



University of Nairobi

College of Biological and Physical Sciences

School of Computing and Informatics

Annual Report

2020

1. Introduction

The School of Computing and Informatics (SCI) was formally established in 1977 as the Institute of Computer Science whose mandate included academic as well as university ICT services. In the year 2002, and in the interest of realizing more focused management and efficiency of the two functions, ICS was split into two units i.e. ICTC and SCI. The School takes its name from the core competencies that it seeks to nurture: *Computing*, to cover the theory and science of computation and *Informatics* to exemplify the practical outworking of this theory in technology and application. The School is a regional leader in research, research and development (R&D) and advanced education in computing. It was the first to offer Bachelors and Postgraduate degrees in Computer Science in the region.

The core mission areas are: Teaching and Learning, Research, Consultancy, Research and Development and Extension Services

Teaching and Learning

Our objective in teaching and learning is to produce high quality, well-rounded, sophisticated graduates who are productive, innovative, and capable of lifelong learning. Our courses are therefore developed and delivered to a high standard of educational and technological competence.

Research

We aim to institute a dynamic programme of aggressive research in our core areas of competence: information systems, distributed systems and artificial intelligence, in line with national and regional priorities.

Consultancy

We seek to engage productively with the public and private sector to solve problems of national or organizational economic importance in order to foster progress in our environment. A number of our academic staff members are involved in consultancy work through UNES.

Research and Development and Extension Services

Based on sound research, relevant teaching, and problem-solving experience gained through consultancy opportunities, we develop training programmes, policies, methodologies and information technology software and hardware products for the local, regional and international market and increase awareness of the same in the community at large.

Thematic Areas

The research mandate of the School of Computing and Informatics is carried out under three research groups in the following thematic areas:

1. ICT for development (ICT4D)
2. Computational Intelligence
3. Distributed Computing

2. Programmes Offered

Programmes	Year Started	Summary
B.Sc. Computer Science, Diploma in Computer Science	1993	This is the School's flagship programme. Continues to attract high caliber students. We admit a second class at Kenya Science campus in addition to the class based in Chiromo campus. Curriculum has been reviewed 5 times. Most recent review in 2019 March.
M.Sc. Computational Intelligence	2013	This is an evening programme targeting applicants with first degree in Computer Science or related Engineering, Mathematics or Statistics discipline. Mode of study is coursework and project. Curriculum is currently under review
M.Sc. Distributed Computing Technology	2013	This is an evening programme targeting applicants with first degree in in Computer Science or a related discipline (e.g. Engineering, Mathematics and Physics). Mode of study is coursework and project. Curriculum is currently under review
M.Sc. Information Technology Management	2013	This is an evening programme targeting applicants with first degree in Computer Science or Information Technology or a related discipline. Mode of study is coursework and project. Curriculum is currently under review
Ph.D. Information Systems, Ph. D. Computer Science	2000	These are Ph.D. purely by research. The program was reviewed in May 2019 and its course work and Research .The programmes have produced 24 graduates so far. Currently over 60 students are registered.

3. Undergraduate Enrolment

Year of Study	Number of students								
	Government Sponsored			Privately Sponsored			Totals		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1	34	13	47	42	8	50	76	21	97
2	36	9	45	79	13	92	115	22	137
3	25	8	33	76	10	86	101	18	119

4	26	8	34	45	8	53	71	16	87
Total	121	38	159	242	39	281	363	77	440

4. Postgraduate Enrolment

Masters Programmes

Year of study	Number of students									Grand Total
	M.Sc. IT Management			MSc Computational Intelligence			MSc Distributed Computing Technology			
	Male	Female	Total	Male	Female	Total	Male	Female	Total	
1	20	4	24	27	6	33	12	3	15	72
2	36	14	50	22	7	29	19	4	23	102
Total	56	18	74	49	13	62	31	7	38	174

PhD

Level	Male	Female	Total
1	16	5	21
2	17	6	22
3	22	7	29
Total	55	18	72

5. International Student Component

Reg. Number	Student Name	Gender	Country
P15/100014/2017	Arow John Alier Majok	M	Australia
P15/101326/2017	Orio Kenedy	M	Tanzania
P15/43771/2017	Maiki Mambia Emanueli	M	Tanzania
P15/130671/2018	Okech Allan Ongom	M	Uganda
P15/141008/2020	Twaakyondo Ibrahim Salim	M	Tanzania
P15/138525/2019	Ecil Paul Pennuel	M	Uganda
P15/132423/2018	Mabor Michael Makuac Maker	M	South Sudan
P15/44418/2017	Haar Ajach Anuer	M	South Sudan

P15/138525/2019	Ecil Paul Pennuel	M	Uganda
P15/138521/2019	Mareech Makuach	M	South Sudan
P15/137741/2019	Thon Peter Mawut	M	South Sudan
P54/34840/2019	Anisa Ali Hassan	F	Somalia
P54/32411/2019	Akol Akol Anei Arop	M	South Sudan
P54/12247/2018	Hersi Mohamed Hassan	M	Somali
P53/72934/2014	Bahati Protus Goodluck	M	Tanzania
P58/73247/2009	Kapumba Michel Mwandu	M	D.R. Congo

6. Number of Graduates

DEGREE PROGRAMMES	Male	Female	Total
Diploma in Computer Science	27	9	36
BSc in Computer Science	52	11	63
MSc in Information Systems	1	0	1
MSc in Computer Science	4	0	4
M.Sc. IT Management	14	11	25
MSc Applied Computing	3	1	4
MSc Computational Intelligence	4	3	7
MSc Distributed Computing Technology	15	1	16
Ph.D. Information Systems	0	0	0
Ph. D. Computer Science	2	0	2
Total	122	36	158

7. Research Projects

Title	Partners
Health IT Project	USAID
Digital Matatus	Costworld Foundation
HIV Capacity building (UNITID)	UNITID
Africa Climate Change Leadership Program (AFRICLP)	Institute of research Assessment (IRA, IDRC)
Quantifying the contribution of forage technology adoption and advise on policy targets under the Kenya Climate Smart Agriculture Strategy	KALRO
Data Center Management, Maintenance and Support Services	KeeRA

8. Publications

S/No.	AUTHOR	TITLE	JOURNAL	MONTH & YEAR
1.	Frankline Makokha, Christopher K. Chepken, and Elisha T. Opiyo	A Comparative Study of a Client Based Vendor Neutral Cloud QoS Monitoring Tool and Cloud Providers' Platform Integrated QoS Monitoring Tools	EJECE, European Journal of Electrical Engineering and Computer Science	January 2020
2.	Benard Mutisya Nzyoka Nzyoka, David Muchangi Mugo, Stephen Mburu Ng'ang'a	Medical Device Integration with Electronic Health Records: A Case Study of University of Nairobi Health Services, Kenya	International Journal Of Computers & Technology	January 2020
3.	Grace Leah Akinyi and Robert Oboko	Proposed Self-Regulation Model for Collaborative E-Learning Systems in Kenyan Public Universities	American Journal of Engineering and Applied Sciences	January 2020
4.	Eric Araka, Elizaphan Maina , Rhoda Gitonga and Robert Oboko	Research trends in measurement and intervention tools for self-regulated learning for e-learning environments—systematic review (2008–2018)	Research and Practice in Technology Enhanced Learning	2020
5.	Rachael Njeri Kibuku, Prof. Daniel Orwa Ochieng and Prof. Agnes Nduku Wausi	e-Learning Challenges Faced by Universities in Kenya: A Literature Review	The Electronic Journal of e-Learning	February 2020
6.	David Gureya, João Neto, Reza Karimi, João Barreto, Pramod Bhatotia, Vivien Quema, Rodrigo Rodrigues, Paolo Romano, Vladimir Vlassov	Bandwidth-Aware Page Placement in NUMA Systems	34th IEEE International Parallel & Distributed Processing Symposium (IPDPS)	March 2020
7.	Kevin Obiero, Ted Lawrence, Jessica Alves, Stephanie Smith ,Friday Njaya, Robert Kayanda, Herwig Waidbacher, Dan Olago, Evans	Advancing Africa's Great Lakes research and academic potential: Answering the call for harmonized, long-term, collaborative networks and partnerships	Journal of Great Lakes Research	February 2020

S/No.	AUTHOR	TITLE	JOURNAL	MONTH & YEAR
	Miriti, R.E.Hecky			
8.	Kwale F.M., Wagacha P.W. and Kahonge A. M.	A Clustering Accuracy Comparison Framework	African Journal of Education, Science and Technology	March 2020
9.	Boniface Akuku, Timothy Mwololo Waemaand Robert Oboko	Institutionalization of knowledge management strategies in agricultural research organizations: a systematic literature review	Knowledge Management for Development Journal	March 2020
10.	Walter Buyu,Elisha O.Abade	Forensic Analysis of Dropbox Data Remnants on windows 10	International Journal of computer Application	July 2020
11.	Michael M Kangethe,Elisha O,Abade	Dynamic Directional NxN Chart Based Text Based Substitution Cipher	Journal of Computer Science and Applications	September 2020
12.	Michael M Kangethe,Robert Oboko	Association Rankings Model for Cellular Surveillance Analysis	Journal of Computer Science and Applications	July 2020
13.	Simon kihui,Elisha Abade	Comparative Analysis of Distinctive Features of the Ransomware tactics in Relation to other Malware	International Journal of Computer	July 2020
14.	Justin M Njeru,Elisha O,Abade	A Survey on Big Data Analytics Architecture for Urban Transport System:A case for Nairobi Metropolitan	International Journal of computer Application	September 2020
15.	John onyiego,Odira Elisha Abade	Supervisory Control and Data Acquisition(SCADA) System Forensics Based on the Modbus Protocol	International Journal of Computer	August 2020
16.	Boniface Akuku, Timothy Mwololo Waema and Robert Oboko	Institutionalization of knowledge management strategies in agricultural research organizations: a systematic review of the international literature	Knowledge Management for Development Journal	September 2020.
17.	Jecinta Muthoni Ndungu,Christoph er A.Moturi	Determinants of Mobile Fintech Update in Kenyan Microfinance Sector	Current Journal of Applied Science and Technology	September 2020.
18.	Wanjiku Nganga,Ikechukw u Achebe	Spoken word Corpus and dictionary definition for an African language	Journal data Mining and digital Humanities	August 2020
19.	Dennis M.Muriuki, Lawrence G.Muchemi	A Recommendation System for retail Banking products	African Journal of Mathematics and Computer Science Research	September 2020

S/No.	AUTHOR	TITLE	JOURNAL	MONTH & YEAR
20.	Veronica Owino, Timothy Waema	Digital Transformation as A Source of Competitiveness among Small and Medium Enterprises in Nairobi City County, Kenya	Journal of Business and management	August 2020
21.	Erick O. Otieno, Agnes N. Wausi Andrew M. Kahonge	Exploring the Factors That Contribute Towards Information Security Policy Compliance Culture	Information and Knowledge Management	August 2020
19	Edward Buhasho, Agnes Wausi, James Njihia	Business Intelligence Capability, Complementary Resources and Performance among Public Listed Firms in Kenya	Information and Knowledge Management	August 2020
20	Noel K. Joseph, Peter M. Macharia, Paul O. Ouma, Jeremiah Mumo, Rose Jalang'o, Peter W. Wagacha, Victor O. Achieng, Eunice Ndung'u, Peter Okoth, Maria Muñiz, Yaniss Guigoz, Rocco Panciera, Nicolas Ray & Emelda A. Okiro	Spatial access inequities and childhood immunisation uptake in Kenya	BMC Public Health	September 2020
21	Christopher Moturi; Geoffrey Ogoti	Strengthening technology risk management in mobile money lending	International Journal of Financial Services Management	October 2020
22	Charles Lwande, Robert Oboko & Lawrence Muchemi	Learner behavior prediction in a learning management system	Educ Inf Technol	November 2020
23	Edwin O. Ngwawe, Elisha O. Abade, Stephen N. Mburu	Context-Aware Computational Trust Model for Recommender Systems	EJECE, European Journal of Electrical Engineering and Computer Science	November 2020
24	Erick. O. Otieno, Agnes N. Wausi, Andrew M. Kahonge	A Theoretical Model for Information Security Policy Compliance Culture	International Journal of Applied Information Systems	September 2020

9. Links/Collaborations/Partnerships

S/No	Partners	DETAILS**	DURATION
1	KALRO	<ul style="list-style-type: none"> Quantifying the contribution of forage technology adoption and advise on policy targets under the Kenya Climate Smart Agriculture Strategy; 	2020 - 2021
2	USAID	<ul style="list-style-type: none"> Providing support to the sustaining use of District Health Information System II in Kenya Program 	September 2020-September 2021
3	Costworld	<ul style="list-style-type: none"> Supporting Digital Matatu Project 	September 2020-September 2021
4	Pompeu Fabra University Spain	<ul style="list-style-type: none"> Mobility for learners and staff 	2020-2021
5	KeRRA	<ul style="list-style-type: none"> Data Center Management, Maintenance and Support Services 	2020-2021

10. Human Resource

Designation/Grade	No of Staff
Professor	3
Associate Professor	4
Senior Lecturer	8
Lecturer	4
Tutorial Fellow	4
Graduate Assistants	0
Assistant Registrar	0
Senior Administrative Assistant	1
Admin Assistant	0
Senior Secretary	1
Secretary	0
Network Engineer	1
Senior Technologist	2
Technologists	2
Library Assistant	1
Office Assistant	0
Record Clerk	1
Messenger	0

Receptionist/Telephone Operator	0
Cleaners	1
Driver	1
Total	35

Staff Portfolio

Director:

Oboko, R.O., Bed (KU), PGDip C.S. (Nairobi), MSc (Brussels), PhD, (Nairobi)

Professor:

Waema, T.M., B.Sc. (Bath), PhD (Cambridge)

Omwenga, E.I., B.Ed (KU), PGDip.C.S (Nairobi), MSc (NUST), PhD (Nairobi)

Wagacha, P.W., BSc. (Nairobi), MSc (Shanghai), PhD (Nairobi)

Associate Professor:

Wausi, A.N., BSc (KU), PGDip C.S. (Nairobi), MSc (Brussels), PhD (Nairobi)

Opiyo, E.T.O., B.Ed (Nairobi), PGDip C.S (Nairobi), MSc (Brussels), PhD. (Nairobi)

Ochieng, D.O., BSc (Nairobi), MSc (Shanghai), PhD (Nairobi)

Senior Lecturer:

Moturi, C.A., BSc, PGDip C.S., (Nairobi), MSc. (Aston)

Ng'ang'a, J.W., BSc (Nairobi), MPhil (Cambridge), PhD (Helsinki)

Omwansa, T.K., BSc (Nairobi), MSc (Wichita State University), PhD (Nairobi)

Kahonge, A.M., BSc (Nairobi), MSc (Birmingham, UK)

Githiari, L.M., B.Tech.Prod. Eng. (Moi), MPhil.Prod.Eng. (Moi)

Chepken, C.K., BSc (Nairobi), MSc (Nairobi), PhD (Cape Town)

Abade, E.O., B.Sc (Nairobi), MSc. (Nagoya University, Japan), Ph.D.(Nagoya)

Miriti E.K., BSc (Nairobi), MSc (Nairobi), PhD (Nairobi)

Lecturer:

Ayienga, E.M., B.Ed (Kenya University), MSc (Sheffield)

Ronge, C.A., BSc (Nairobi), PGDip C.S (Nairobi), MSc (Newcastle)

Ruhiu, S.N., BSc (Nairobi), MSc (Manchester)

Mburu, S.N., BEd. Maths & Comp. Science (Kenya University), MSc (Nairobi)

Tutorial Fellow:

Ogut, J.O., BSc. Maths & Comp. Science (JKUAT), Dip.Ed.Science (KSTC), MSc (Nairobi)

Wangunyu, P.W., BSc (Nairobi), MSc (Nairobi)

Gureya, D.D., BSc (Nairobi) MSc (KTH Royal Institute)

Ochukut, S.A., B.Sc. (Masinde Muliro University), MSc (Nairobi)

Network Engineer

Rabala, P.O.H. Higher Nat. Dip in Electronics (Kenya Poly), BSc. (Tech. in Elect Com. Eng. (Moi University), MSc (Nairobi)

11. Promotions & Appointments

The School did have promotions

12. Other Events (Please see attached photographs)

HUAWEI AWARDS



Huawei Awards

A third year student at the School of Computing and Information, Maluki Muthusi, was awarded the first prize for winning in the global Huawei ICT Competition in the network track. This is a skill-based competition involving hands-on experience in computer networks and network security. Over 109 teams from Asia, Europe, Southern, and Eastern Africa participated in the global finals. A total of 327 students managed to get to the global finals out of the 150,000 who had registered for the competition. The award ceremony that took place on January 18, 2020, at Serena Hotel, Nairobi and was presided by the PS for Education, Amb.

Simon Nabukwesi, who reiterated the government's commitment to nurture ICT skills among the youths. The student later presented the prize to the Vice-Chancellor Prof Stephen Kiama.

MACHINE LEARNING WITH AZURE EVENT ON 19THFEBRUARY 2020.

AZURE IS MICROSOFT'S CLOUD COMPUTING PLATFORM

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Microsoft student partner clubs are on-campus clubs around the world that seek to empower and help grow the local community through technology. On the afternoon of Wednesday February 19, 2020 from 2pm to 4 pm, the Microsoft student partners club at the University of Nairobi held an Azure fundamentals workshop. Azure is Microsoft's cloud computing platform where one is able to deploy and build their applications. An introduction to azure and hosting of an application using azure app service was done during the workshop. Students with their student emails were able to access the student azure student's account. An Azure for Students subscription includes \$100 in Azure credits to be used within the first 12 months plus select free services without requiring a credit card at sign-up

MACHINE LEARNING WITH AZURE 19TH FEBRUARY 2020.



Machine learning

SCI STUDENT SELECTED AS THE UNIVERSITY DEVELOPER STUDENTS CLUB LEAD



Thabitha Kavyu, a third year student at the School of Computing and Informatics, was selected to be the Google Developer Students Club Lead of the University of Nairobi for the 2019 - 20 year. She is part of an amazing community of student leads who will be representing hundreds of colleges and universities across the globe. Her role is to help fellow students become competent software developers. She also trains them on the basics of coding by organizing events where students get to learn about emerging technologies such as Web, Android, Cloud and Artificial Intelligence. The position also entails bringing together women who are passionate about technology, and give them a platform to interact and learn from other successful women.