchter was awarded Professional member status of the IITPSA, and was also elected as a non-executive board member of the IITPSA.

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 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 2021 with an amount of R 744.75 which was unused and thus remained at the end of 2021.

6.2 Financial statements

See attached financial statements for cost centre H988.

7. Additional information

Provide any additional information regarding the year under review, which is deemed significant and is not covered under the above headings.

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/ACTIVITIES (2021)**

OUTPUTS/ACTIVITIES	NO	DETAILS	STAFF INVOLVED	OTHER (Specify)
JOURNAL ARTICLES				
International indices (ISI & IBSS)	8	See below		
DoE list of South African Journals	1	See below		
Other Peer-reviewed Journal Articles				
CONFERENCES				
International Conferences (Published Papers)	1	See below		
National Conferences (Published Papers)	0			
International Conference (presented but not published papers)	1	See below		
National Conference (presented but not published papers)	0			
International Conferences (only attended)	0			
National Conferences (only attended)	0			
BOOKS AND BOOK CHAPTERS				
Books	0			
Book chapters	0			
RESEARCH REPORTS				
CREATIVE OUTPUTS	0			
POST-GRADUATE QUALIFICATIONS COMPLETED				
MASTERS COMPLETED				
Masters by Coursework and Treatise	9			
Masters by Research	3			
DOCTORAL DEGREES COMPLETED				
	0			

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

Details of Publication on accredited international lists

(CRICS affiliated authors indicated in bold)

Botha, R.A. and Furnell, S (2021) *Facing up to Security and Privacy in Online Meetings*. Network Security, Volume 2021, Issue 5, May 2021, pp. 7 – 13

Furnell, S.M., Helkala, K., & Woods, N. (2022). *Accessible authentication: Assessing the applicability for users with disabilities*. Computers and Security, 113

Futcher, L., Thomson, K.L., Mbuqe, A. (2021). *A Cybersecurity Curricular Framework for IT Undergraduates in South Africa*. Communications in Computer and Information Science, vol 1518.

Koekemoer, S. & von Solms, R. (2021) *A Strategy for the Implementation of Standard Data Structures in Financial Management Information Systems – A South African Case Study*. African Journal of Business and Economic Research (AJBER), Vol 16(1), 2021.

Koekemoer, S. & von Solms, R. (2021) *A Feasibility Study towards e-processing Supply Chain Management Transactions on South African Municipalities*. Lecture Notes in Networks and Systems (LNNS), Springer, Vol 3, Pages 505-513

Muchenje, T. and Botha, R.A. (2021) Consumer-centric factors for the implementation of smart meters in South Africa. South African Computer Journal, Volume 33, No 2, pp. 17 – 54

Slabbert, E., Thomson, K. and Futcher, L. (2021) *Towards a Risk Assessment Matrix for Information Security Workarounds*, Human Aspects of Information Security and Assurances, Springer, IFIP AICT 613, pp. 164-178

Tolah, A., **Furnell, S.M.**, & Papadaki, M. (2021). *An empirical analysis of the information security culture key factors framework*. Computers and Security, 108

Details of Publication on DoE list of South African Journals

(CRICS affiliated authors indicated in bold)

Koekemoer, S. & von Solms, R., (2021) *Does the 4th Industrial Revolution Provide Solutions for Sustainable Basic Service Delivery in South African Municipalities?*, Journal of Public Administration (JOPA), Vol 56, No 2, pp. 339 – 351

Details of Refereed Conference Publications

(CRICS affiliated authors indicated in bold)

Mdunyelwa V., Futcher, L. & van Niekerk, J. (2021). *Towards a Framework for Teaching Secure Coding Practices to Programming Students*. Proceedings of the 20th European Conference on e-Learning [ECEL 2021], Berlin, Germany.

Details of conferences presented, but no paper published

(CRICS affiliated authors indicated in bold)

Botha, R.A. *Security Checklists: The Good, The Bad and the Downright Ugly*, 20th Annual Information Security, Las Vegas, March 2021 (virtual)