



**ANNUAL  
REPORT**  

---

**2020/2022**



**Makerere University**  
College of Computing and  
Information Sciences  
(CoCIS)

**THEME:**  
**A Transformed College**

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Principal's Office, CoCIS

**Concept:**

Prof. Tonny Oyana

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## Message from the Principal



**W**e are extremely grateful and privileged to share our Annual Report for the Academic Period of 2020/2022 with the Makerere University community. CoCIS is on the right track to being a thoughtful leader in shaping a shared vision of academic success and flagship in ICT research and education.

As we continue to build a successful college, I must report that in the academic period 2020/2022, we have made significant and excellent progress in meeting our core obligations. Despite the challenges, we experienced due to the unprecedented pandemic of severe acute respiratory syndrome coronavirus 2 (SAR-CoV-2), which causes Corona Virus Disease 2019 (COVID-19), and limited public budgetary support. Furthermore, I anticipate our continued excellent performance and collective actions will yield better positive outcomes than in the previous years.

As is my tradition, I would like to take this unique opportunity to thank CoCIS staff, faculty, and

students for their continued resilience. Collectively, they have demonstrated the will and commitment to keep moving forward, thus ensuring the accomplishment of our strategic goals. Achieving academic success is an intentional outcome of our research and educational activities.

This academic year I would like to highlight the excellent research and innovations done by our students and faculty. Before I do that, I have a lingering question that I always focus on: Why is our principal focus on Research and Innovations? At the heart of our distinctive model of ICT teaching and learning, we ensure the production of high-quality human resources. Within research and innovations, we will increase the production of critical breakthroughs of ideas that advance scientific knowledge and innovations. This primary focus, we believe, will culminate in improved scientific and technological solutions. Currently, our College has a majority population of young faculty with incredible potential and a top 10% talented crop of students in the nation. This group is ready to move our research and innovation agenda forward. For example, our faculty and students are building IoT sensor devices for Smart homes, smoke detection, indoor and outdoor asthma monitoring, air quality monitoring, weather monitoring, and robotics.

As College Principal, I appreciate the excellent progress the College is making in conducting high-quality research. Our research capacity in the College has significantly grown and is very strong. We have a total number of 32 active grants secured either internally (22) or externally (10). The College has a solid research portfolio with a clear upward trajectory. Our graduate enrolment now stands at 9.6 percent, up from 3% five years ago. We are on a steady march to meet our current target of 15%. This academic year we graduated ten PhDs, 24 Masters, and over three faculty have

successfully completed their PhDs. Our College continues to offer impeccable educational and research opportunities for students and the at-large community. These accomplishments could not have been possible without our enthused staff and students. However, despite being on track, as represented by the incredible outputs, I continue to encourage our staff and students to live healthier lives and practice good hygiene habits at work and at home.

Thank you very much for reading our Annual Report, and when you visit the University, stop by and visit our College. We are committed as a college to being the leading African hub for Data Science and artificial intelligence (AI) research and innovations.



Professor Tonny Oyana  
**PRINCIPAL**



## 1.1: The College of Computing and Information Sciences (CoCIS)

Makerere University, College of Computing and Information Sciences (CoCIS) is the main ICT training, research and consultancy Centre in Makerere University and the region. It was established by the University Council on 1st February 2011 through the merge of the Faculty of Computing and Informatics Technology (CIT) and the East African School of Library and Information Sciences (EASLIS).

The College has two schools with six academic departments. The School of Computing and Information Technology (SCIT) comprises four departments:

- Department of Computer Science
- Department of Networks
- Department of Information Technology
- Department of Information Systems

The East African School of Library and Information Science (EASLIS) has two departments namely;

- Department of Records and Archives Management

- Department of Library and Information Sciences.

Each department is engaged in teaching, supervising field attachment; conducting research, consultancy and outreach programs in the respective sub-disciplines.

## 1.2: CoCIS Vision, Mission and Core values

### Vision

To be a thought leader of Knowledge generation for societal transformation and development

### Mission

To provide first class teaching, research and services in Computing and Information Sciences responsive to national and international needs.

### Core values

- Commitment, (Efficiency and Effectiveness)
- Transparency (Honesty and Integrity)
- Vibrancy (Enjoyment, Healthy environment and Sporting life)
- Respect (Friendly and Gender Sensitivity)
- Responsiveness

## 1.3: College Leadership 2020 - 2022



**Prof. Tonny Oyana**  
**PRINCIPAL**

### PRINCIPAL & DEPUTY PRINCIPAL



**Assoc. Prof. Agnes Rwashana Semwanga**  
**DEPUTY PRINCIPAL**

**SCHOOL DEANS**



**Prof. Constant Okello Obura**  
**Dean EASLIS**



**Assoc. Prof. Gilbert Maiga**  
**Dean SCIT**

**HEADS OF DEPARTMENT**



**Assoc. Prof. Engineer**  
**Bainomugisha**  
**HoD Computer Science**



**Dr. Sarah Kaddu**  
**HoD Library & Information**  
**Sciences**



**Dr. Evelyn Kigozi Kahiigi**  
**HoD Information Technology**



**Dr. Swaib Kaawaase Kyanda**  
**HoD Networks**



**Dr. David Luyombya**  
**HoD Records and Archives management**



**Dr. Peter Nabende**  
**HoD Information Systems**



CoCIS is one of the largest computing and ICT training, information science, research and consultancy colleges in Africa committed to delivering excellent services in the area of Computing, Library, Records and Information Sciences and attracts both local and international students. CoCIS boasts of the state-of-the-art infrastructure including lecture theatres, giant computer laboratories, specialized computer laboratories and a college library. Its three buildings can accommodate over 10,000 students in one sitting.

## 2.1: Programmes offered at CoCIS

### 2.1.1: Programmes offered at SCIT

- BSc. Computer Science
- BSc. Information Systems
- BSc. Data Communications and Software Engineering
- BSc. Information Systems and Technology
- BSc. Software Engineering
- PhD Computer Science
- PhD Software Engineering
- PhD Computer Science

### 2.1.2: Programmes offered at EASLIS:

- Bachelor of Library and Information Science (BLIS)
- Bachelor of Records and Archives Management (BRAM)
- Diploma in Library and Information Studies (DLIS)
- Diploma in Records and Archives Management (DRAM)
- PhD in Information Science (PhD)
- MSc. in Information Science (MSc Inf. Sc.)
- Post Graduate Diploma in Librarianship (PGDL)

## 2.2: Student Enrolment 2021 / 2022

Enrolment was adversely impacted by Covid-19 pandemic and challenges associated with data migration from AIMS to ACMIS. A total of 2,617 students enrolled; out of these, 2,047 registered and 570 did not register. Table.1 below shows the students enrolment statistics in the year under review.

**Table 1** Enrollment statistics for the Academic Year 2021/2022

SN	School	Level	Enrolled	Registered	Did Not Registered
1	East African School of Library and Information Science (EASLIS).	(a) Graduate	35	14	21
		(b) Undergraduate	1,108	991	117
		<b>Subtotal a + b</b>	<b>1,143</b>	<b>1005</b>	<b>138</b>
2	School of Computing and Informatics Technology (SCIT).	(a) Graduate	167	94	73
		(b) Undergraduate	1307	948	359
		<b>Subtotal a + b</b>	<b>1,474</b>	<b>1042</b>	<b>432</b>
<b>TOTALS (EASLIS + SCIT)</b>			<b>2,617</b>	<b>2,047</b>	<b>570</b>



The number of students who did not register in time is likely to reduce because some have met the requirements for late registration.

## 2.3: Graduation output at Mak 72<sup>nd</sup> Graduation.

A total 609 students from CoCIS were awarded degrees and diplomas in various disciplines during the Mak 72<sup>nd</sup> graduation ceremony held during the week of 23<sup>rd</sup>-27<sup>th</sup>, May 2022. The College presented 9 PhDs, 43 Masters, 1 Postgraduate Diploma, 555 Bachelors' Degrees and 1 Undergraduate Diploma. Table 3 below shows the graduation statistics during the Mak 72<sup>nd</sup> graduation ceremony while Table 4 and 5 show the graduation output by gender per school.

**Table 2** Out-put: Statistical Summary of Graduates at the 72<sup>nd</sup> Graduation Ceremony on May 26<sup>th</sup>, 2022

SN	Qualification	Female	Male	Total
1	Doctoral Degrees	5	4	9
2	Masters Degrees	17	26	43
3	Postgraduate Diplomas	0	1	1
4	Bachelors' Degrees	264	291	555
5	Undergraduate Diplomas	1	0	1
<b>COLUMN TOTALS</b>		<b>287</b>	<b>322</b>	<b>609</b>

**Table 3** Statistical summary by Gender, School of Computing and Informatics Technology (SCIT).

Program	1 <sup>st</sup> Class		2 <sup>nd</sup> Upper		2 <sup>nd</sup> Lower		Pass		Sub Totals		Total
	F	M	F	M	F	M	F	M	F	M	F + M
BITE	0	0	0	0	3	7	17	0	4	7	11
BISY	0	0	0	0	3	12	12	1	3	13	16
BIST	0	0	14	23	19	55	28	0	33	78	111
BCSC	2	2	12	16	6	31	46	0	20	49	69
BSSE	1	2	8	19	11	34	44	3	18	60	78
	<b>3</b>	<b>4</b>	<b>34</b>	<b>58</b>	<b>42</b>	<b>139</b>	<b>127</b>	<b>4</b>	<b>78</b>	<b>207</b>	<b>285</b>

**Table 4****Statistical summary by Gender, East African School of Library and Information Science (EASLIS).**

Program	1 <sup>st</sup> Class		2 <sup>nd</sup> Upper		2 <sup>nd</sup> Lower		Pass		Sub Totals		Total
	F	M	F	M	F	M	F	M	F	M	F + M
BLIS	0	0	19	8	46	22	2	0	67	30	97
BRAM	0	0	32	19	86	35	1	0	119	54	173
DRAM	1	0	0	0	1	0	0	0	1	0	1
	<b>1</b>	<b>0</b>	<b>51</b>	<b>27</b>	<b>132</b>	<b>57</b>	<b>3</b>	<b>0</b>	<b>187</b>	<b>84</b>	<b>271</b>



The graduands of CoCIS were presented for the awards of Degrees and Diplomas on Wednesday 26<sup>th</sup> May 2022. Unlike the preceding graduation ceremony of 2021, the Mak 72<sup>nd</sup> Graduation Ceremony was physically held and attended by the graduands, parents, guardians and staff.

**2.4: Student Enrolment 2020 / 2021**

Over 3000 students were enrolled. Of these, slightly over 2300 registered.

Table. 1 below shows the students enrolment statistics in the year under review.

**Table 1****Enrolment statistics for the Academic Year 2020 / 2021**

SN	School	Level	Enrolled	Registered	Did Not Registered
1	East African School of Library and Information Science (EASLIS).	(a) Graduate	64	27	37
		(b) Undergraduate	1,032	798	234
		<b>Subtotal a + b</b>	1,096	<b>825</b>	<b>271</b>
2	School of Computing and Informatics Technology (SCIT).	(a) Graduate	212	93	119
		(b) Undergraduate	1,822	1,401	401
		<b>Subtotal a + b</b>	<b>2,034</b>	<b>1,494</b>	<b>520</b>
	<b>TOTALS (EASLIS + SCIT)</b>		<b>3,130</b>	<b>2,319</b>	<b>791</b>

**2.5: Graduation output at Mak 71<sup>st</sup> Graduation**

Over 650 students from CoCIS were awarded degrees and diplomas in various disciplines during the Mak 71<sup>st</sup> graduation ceremony held on 17<sup>th</sup> - 21, May 2021. The college presented 5 PhDs, 32 Masters, 630 undergraduates and 7 undergraduate Diplomas.

Table 2 below shows the graduation statistics during the Mak 71<sup>st</sup> graduation ceremony while Table 4 and 5 show the graduation output by gender per school.

**Table 2****Out-put: Statistical Summary of Graduates at the 71<sup>st</sup> Graduation Ceremony in May 2021**

SN	Qualification	Female	Male	Total
1	Doctoral Degrees	4	1	5
2	Masters Degrees	13	19	32
3	Bachelors' Degrees	324	306	630
4	Undergraduate Diplomas	5	2	7
		346	328	
<b>GRAND TOTAL</b>				<b>674</b>

**Table 3****Statistical summary by Gender, School of Computing and Informatics Technology**

Program	1 <sup>st</sup> Class		2 <sup>nd</sup> Upper		2 <sup>nd</sup> Lower		Pass		Sub Totals		Total
	F	M	F	M	F	M	F	M	F	M	F + M
BITE	0	0	1	2	7	17	1	3	9	22	31
BISY	0	0	0	0	3	12	0	5	4	17	21
BIST	1	1	0	9	2	8	0	0	3	18	21
BCSC	1	2	8	13	4	46	0	2	13	63	76
BSSE	1	3	16	20	12	44	0	0	28	68	96
	<b>3</b>	<b>6</b>	<b>25</b>	<b>44</b>	<b>28</b>	<b>127</b>	<b>1</b>	<b>10</b>	<b>57</b>	<b>188</b>	<b>245</b>



*Inclusive of students who missed graduation in 2020*

**Table 4****Statistical summary by Gender, East African School of Library and Information Sciences**

Program	1 <sup>st</sup> Class		2 <sup>nd</sup> Upper		2 <sup>nd</sup> Lower		Pass		Sub Totals		Total
	F	M	F	M	F	M	F	M	F	M	F + M
BLIS	1	0	42	12	80	34	11	6	133	52	185
BRAM	0	2	40	16	93	45	2	1	137	63	200
DRAM	0	0	0	0	2	1	0	1	2	2	4
DLIS	0	0	1	0	0	0	0	0	1	0	1
	<b>3</b>	<b>2</b>	<b>83</b>	<b>28</b>	<b>175</b>	<b>80</b>	<b>13</b>	<b>8</b>	<b>273</b>	<b>117</b>	<b>390</b>



The 71<sup>st</sup> graduation ceremony took place from 17<sup>th</sup> to 21<sup>st</sup> May 2021. Due to COVID-19, the graduation ceremony was blended with only a few invited guests attending physically at the freedom square while the rest of the students, parents and guardians attended virtually.

## 2.6: Resumption of Teaching and Learning Semester II 2020/2021

### 2.6.1: Teaching and Learning through ODeL

The College followed the Makerere University Senate guidelines on resumption of teaching and learning through online classes for semester II 2020/2021 for Final Year students and Graduate programmes that had completed Semester 1 2020/2021 examinations. The staggered teaching and learning through ODeL for Semester II 2020/2021 commenced on 30<sup>th</sup> August 2021. The rest of the students resumed through virtual lectures as guided. Academic units and faculty members were prepared to update Teaching and Learning materials on the MUELE. E-Learning training for EASLIS academic staff was held on 20<sup>th</sup> April to 21<sup>st</sup> April 2021 in order to improve on the teaching and learning in the School given the current digital era. The different undergraduate courses were uploaded in MUELE.

### 2.6.2: Completion of Examinations for Semester I 2020/2021 for First Year and Other Continuing Students

Following the Makerere University Senate deliberations on alternative modalities of examination to enable students who were affected by the second Lockdown against COVID-19 pandemic complete Semester 1 2020/2021, staff and students were sensitized on the alternative assessment methods that enabled students to first complete Semester I before embarking on Semester II teaching and learning. Examinations for Semester I 2020/2021 for Year I and other continuing students were conducted from 6<sup>th</sup> – 24<sup>th</sup> September 2021.

Table 5 below shows the approved university road map that was adhered to for the completion of Semester I 2020/2021 while table 6 shows the approved alternative online assessment tools agreed upon by the Senate.

**Table 5** Roadmap for completion of Semester 1 2020/2021

Activity	Time line	Comments
Ongoing stakeholder engagement/Training and (Students, Government, Telecom sensitization of students	1 July - September 2021	Went on with a lot of staff enthusiasm online assessment using MUELE
Training of Staff using MUELE	27 <sup>th</sup> July - September 2021	Training conducted
Submission of ODeL status to Mak Senate	9 <sup>th</sup> August 2021	Report was submitted
Submission of Emergency ODeL implementation progress report and application to NCHE for extension	16 <sup>th</sup> August 2021	Report was prepared
Training of Staff in Online module design and assessment facilitation	18 <sup>th</sup> August 2021	Resumed after training in online
Application to NCHE to conduct multiple / Augu 2021 Special Senate alternative assessment methods	20 <sup>th</sup> August 2021	Content of application compiled and submitted



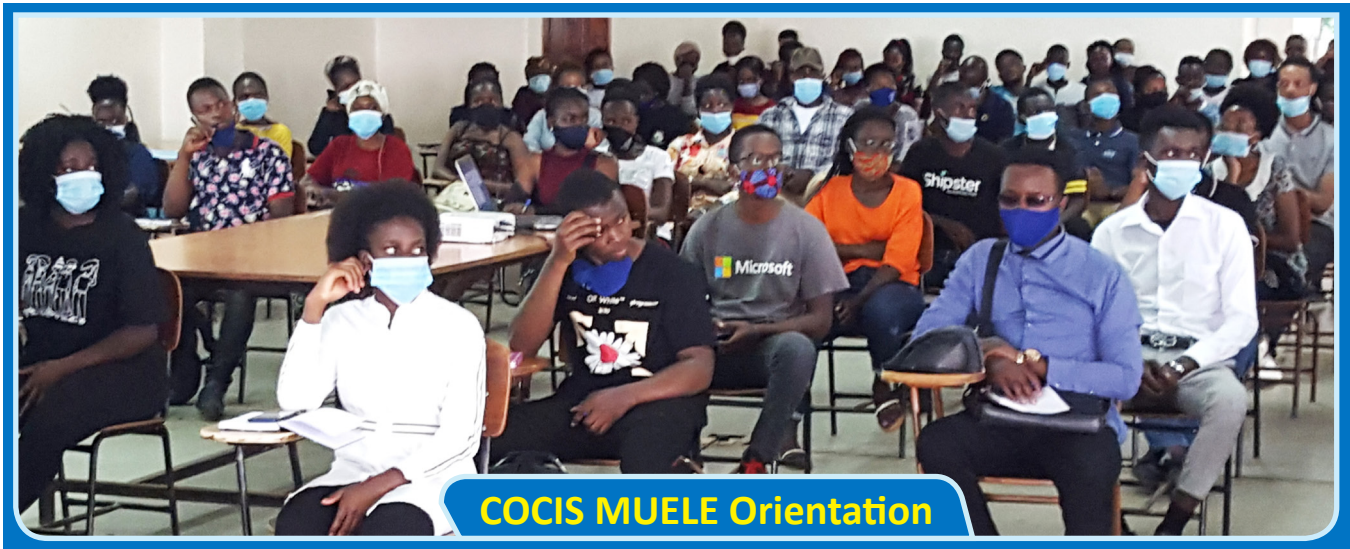
Practical demonstration to NCHE of the online assessment strategies adopted by Senate on 9 <sup>th</sup> August 2021	27 <sup>th</sup> August 2021	
<b>Examinations for Semester 1 2020/2021</b>		
Completion of 1 <sup>st</sup> Semester 1 examinations.	6 <sup>th</sup> - 24 <sup>th</sup> September 2021	As training for alternative assessment examinations methods continued, College/ School Academic Boards drew and submitted plans alternative assessment to complete the pending examinations
<b>Online Teaching and Learning for Semester II 2020/2021 (Group 2)</b>		
Opening of Semester 2 for First Year and other continuing students	27 <sup>th</sup> September, 2021	Unit academic leaders monitored and ensured faculty update of MUELE course shells with Semester 2 training_ materials

**Table 6** Approved alternative online assessment tools / modalities

Online assessment types	Examples
Traditional assessment online	Essays, Case studies, Article reviews, Proposal writing, Report writing submitted
Automated online assessment	Online Quizzes (Multiple choice questions, Multiple response questions, assessment fill in the blanks, True and False, matching, ordering)
Online interactions	Contributions to forums, Chats, Slogs and Wikis, Reading summaries, Collaborative learning, Critical reviews
Group assessments online	Online presentations, Group online projects, Online debates
Critical reflection and meta - cognition	Electronic portfolios, Online journals, logs, diaries, blogs, wikis, Embedded reflective activities, Peer & self - assessment
Authentic assessment	Scenario-based learning, Laboratory / field trip reports, Simulations, Case studies / Role-plays Online oral presentations

Since there were challenges to full implementation of digital assessment; also taking into account the different demands and requirements of the different programmes/courses, the following online assessments routes were also considered;

- Record videos showing a demonstration of a science experiment that would have been done in a lab or a presentation of monographs for a language course
- Producing an independent study project relevant to the student course while following a rubric.
- Quizzes that randomize the order of questions and shuffle the answers within a question.
- Writing a ready-to-submit manuscript for a journal or a script for a play
- Write field/lab reports examining concepts, obtained in a previous semester.
- Open book examinations where answers cannot be readily extracted from the material
- Case studies analyzing a real-life instance of an event
- Forum Discussions can benefit any discipline, including math and science courses
- Oral examinations conducted over Zoom



## 2.7: Field Attachment and Recess term

- This phase involved the planning meetings which included budgeting meetings; preparation and distribution of introduction letters for students and staff; sensitization of students and staff; identification of organizations for attachment; allocation of supervisors to students; and preparation of FA packages.
- Field Attachment exercise for 2020/2021 commenced after online student orientation. Recess Term was not done because of the situation posed by the COVID-19 pandemic
- Unlike previous years, the Academic Calendar for 2021/2022 did not provide a dedicated period for FA and the Registrar advised Colleges and Schools to embrace alternative modes of Internship approved by the Senate. As a result, Students were given the opportunity to get attached to real world organizations as long as their schedules did not conflict with the University's academic programs. As such, students were allowed to get attached to organizations that offered remote Internship, evening students were allowed to get attached to organizations that allowed day internship while students from previous years that were left with only internship to satisfy requirements for their graduation were also allowed to get physically

attached organizations. Any students whose FA activities would conflict with the School's academic programs were advised to undertake a Project for their internship

- The actual internship period for 2021/2022 was scheduled to run between 30/05/2022 to 22/07/2022 but was later extended to 05/08/2022 on request from students. Students are expected to submit their final reports by 20/08/2022.
- The supervision went on smoothly and submission of results is expected to be made by 30/09/2022.
- This year's internship presented a challenge to academic supervisors having a large number of interns due to a backlog from previous years brought about by COVID-19 effects.
- On average, academic supervisors were allocated 10 students, one of whom was in an upcountry placement. On average they are expected to visit the students in Kampala twice and the up-country students once.

## 2.8: Curriculum Review EASLIS

1. New BLIS was revised, and approved by the University Senate and Council. It will be considered for private sponsorship in 2021/2022 Academic Year.
2. The graduate programmes: MSc. INF. SCI. and PhD. INF. SCI. were revised and due to

- consideration in the College Academic Board.
3. The revision for the MSC. RAM programme was started and considered in the Higher Degrees and Research Grants Committee
  4. New programme – PhD in Archival Science was developed and 1<sup>st</sup> draft completed in June 2021 and awaiting a stakeholder’s workshop for consideration.

The University Council at its 154<sup>th</sup> meeting held on 9<sup>th</sup> December 2021 approved four academic programmes;

- Bachelor of Science in Software Engineering
- Bachelor of Science in Computer Science
- Bachelor of Library and Information Science
- Master of E-Governance Technologies and Services

On the 14<sup>th</sup> January 2022 communication to the college Principal copied to the Dean, East African School of Library and Information Sciences and

the Dean, School of Computing and Information Technology, the college was expected to submit final copies (2) and 1 CD to room 611 Senate building for forwarding to National Council for Higher education(NCHE) for accreditation.

## 2.9: Six EASLIS students sent to the University of Boras

The East African School of Library and Information Science (EASLIS), College of Computing and Information Sciences (CoCIS), Makerere University in collaboration with the University of Boras officially launched the Erasmus + ICM and Linnaeus-Palme projects. Under the project, each institution exchanges and sends undergraduate students, academic and administrative staff to their respective partner institutions. The project is to last three years with students, academic staff, and administrative staff benefitting from the exchange program.



Some of the partner countries on this project include Albania, Brazil, Sweden, Canada, Iran, China, Rwanda and Uganda. On the 1<sup>st</sup> September 2021 the East African School of Library and Information Science officially bid farewell to the eligible six undergraduate exchange students as the first cohort on this project.



The students are presented in the table below:

S/N	Name	Course	REG.NO
1	Kato Arnold	BRAM	18/U/26417/EVE
2	Kavunani Immaculate	BLIS	18/U/41702
3	Nagujja Jamirah	BRAM	18/U/20633/PS
4	Nakibuka Ester	BLIS	18/U/41277
5	Ngowi Innocent Ebrahim	BLIS	18/T/40752/PS
6	Ssemwogerere Abubakari	BLIS	18/U/280

## 2.10: Deep Mind supports the establishment of Master's scholarships to study AI at Makerere University



DeepMind will make a donation to Makerere University to fund the establishment of four scholarships in the field of Machine Learning beginning in the academic year 2021/2022. The scholarship will support students who wish to study MSc. Computer Science program (Track: AI and Data Science) taught in the Department of Computer Science at Makerere University beginning in the academic year 2021/22. The scholarship is open to students from Uganda, other East African countries, or International students from a Sub-Saharan African country. The scholarship package includes full financial support for tuition, stipend, equipment, AI conference participation and mentorship. International students are also eligible

for a relocation grant to move to Makerere to begin their studies.

Makerere University joins other leading universities in partnering with DeepMind to offer scholarships, including Stellenbosch University in South Africa and international partners, such as the Universities of Cambridge and Oxford, University College London and Imperial College in London. DeepMind is a multidisciplinary team of scientists, engineers, machine learning experts and more, working together to research and build safe AI systems that learn how to solve problems and advance scientific discovery for all.

# 3.0 RESEARCH GROUPS

The College of Computing and Information Sciences is poised to continue being a model college providing research that directly answers to both local and international demands. To achieve this, staff and PhD students have formed groups to conduct research in different fields to address the needs of society

## 3.1: Research groups at the SCIT

### Artificial Intelligence & Data Science Research Lab





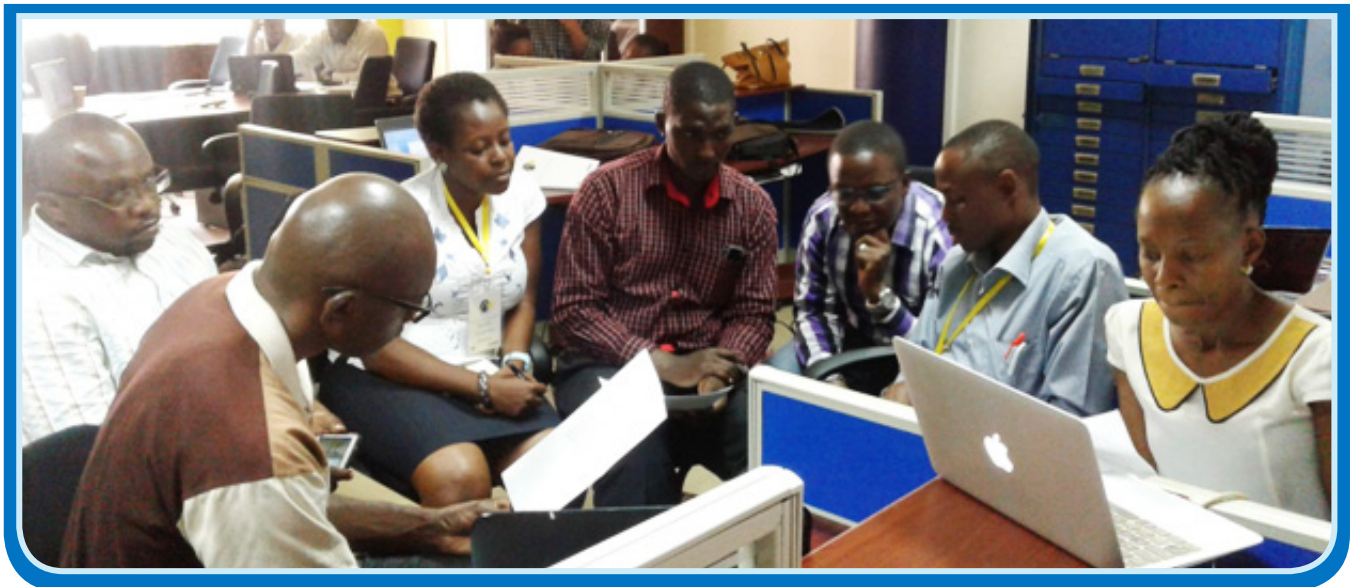
The AI and data science research group specializes in the application of Artificial Intelligence and Data science -including methods from machine learning, computer vision and predictive analytics- to problems in the developing world. Applications involve natural language processing for under-resourced languages, automated diagnosis of both crop and human diseases, auction design for mobile commodity markets, analysis of traffic patterns in African cities, and of telecoms and remote sensing data for anticipating the spread of infectious diseases

## **The wireless Networks and System Security Research Group**

This group develops networked systems and applications that ease access to communication and

mobile wireless services thus contributing to the (Uganda's) national development goals to build a strong foundation for analyzing and solving various forms of digital security problems through modern research methods and strategic collaborations. Application Areas include Weather Monitoring, Precision Agriculture, Mobile applications in health, Electronic Commerce, Systems and Information audit and Surveillance Cloud Services.

## **SSC: The Center of Excellence in Software Engineering and Software Systems**



The software systems center is operated by Makerere University and center of Excellence in software engineering and software systems. This group deals with software challenges that are peculiar to emerging economies with various resource constraints. SSC brings together top academics in Software Engineering, Cyber Security and Information Technology. The focus areas include

embedded systems, software quality improvement, software project management, business process management and big data analytics. The specific problems worked on are directly derived from industry partners who continue to participate and review results at least every 6 months during different iterations of the solutions.

## Informatics and Visualization Research Group

The research group in Informatics and Visualization, and the Advanced Modeling and Simulation make up the main research directions pursued in the department of Information Systems of the School of Computing and Informatics Technology of Makerere University. Informatics focuses on efficient and effective creation, management and utilization of information using ICT in the modern world. Visualization on the other hand focuses on the use of graphic to visually present and explore data/information solely for gaining more insight to complex data.

The Research group seeks to find ways of applying information science principles, information technology, and communication to a wide range

of disciplines, with a main focus of presenting and enhancing understanding of data, information, and knowledge discovery processes.

The Research group addresses both theoretical and practical aspects of informatics.

## Health Informatics Research Group

This group conducts cutting edge research based on observations made and demands in the healthcare ecosystem in Uganda and beyond and particularly addresses the broad research problem on the “disconnection between health informatics solutions and society”. The aim is to answer the broad research question on “how Health Informatics research and development can facilitate and stimulate actualizing of better health outcomes for society (more than 40 million people in Uganda and beyond).



The application of these ICT tools embraces the promise of making healthcare service provision more beneficial and valuable. The concept of Health Informatics (HI) refers to the designing and development of health information systems and technologies, applied in health care to improve health care service delivery, management and planning in terms of better quality and efficiency (control cost for more availability).

## 3.2: Research groups at the EASLIS

East African School of Library and Information Science (EASLIS) has several scholars undertaking research in different areas and these include research associates and PhD students. The research work undertaken ranges from Information Policy Research and Publishing, Knowledge Management, ICTs for Libraries, and LIS Curriculum. The research

work is conducted in research groups and detailed information can be easily accessed by clicking on the individual research group link.

## Information Policy Research and Publishing Group

The Information Policy Research Group is a multidisciplinary research team for the study of the intersections between the policies, ethical, political, social and legal aspects of the global information society. The Group's research and scholarship focuses on such key information policy issues as intellectual property, privacy, intellectual freedom, access to information, censorship, cyber law, and the complex array of government, corporate, and global information practices and policies.

## Knowledge Management Research Group

The mission is to establish an effective way of managing information for management and administrative purposes in Uganda bearing in mind the fact that: availability of quality information is a critical resource in management and administration

of institutions; the information industry is characterized by numerous factors that include information over production, information scatter, high rate of obsolescence, timeliness, institutional restrictions, among others; a wide range of new stock of information and communication technologies are regularly in the offing.

### 3.3: Research projects 2020/2022

#### 3.3.1: The RISE initiative

The RISE Directorate continues to strengthen research and innovation at the College under the leadership of Dr. John Ngubiri. The Directorate has departmental representatives across the two Schools who represent their respective Departments on the RISE Committee. The unit receives funding support from the Office of the Principal to encourage faculty to engage in research. In the year under review, a total of 06 RIF grants were awarded and currently 15 are being implemented. Table 8 below shows our college seed grants that have yielded eleven external grants

**Table 7** College seed and external grants.

S/N	Title	Amount (UGX)	Period	Team Members
1	Persuasive Technologies for Public Participation In Waste Segregation and Recycling	UGX 10,000,000	May 2022 - October 2022	Dr. Rose Nakibuule
2	My Relief: A relief tracking system for accountability	UGX 3,000,000	May 2022 - October 2022	Assoc. Prof. Engineer Bainomugisha
3	Re unite mobile and app application	UGX 3,000,000	May 2022 - October 2022	Dr. Steven Odong Eyobu
4	Expert Camera	UGX 3,000,000	May 2022 - October 2022	Dr. Mary Nsabagwa
5	Traffic flow monitoring at the edge with computer vision in crowded cities	UGX 10,000,000	2021 to date	Dr. Rose Nakibuule
6	Towards improved access to equality and equitable lower education in Uganda through integrated schools monitoring technology (TELTIM)	UGX 10,700,000	2021 to date	Dr. Kyanda Swaib Kawaase (PI)

7	A smart affordable and efficient rural water quality system - SWAQs	UGX 12,000,000	2021 to date	Dr. Hasifah Namatovu Kasujja (PI)
8	Electronic Product Verification System for SMEs in Uganda.	UGX 10,000,000	2021 to date	Dr. Joab Agaba Ezra
9	Mobile Money Card	UGX 2,995,000	2021 to date	Dr. John Ngubiri
10	Clinical decision Support Platform for Supporting Knowledge sharing in the management of acute child malnutrition in Uganda (CLISAM)	UGX 3,000,000	2021 to date	Dr. Agnes Nakakawa (PI)
11	Towards an Improved Refugee Resource Mobilization Approach	UGX 10,000,000	2021 to date	Dr. Hawa Nyende
12	Making Makerere University's Learning Management System (Makerere University E Learning Environment- Muele) Accessible to students with disabilities (Principal Investigator)	UGX 10,000,000	2021 - 2022	Dr. Rehema Baguma (PI)
13	A Social Media Threat And Crime Awareness Reporting System in Uganda	UGX 3,000,000	2021 to date	Dr. Rehema Baguma (PI)
14	Developing the MpekeXchange prototype to Minimal Viable Product (MVP) through Participatory Design	UGX 10,000,000	2020 - 2021	Mr. Grace Kamulegeya (PI)
15	An Online Alumni Management System	UGX 3,000,000	2020 - 2021	Mr. Bitwire Albert (PI)
16	Mobile Bookstore Application	UGX 3,000,000	2020 - 2021	Dr. John Ngubiri (PI)
17	Peer-to-Peer Money Lending App	UGX 2,590,000	2020 - 2021	Dr. Rose Nakibuule

### 3.3.2 New projects

S/N	Title of Grant	Funder	Amount (\$/€)	Grant Period	Research Team
<b>A) Internal Projects</b>					
1	Improving Point-of-Care Learning for Prostate Cancer Imaging using Machine Learning	Makerere University Research and Innovations Fund		2020 - 2021	Dr. Peter Nabende (PI)
2	EHealth Adoption In Uganda (EHAU)	Makerere University Research and Innovations Fund		2020 - 2021	Dr. Namatovu Hasifah Kasujja (PI)
3	Data Sanitizer: Semi-Automated Identification and Fact-Checking Of Viral COVID-19 Related Posts Using Online Expert Panels	Makerere University Research and Innovations Fund		2020 - 2021	Dr. Namatovu Hasifah Kasujja (Co-PI)



4	A Real-time Application for Screening Symptoms of Perinatal Depression among Expectant and Postnatal Mothers. (RAPID)	Makerere University Research and Innovations Fund	2021 - to date		Dr. Namatovu Hasifah Kasujja (PI)
5	A Smart, affordable and efficient rural Water Quality System (SWaQS)	COCIS Seed Grant	UGX 10,000,000	2021 - to date	Dr. Namatovu Hasifah Kasujja (PI)
6	Yo-Waste: a mobile and cloud-based hauler and garbage collection service (“uber for garbage”)	Makerere University Research Innovation Fund	UGX 73,821,670	2020 - 2021	Dr. Aminah Zawedde
7	Automatic Generation and Management of Timetables in Public Universities in Uganda	Makerere University Research Innovation Fund	UGX 169,598,000	2021 - 2022	Dr. Joab Agaba
8	Towards an ICT-driven Community-based Nutrition Education network for increasing awareness and knowledge transfer on Maternal Nutrition (NEMAT)	Makerere University Research Innovation Fund	UGX 40,000,000	2020 - 2022	Dr. Agnes Nakakawa
9	PeerLearn: Peer-to-Peer Offline e-Learning Content Distribution Platform	Makerere University Research Innovation Fund	UGX 74,923,600	2020 - 2021	Mr. Alex Mwotil
10	Advanced Localization Techniques on Smart Devices for Inclusive Location-based Services: A focus on healthy ageing for the elderly with dementia and mild cognitive impairment in rural communities	Makerere University Research Innovation Fund	UGX 74,915,714	2020 - 2022	Mr. Paddy Asiimwe
<b>B) External Projects</b>					
1	Using Machine Learning to Predict Crop Output of Small-scale farmers (MLPCO) The collaboration is between the School of Computing & IT, Makerere University, Central University of Technology South Africa and Hochschule Niederrhein University of Applied Sciences, Germany	BMBF	30,000 Euro	2020 - 2021	Dr. Joyce Nakatumba Nabende (Co-PI)



2	Maternal Mental Health in Uganda – Pathways to Resilience	University of Edinburgh, Global Impact Accelerator		2021 - 2022	Dr. Namatovu Hasifah Kasujja (PI)
3	Sub-award Contract between Cornell University and Makerere University to Support the Next Generation Cassava Breeding Phase 2.	Bill and Melinda Gates Foundation	USD 260,808	2018 - 2022	Dr. Joyce Nakatumba Nabende (PI)
4	Evaluation of the use of telehealth for cervical cancer screening in Uganda- Results Follow up.	Spider	10,000 SEK	2021	Dr. Joyce Nakatumba Nabende (PI)
5	Expert-in-the-loop Recommender System using Machine Learning for Localized Agricultural Advisory to Smallholder Farmers in a Developing Country	Facebook	10,000 USD	2020 - 2021	Dr. Joyce Nakatumba Nabende (PI)
6	Text Mining of Social Media Luganda Data to Track Misinformation and Perceptions Related to COVID-19 Transmission Mitigation Strategies Agency.	Data Science Africa Research Grant	10,000 USD	2021	Dr. Joyce Nakatumba Nabende (PI)
7	Development of Machine Learning Datasets for Crop Pest and Disease Diagnosis based on Crop Imagery and Spectrometry Data	Rockefeller Foundation	USD 239,741.43	2020 - 2022	Dr. Joyce Nakatumba Nabende (PI)
8	Development of Machine Learning Datasets for Crop Pest and Disease Diagnosis based on Crop Imagery and Spectrometry Data	NORHED II	NOK 1086771.09	2021 - 2026	Dr. Julianne Sansa Otim (PI)

9	End-to-end AI and data systems for targeted surveillance and management of COVID-19 and future pandemics affecting Uganda (COAST). The collaboration is between the School of Computing & IT, and the Infectious Diseases Institute Makerere University	IDRC, Canada and SIDA	USD 966,680	2021 - 2022	Assoc. Prof. Engineer Bainomugisha (PI)
10	Establishment of scholarships in the field of Machine Learning	DeepMind Technologies	USD 93980	2021 - 2022	Assoc. Prof. Engineer Bainomugisha (PI)
11	Scaling up a participatory and citizen driven air pollution sensing and analysis system for urban resilience in Uganda	Enabel under the WEHUBIT Programme	EUR 342,000	2021 - 2022	Assoc. Prof. Engineer Bainomugisha (PI)
12	DIGI EYE Project – Sweet Potato	Bill and Melinda Gates	USD 50,001	2021 - 2022	Dr. Joyce Nakatumba Nabende (PI)
13	Using Machine Learning to predict Deforestation	Google	USD 10,000	2021 - 2022	Dr. Joyce Nakatumba Nabende (PI)
14	Mozilla Common Voice	Mozilla	USD 3,000	2021 - 2021	Dr. Joyce Nakatumba Nabende (PI)
15	Machine learning for localized and targeted advisory small holder farmers in Uganda	Google	USD 35,000	2021 - 2022	Dr. Joyce Nakatumba Nabende and Dr. Andrew Katumba
16	Predicting sweet potato sensory attributes using image analysis	Bill and Melinda Gates	USD 50,000	2021 - 2022	Dr Joyce Nakatumba Nabende
17	Helmets labeling crops	University of Maryland College Park Meridian Institute	USD 30,284	2021 - 2021	Dr Joyce Nakatumba Nabende

18	Machine learning application to USAID/ Uganda Exo Business processes	USAID	USD 199,500	2021 - 2022	
19	MASTERCARD	MASTERCARD	USD 26,160	2020 - 2021	Barbra Nalubega
20	HUAWEI	HUAWEI TECHNOLOGIES CO	USD 16,593	2019 - 2023	Barbra Nalubega
21	Automated Malaria Microscopic (Ocular)	Villgro Africa	USD 8,000	2021 - 2022	Dr. Rose Nakasi
22	Toward Creditworthiness: Eliciting Social knowledge for Agricultural credit in the Development World	ACM	USD 20,000	2020 - 2022	Mutembesa Daniel
23	The F.A.T.E of AI in African agriculture A case study of algorithms used to assess creditworthiness for digital agro-credit to smallholder farmers in Uganda	Sales force	USD 50,000	2021 - 2022	Mutembesa Daniel
24	Graph-based multi-station routing and incentive schemes for mobile air quality sensing using combinatorics	Google	USD 10,000	2021 - 2023	Mutembesa Daniel
25	LUGANDA (Lift Health Uganda): Long-term field site network for health services and technology innovation in Uganda	Google	£ 23112	2020 - 2021	Dr Kyanda Swaib
26	COAST	IDRC, SIDA	CAD 1,240,000		Assoc. Prof. Engineer Bainomugisha
27	CRANE CLOUD	Paul Martz	UGX 344,338.961	2021 - 2023	Assoc. Prof. Engineer Bainomugisha
28	Expansion of Low-cost air pollution monitoring and analysis using machine learning to 10 African cities	Google.org	USD 3,000,000	2022 - 2025	Assoc. Prof. Engineer Bainomugisha
29	Generating Synthetic Datasets for Mobile Money transactions for AI Research	J.P Morgan	USD 65,000	2021 - 2022	Assoc. Prof. Engineer Bainomugisha

30	Early Detection and Diagnosis of Crop Diseases in Asymptomatic Plants: Acquisition and Machine Learning Analysis of Spectral Data	Data Science Africa (DSA)	USD 85,774.33	2021 - 2021	Dr. Godliver Owomugisha
31	Adaptive Environmental Monitoring Networks For East Africa (ADEMNEA)	NORAD	NOK 9,359,490	2021 - 2026	Dr. Julianne Sansa - Otim
32	Using Health Information Technology Governance and Epidemiologic Approaches to Implement Sustainable Digital Health Systems in Central Uganda	AAP	USD 28,445	2021 - 2022	Dr. Michael Kizito
33	HASH PROJECT ("Innovation Hub on Artificial Intelligence for Sexual, Reproductive and Maternal Health in Africa)	IDRC	USD 137,867	2021 - 2024	Assoc. Prof. Engineer Bainomugisha
34	AIRQo-(Makindye AirQloud)	US Embassy/ US Mission	USD 40,000	2021 - 2022	Assoc. Prof. Engineer Bainomugisha
35	USAID EXO/HR AI:Development of the EXO/HR Artificial Intelligence Machine Learning	USAID	UGX 707,000,000	2021 - 2022	Assoc. Prof. Engineer Bainomugisha
36	IPID Network East Africa Chapter	SPIDER	USD 100,000		Assoc. Prof. Rehema Baguma
37	GOOGLE RECOMMENDER	MELINDA & BILL GATES FOUNDATION	USD 50,001	2021 - 2022	Dr. Joyce Nakatumba - Nabende
38	Using Building Luganda Automatic Speech Recognition Models for Agriculture ( Google NLP)	GOOGLE	USD 35,000.00	2021 - 2022	Dr. Joyce Nakatumba - Nabende
39	Development of customized ICT Tools and Platforms for the Pathogen Economy	MoSTI	UGX 1,000,000,000	2022 - 2023	Dr. Joyce Nakatumba - Nabende Dr. Andrew Katumba

40	Ocular (microscope eyepiece)	AI4D-Villgro Africa	USD 8000	30 <sup>th</sup> April 2022	Dr. Rose Nakasi
41	Data sets for AI based diagnosis of Malaria	LACUNA	USD 100,000	30 <sup>th</sup> April 2022	Dr. Rose Nakasi
42	HOLICARE: A Holistic approach in patient management and epidemic surveillance through convergence of diagnostic technologies, capacity building and stakeholder engagement.	European Commission	EUR 500,000	2022 - 2025	Prof. Tonny Oyana

### 3.3.3 Ongoing Projects

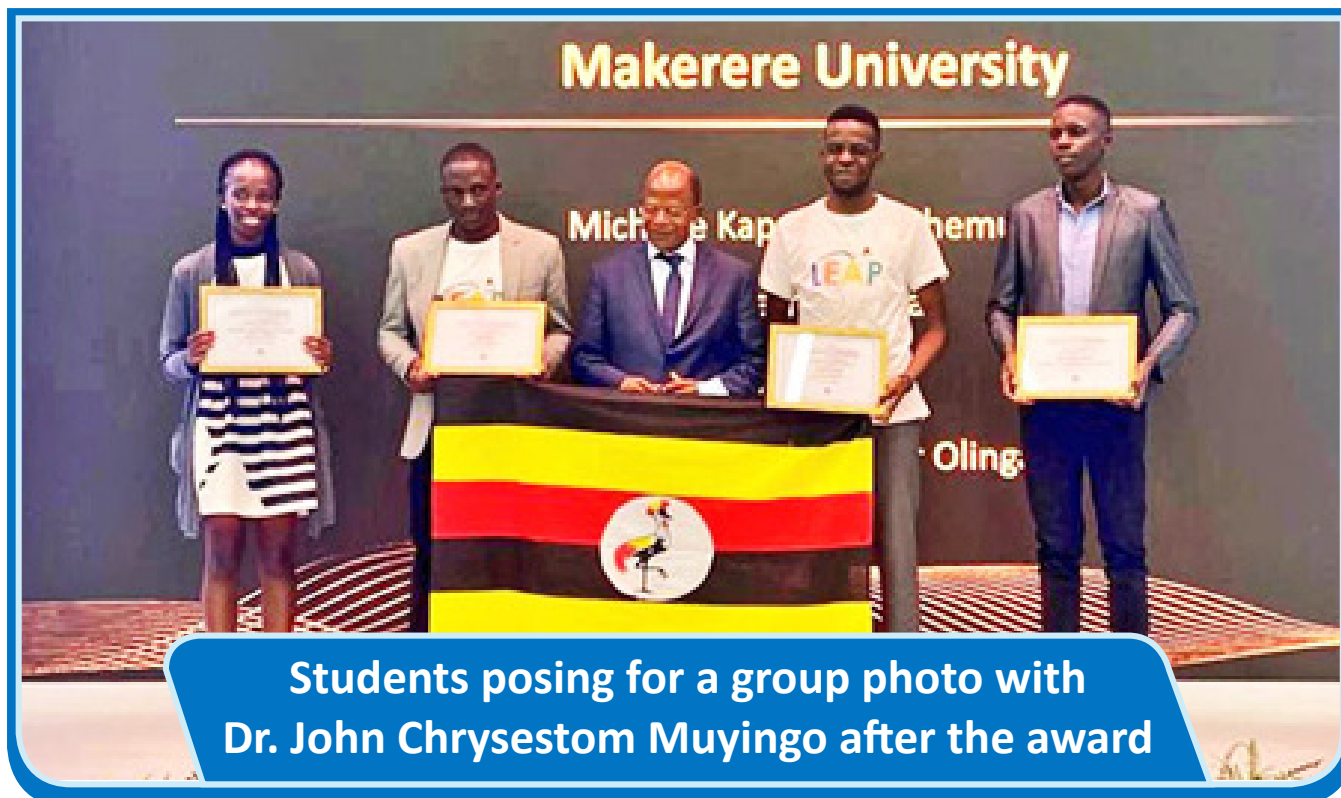
S/N	Title of Grant	Funder	Amount (\$/€)	Grant Period	Research Team
<b>A) Internal Projects</b>					
1	Towards Automatic Speech Recognition for Ugandan English.	RISE, CoCIS	UGX 10,000,000	1 year	Dr. Peter Nabende
<b>B) External Projects</b>					
1	Applying AI to Radio and Image Data for Crop Disease Surveillance	Bill & Melinda Gates Foundation Grand Challenges Explorations	US\$ 100,000		Dr. Joyce Nakatumba Nabende
2	Improvement of urban ambient air quality by providing low-cost technologies"	Google grant	US\$ 1.3m		Assoc. Prof. Engineer Bainomugisha
3	Enhancing Quality and Internationalization of Study Programmes Through Mobile Transformative Pedagogy (EQIP)"	NORPART. (Co-PI with University of Agder, Norway, University of Rwanda and Paul Muyinda from the College of Education and External Studies-CEES).		2019 - 2023	Rehema Baguma
4	Data Science and Artificial Intelligence Lab, Incentives on scale, mechanisms for	Facebook MD4SG Research Grant	US \$ 50,000		Mutembesa Daniel



	crowdsourcing with small-holder farmers				
5	BRIGHT: Building Research Capacity in Innovative Information and Communication Technologies for Development (ICT4D) for Sustainable Socio-economic Growth in Uganda.	Collaboration between Chalmers University, University of Gothenburg, and Makerere University.			Associate Professor Engineer Bainomugisha
6	E-Services: Training for Sustainable Spatially Enabled E-Services Delivery in Uganda. This project is a collaboration between Lund University in Sweden, and Makerere University				Professor Gilbert Maiga
7	KIPS: Building Capacity for Knowledge and Information Production and Sharing for Socio-economic Development in Uganda.	NORAD under the NORHED scheme	NOK 9,234,264	Ended Dec 2020	Dr. Julianne Sansa - Otim
8	NIH training grant		US\$ 1.25 m		Dr. D. Jjingo and Dr. Florence Kivunike
9	AirQo: Low-cost Air Pollution Monitoring	DIL/USAID.	US\$ 52,000		Assoc. Prof Engineer Bainomugisha
10	SoCoMoT, Low-cost Internet of Things Technology for Soil Conditions Monitoring	UNCST.	US\$ 80,000		Assoc. Prof Engineer Bainomugisha
11	Digitization of Cultural Heritage.	EU grant (EU ICT H2020),	€111,775.00		Dr. Sarah Kaddu
12	Gender-Just Digital Innovation in Africa (GeDIA)	Engineering and Physical Sciences Research Council(UKRI)	£882/£159,000		Ms. Fiona Ssozi
13	Gender and Digital Learning	Malala Fund	£8,500	7 months	Ms. Fiona Ssozi

14	Pathway to Change: Towards Gender Justice in STEM Research in Africa (GeJuSTA)	IDRC	R3,178,046	3 years	Ms. Fiona Ssozi
15	Air Quality and Transport	The Swedish Foundation for International Cooperation in Research and Higher Education (STINT) under Sweden-East Africa University Network (SWEAFUN)	SEK 159 700	2022 - 2024	Assoc. Prof Engineer Bainomugisha
16	Data Driven ICT	The Swedish Foundation for International Cooperation in Research and Higher Education (STINT) under Sweden-East Africa University Network (SWEAFUN)	SEK 50,700	2022 - 2024	Dr. John Ngubiri
17	Epilepsy App to Build Resilience among Adolescents & their Community	Under partnership with College of Health Sciences	USD 5,687	2022	Dr. Daudi Jjingo

#### 4.1: Quick Test App wins the Huawei Continental ICT Competitions



A team of second year students of B.Sc. Software Engineering won the first prize for the Huawei African Information and Computer Technology (ICT) competition 2021-2022. The awarding ceremony was graced by State Minister for Higher Education Dr. John Chrysestom Muyingo at the grand finale event held in South Africa under the theme, “Connection, Glory, Future”.

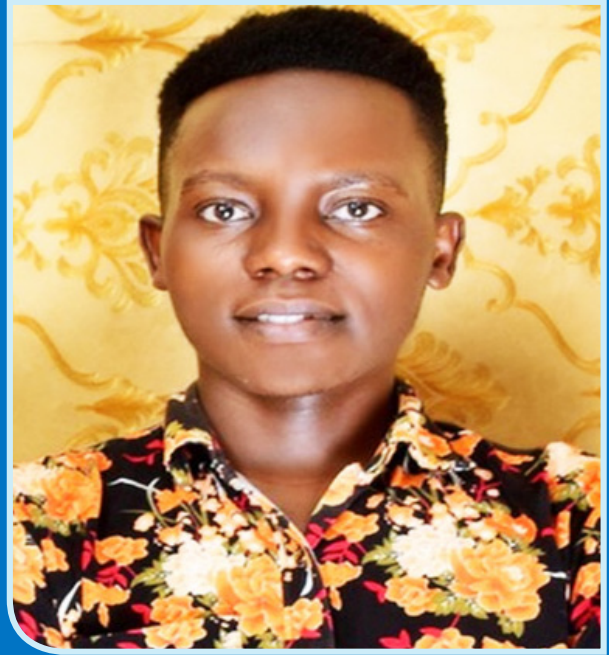
A team of three CoCIS students codenamed, “KILO-TECH” designed a QuickTest App for blood diagnosis without pricking of blood from the patient. The QuickTest App is An embedded mobile application

system to diagnose blood diseases mainly HIV/AIDS and Malaria without pricking the patient.

The team was led by Rutanana Arnold. Others are Nakyanzi Catherine (also Vice President CoCIS) and Nsengiyumva Wiberforce. The key benefit of the QuickTest App System is to reduce blood disease diagnosis time. It is designed in such way that a patient just logs in the app, place the thumb on the scanner, and get the test results.



**Rukutana Arnold**



**Nsengiyumva Wilberforce**

**The Team Behind  
the Mak Quicktest  
App**



**Mr. Daniel Kateregga**  
Mak Lead instructor



**Nakyanzi Catherine**



## 4.2: Automation of the Process of Monitoring Bees and Fruit flies



CoCIS Researchers in collaboration with other universities and institutions embarked on a project to develop the technology that can automate the process of monitoring bees and fruit flies for purposes of controlling their population on farms and in the wild.

The project dubbed, “Adaptive Environment Monitoring Network AfricA (AdEMNEA)” that will deploy applications for bee protection and fruit fly control in East Africa was launched on 25th February 2022 by the Vice Chancellor Makerere University represented by his Deputy in Charge of Finance and Administration Prof. Henry Alinaitwe.

This is a collaborative project being led by Prof. Stephen Wolthusen from the Norwegian

University of Science and Technology, Department of Information Security and Communication Technology (NTNU). At Makerere university the project is being led by Dr. Julianne Nsasa-Otim with staff from the College of Engineering Design and Art (CEDAT) and the college of Veterinary Medicine Animal Resources and Biosecurity (CoVAB). Other partnering institutions are Dar es Salaam Institute of Technology (Tanzania), University of Juba (South Sudan) and the University of Bergen (Norway), the Uganda Meteorological Authority, NaCCRI and NARO. Other partners are the Ministry of Agriculture (MAAIF), The Uganda National Apiary Development Organisation (TUNADO, Research and Education Network for Uganda (RENU) and Fruit / Bee farmers: (Nwoya fruit growers cooperative society and Green Zabu Farm).



The Project is funded by NORAD under the NORHED II programme supported for five years with main emphasis on Southern partners. It builds on positive experience and results from the WIMEA project funded under the NORHED I framework with several other projects currently funded with NTNU and Makerere as partners.

**Dr. Julianne Sansa Otim**  
Making her remarks during the project launch

## 4.3 CoCIS Student for the Continental Africa Internet of Things & Artificial Intelligence Challenge Finals 2021



Mbusa Joseph, a student from the College of Computing and Information Sciences undertaking a Bachelor's Degree in Information Systems and Technology attended the Africa Internet of Things (IoT) & Artificial Intelligence (AI) Challenge finals in Jumeirah Towers in Dubai, UAE from 12th-18th December 2021. The student emerged 2nd run up overall.

Mr. Mbusa Joseph who is a former CoCIS College president emerged as the best during the National competition of the (IOT) & (AI) Challenge in Uganda which took place on Thursday 18th November 2021 at the National ICT Hub premises at Uganda Institute of Information and Communications Technology, Nakawa. Mr. Mbusa Joseph and others trounced their counterparts from Kabale and Busitema University.

Mbusa was among the Mak team that developed a

technology dubbed, "Ntaasa Emergency system", to improve communication between the emergency service providers (Ambulances, Police, firefighters, health workers) and the Ugandan citizen.

### Africa IoT & AI Challenge

Africa IoT & AI Challenge is a continent-wide program for senior university students and startups that have innovative ideas in the areas of Internet of Things (IoT), Artificial Intelligence (AI) and related fields. The challenge is co-organized by several national and international partners like the Institute of Electrical and Electronics Engineers (IEEE) with its dedicated society for Technology and Engineering Management (IEEE TEMS), and different universities, corporates, and governmental entities in Africa

## 4.4: Technique for Minimizing Geometrical Errors while Updating Geospatial Databases.



**Ismail Wadembere**

Spatial data capture is becoming easier due to reduction in cost and technologies thus attracting many players at different times for the same location who often use different methods, instruments and data storage structures.

These datasets can be integrated through direct merging however, it creates geometrical errors in form of slivers and danglings emanating from the openings and overlaps of objects. Attempts to address this limitation have not achieved the duo objective of removing the errors and maintaining the geometrical characteristics of objects.

To minimize the geometrical errors Mr. Wadembere Ismail a PhD student at the college carried out a study and developed a Localized Geometrical Alignment Technique (LGAT) for updating geo-spatial datasets. The technique provides an innovative approach of integrating multitude of vector datasets having spatial topological and attributes inconsistencies from different agencies. Mr. Wadembere was supervised by Prof. Patrick Ogao, and Prof. Moses Musingunzi.

**Read more:** <https://cis.mak.ac.ug/mak-cocis-phd-student-develops-technique-which-minimizes-geometrical-errors-for-updating-geospatial-databases/>

## 4.5: Ontology-Based Model for Integrating Knowledge of Modern and Traditional Medicine



**Richard Okelo Angole**

Mr. Richard Okelo Angole developed ontology model for integrating complex knowledge of African

traditional medicine and modern medicine. complex African Society; African Traditional Medicine (ATM) is used in parallel to Modern medicine (MM). Various attempts have been made to bridge the gap between ATM and MM in order to harmonize treatment and to create an equal form of therapeutic cooperation but in vein due to lack of formal structure and complexity of the knowledge. each practitioner has their own terminologies and ways of providing healing services unlike Knowledge generated from Modern medicine which is structured. Therefore, ATM knowledge is isolated and mistrusted yet a lot of knowledge is generated in the practices which could be used across the whole health sector. In addition, modern medicine alone does not provide whole health needs of patients and the drugs are characterized by having undesired side effects, ATM



provides holistic health intervention. ATM treats the body, the mind and the spirit. There is need to come up with a better technology to handle this complex structure of medical knowledge which the current artificial Intelligent (AI) systems used in e-health

cannot manage. The model developed bush the backend of AI to handle complexity in medical knowledge. The work was supervised by Assoc Prof. Gilbert Maiga and Dr. George Wiiliam Okori.

#### 4.6: Form-based Data Security in Mobile Health Data Collection Systems in Low-Resource Setting



**Marriette Atuhuriire Katarahweire**

Ms. Marriette Atuhuriire Katarahweire investigated security challenges in mobile health data collection systems deployed in low-resource settings. It was found out that data in MHDCS are diverse and

have varying security requirements depending on their sensitivity levels. Particular emphasis was on incorporating security controls early in the development process through electronic forms to be used for data collection, and according to sensitivity levels of the data. A data sensitivity model was developed that takes into consideration both static and dynamic parameters for data sensitivity and categorizes data into different sensitivity levels using parameters defined by the stakeholders. Use of the model enables developers to design and build mobile health data collection systems that adhere to the security goals of confidentiality, integrity and availability. This is expected to reduce the potential threats and increase the confidence and adoption of eHealth services. The study was funded by NORAD and was supervised by Assoc Prof Engineer Bainomugisha and Assoc Prof Khalid Azim Mughal.

#### 4.7: A model for spatial variability of typhoid disease incidences in Uganda



**Ismail Kamukama**

Mr. Ismail Kamukama integrated clinical, environmental and demographic data to explore spatial variability of typhoid disease incidences in Uganda for the period 2012 to 2017 using data science method. The study first explored spatial-temporal trends and distribution patterns of typhoid disease incidences at both regional and national levels in order to gain initial disease burden insights in the population. The study then revealed highest incidences and clustering of the disease in the central region, followed by Western, Eastern and Northern regions throughout the study period. Geographically Weighted Regression model revealed that poor handwashing practice was mainly

influencing disease occurrences in Northwestern, Northern and Northeastern parts of the country. Excessive rainfall was most responsible for disease occurrences in the Eastern, Central and Southern parts of the country. Poor drainage was mainly influencing disease occurrences in the Western, Central and Southern parts of the country. This

knowledge is essential for planners and decision-makers to: efficiently plan, enforce preventive measures and make targeted interventions, which eventually reduce disease surveillance costs. The study was funded by SIDA and supervised by Assoc Prof. Gilbert Maiga, Dr. Denis Ssebugwaawo and Dr. Peter Nabende.

#### 4.8: Characterization of Practices and Measurements in Software Start-ups in an Emerging Ecosystem

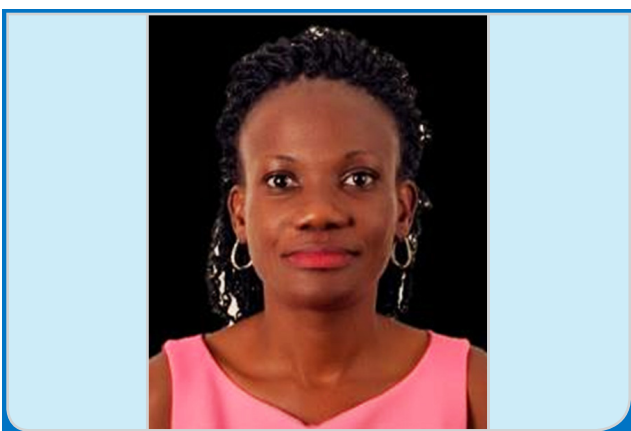


**Dr. Grace Bugembe Kamulegeya**

Dr. Grace Bugembe Kamulegeya, through case studies investigated and characterized software hub operations and software start-up practices, and growth-tracking metrics in the emerging East Africa start-up ecosystem. His study characterized the

operations of hubs in East Africa as not much had been established about how hubs nurture software start-ups. He also established that software start-ups indeed measured but adopted and adapted some practices and metrics used in start-ups in developed ecosystems. He designed and developed a progress measurement dashboard that start-ups can use to monitor their key growth metrics. He also iteratively derived 10 dimensions that can be used to influence and distinguish metrics used in software start-ups and mature software companies. The compiled hub practices can be used by existing and new hubs to benchmark their operations against the successful hubs in the East African region. The growth metrics will enable software start-ups to track the important aspects of their businesses in the different stages as they grow. This study was funded by SIDA and Supervised by Prof Regina Hebig and Dr. Raymond Mugwanya.

#### 4.9: A Persuasive Technology for Fighting Electricity Theft In Kampala, Uganda



**Dr. Ruth Mbabazi Mutebi**

Dr. Ruth Mbabazi Mutebi studied persuasive technology design frameworks, with the aim of developing a technology that could aid in reducing electricity theft in Kampala Uganda. After conducting a survey, Ruth found that electricity consumers are not willing to fight electricity theft, despite its' negative impact on them. She was modified Fogg's Eight Step Process using design theory resulting into the Design Theory-Fogg's Eight Step Process (DT-FESP). This was used to develop a persuasive mobile application to increase willingness to participate in fighting electricity theft called, "Faayo" Evaluation of "Faayo" showed that it had potential to persuade electricity consumers. The research demonstrated

the feasibility of persuasive technologies and recommended that Umeme includes them in their electricity theft mitigation strategies. The study was

funded by SIDA and was supervised by Dr Julianne Sansa-Otim and Prof. Sebitosi Ben.

#### 4.10: Automated Diagnosis of Malaria in Thick Blood Smear Films: Deep Neural Network Approach



**Dr. Rose Nakasi**

Dr. Rose Nakasi investigated how deep learning algorithms can be used for the automated detection of malaria and its parasitemia determination in microscopic thick blood smear images. Using an

experimental design, the study revealed that by exploiting recent technological advances in 3D printing and deep learning to produce effective hardware and software respectively, a functioning point-of-care diagnosis system for malaria on this principle, capable of running on multiple microscopes and phone combinations can be produced. A malaria parasite detection accuracy of over 98% as compared to conventional machine learning methods was achieved. This study contributes to the practical improved malaria diagnosis especially in highly endemic, but low-resource settings in the Sub-Saharan Africa, where there are few trained lab experts. Further, the diagnostic solutions developed in this study could be adapted for the general microscopy disease diagnosis. The study was funded by SIDA, and was supervised by Dr. Ernest Mwebaze and Dr. Aminah Zawedde.

#### 4.11: Management of Agriculture Archives in National Agricultural Research Institutes in Uganda



**Dr. Sylvia Namujuzi**

Dr. Sylvia Namujuzi investigated gaps in the management of agriculture archives in National Agricultural Research Institutes (NARIs) particularly, documentation, maintenance and access. Using case study and descriptive designs, the study established that various agriculture archives existed in NARIs according to their specialties, but were largely in paper format including: Maps, Datasets, Institutional correspondences, Photographs and Government Acts and legislations, among others. However, most of these archival materials were not processed, classified, accessioned and catalogued leading to poor documentation, maintenance and access. Two major outputs of this study were:

an evaluated Agriculture Archives Management Framework for closing the gaps and an Agriculture Archives Monitoring and Evaluation Tool for continuous process improvements in agriculture archives management. Further, the framework and the evaluation tool could be adopted by other

Agricultural Institutions for the general management of agriculture archives in their possession. The study was funded by Carnegie and was supervised by Prof. Robert Ikoja-Odongo and Dr. Mary Basaasa Muhenda.

## 4.12: Predicting Infectious Disease Density in Urban Settings using Convolutional Neural Networks



**Rahman Sanya**

Mr. Rahman Sanya explored applications of Convolutional Neural Networks (CNN) for modeling and analyzing spatial dynamics of human infectious diseases in low-income urban

settings. This work integrates multiple and diverse data sources including housing density signals (used as proxy for indoor overcrowding) extracted from remote sensing satellite imagery, and socio-economic well-being, as predictors for disease density. Using Tuberculosis (TB) disease data from Uganda, the study found that CNN were promising for detecting and quantifying patterns in infectious disease density. This work is the first of its kind in exploring possibilities afforded by advances in deep learning algorithms and remote sensing data to enhance understanding of infectious disease processes. By doing so, it has expanded the frontiers of methods available for digital epidemiology. The study was funded by the African Development Bank and supervised by Dr. Ernest Mwebaze and Assoc. Prof. Gilbert Maiga.

### 5.1: Research dissemination workshops

1. PeerLearn project held a research seminar on Peer Learn offline e-learning content application called PeerLearn which is an online/ offline peer to peer mobile app to enhance e-learning under predictable internet access environments. This project is Funded by Mak RIF.
2. An ecosystem for Telecommuting in Higher Education Institutions in Uganda held on August 5, 2021 funded by Mak Research and Innovation Fund (Mak RIF).
3. Mak / Mak RIF CoCIS open day held on April 15, 2021. The College has obtained 21 grants since FY 2019/2020. This fund is aimed at supporting higher impact research and innovations that inform National development priorities.
4. International Association for social science Information services and technology (iassist) in collaboration with the East African School of Library and Information Sciences and Association of Parliamentary libraries of Eastern and Southern Africa (APLESA) hosted the 1st IASSIST Africa regional conference in Makerere University from 11-13 January 2021
5. Mak-RIF/ CoCIS inaugural ceremony was held on 15<sup>th</sup> April 2021. The ceremony brought together 24 research and innovation project teams in different disciplines including Agriculture, Education, Environment, Health, COVID-19, Energy, Job Creation and Employment. Phases
6. 1<sup>st</sup> Africa Regional Workshop for IASSIST was held on 11<sup>th</sup> January to 13<sup>th</sup> January 2021 virtually and physically at College of Computing and Information Sciences, Makerere University.
7. Workshop on research and graduate training capacity building for members of EASLIS Higher Degrees and Research Grants committee held on 5<sup>th</sup> January to 7<sup>th</sup> January 2021 under the KIPS-334 project
8. Workshop for academic training in publishing for PhD EASLIS students under KIPS-334 project was held on 18<sup>th</sup> February to 21<sup>st</sup> February 2021.
9. E-Learning training workshop for all EASLIS academic staff was held on 20<sup>th</sup> April to 21<sup>st</sup> April 2021.
10. The International Association of Social Science Information Service (IASSIST) Africa Chapter which was launched on 13<sup>th</sup> January 2021 at the College had 1<sup>st</sup> webinar series on “The Role of Data Literacy in Promoting Good Governance”were held on 29<sup>th</sup> April 2021. The different participants from the different African countries attended hosted by the President, Prof. Ekoja Innocent from Nigeria.
11. The International Association of Social Science Information Service (IASSIST) Africa Chapter which that was launched on 13<sup>th</sup> January 2021 at the College had 2<sup>nd</sup> webinar series on “Integrating Data Literacy in LIS Curriculum”held on 17<sup>th</sup> September 2021.



# IASSIST Workshop



12. Research on establishing tele centers in Karamoja was carried out in six districts of Karamoja (Abim, Amudat, Kotido, Moroto, Nakapiripirit and Napak. The research findings were presented to a research dissemination seminar on 14th October 2020 under the project “A framework

for the establishment of community multi-purpose tele-centers in Karamoja sub-region. The Guest of Honor was the Minister of State for Karamoja Hon. Moses Kizige.”



**The project team with the Hon. Moses Kizige (State Minister, Karamoja) Prof. Tonny Oyana (Principal, CoCIS), Assoc. Prof. Agnes Rwashana (Deputy Principal) and Dr. Joyce Bukirwa (Head, LIS Dept.)**

## 5.2 Research Exhibitions

1. MAK TMS – A University Wide Timetable Management System for Makerere University (Dr. Joab Agaba, Principal Investigator).
2. The COVID-19 RAPID RESPONSE project creates awareness on the role of COVID-19 Rapid Response in reporting of COVID-19 suspicious cases and monitoring of discharged patients. (Male Vincent, Principal Investigator)
3. CRANE CLOUD (Engineer Dr. Bainomugisha, Principal Investigator)- A multi-cloud platform for highly available cloud native services in resource constrained environments.
4. A Mobile E- Governance Service Advisor – AMESA (Assoc. Prof. Gilbert Maiga, Principal Investigator). This research team conducted a needs assessment for citizen’s participation in e-governance at municipal level and disseminated the findings in order to create awareness on the role of citizen participation in e-governance for public services delivery.



**COVID-19 SOPs**



### 6.1: Books

1. Oyana T. J. (2021). *Spatial Analysis with R: Statistics, Visualization, and Computational Methods*. Second Edition, Taylor and Francis, CRC Press, Florida, USA.

### 6.2: Book Chapters

1. Muyama L., Nakatumba-Nabende J., Mudali D, (2021). Automated Detection of Tuberculosis from Sputum Smear Microscopic Images using Transfer Learning Techniques. In: Abraham, et. al., *Advances in Intelligent Systems Design and Applications*. ISDA 2019. *Advances in Intelligent Systems and Computing*, vol 1181. Springer, Cham. [https://doi.org/10.1007/978-3-030-49342-4\\_6](https://doi.org/10.1007/978-3-030-49342-4_6)
2. Kabiito D. and Nakatumba J. -Nabende. Targeted Aspect-Based Sentiment Analysis for Ugandan Telecom Reviews from Twitter. *Advances in Artificial Intelligence and Applied Cognitive Computing (Transactions in Computational Science and Computational Intelligence book series)*, Series No. 11769, Springer (2020).
3. Rehema Baguma and Proscovia Namubiru Ssentamu (2022). Building the Capacity of Educators in Designing Usable Online Courses. In press for *Learning Design Voices, Open Access Monographs*, University of Cape Town. <https://openbooks.uct.ac.za/uct/catalog/>
4. Nabende, P., Senfuma, S. & Nakatumba, J. (2021). An evaluation of Bayesian network models for predicting credit risk on Ugandan credit contracts. In: Arabnia H.R., Ferens.K., de la Fuente D., Kozerenko E.B., Olivas Varela J.A., Tinetti F.G. (eds) *Advances in Artificial Intelligence and Applied Cognitive Computing* (pp. 461-474). *Transactions on Computational Science and Computational Intelligence*. Springer, Cham. Print ISBN: 978-3-030-70295-3 Online ISBN: 978-3-030-70296-0 DOI: [https://doi.org/10.1007/978-3-030-70296-0\\_35](https://doi.org/10.1007/978-3-030-70296-0_35).

### 6.3: Peer Reviewed Journal Articles

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2. 8.Nyakweba, I., Bukirwa, J. M., Sendikadiwa, E., & Ratanya, F. C. (2021). Users' needs and expectations on information services provided in libraries: case of four public university libraries from the western region of Kenya. *Library Management*. <https://www.emerald.com/insight/content/doi/10.1108/LM-12-2020->
3. Adelani D. I., Abbott J., Neubig G., D'souza D., Kreutzer J., Lignos C., Palen-Michel C., Buzaaba H., Rijhwani S., Ruder S., Mayhew, S., Abebe Azime I., Muhammad S., Emezue C.C, Nakatumba-Nabende J., Ogayo P., Aremu A., Gitau C., Mbaye D., Alabi J., Yimam S. M., Gwadabe T., Ezeani I., Niyongabo R. A., Mukiibi J., Otiende V., Orife I., David D., Ngom S., Adewumi T., Rayson P., Adeyemi M., Muriuki G., Anebi E., Chukwunke C., Odu N., Wairagala E. P., Oyerinde S., Siro C., Bateesa T. S., Oloyede T., Wambui Y., Akinode V., Nabagereka D., Katusiime A., Awokoya A., MBOUP M., Gebreyohannes D., Tilaye H., Nwaike K., Wolde D., Faye A., Sibanda B., Ahia O., Dossou B. F. P., Ogueji K., Ibrahima DIOP T., Diallo A., Akinfaderin A., Marengereke T., Osei S.,(2021) MasakhaNER: Named Entity Recognition for African Languages. *Transactions of the Association for Computational Linguistics Vol 9: 1116–1131*. DOI available: [https://doi.org/10.1162/tacl\\_a\\_00416](https://doi.org/10.1162/tacl_a_00416)
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## 7.1: Launch of the Pan African e-learning Center (e-VBAB)



**Chief Guest Hon. V. Muraleedharani and Hon Dr. John Chrysestom Muyingo, cut the tape flanked by Prof. Barnabas Nawangwe, Prof. Tonny Oyana during the launch of the e-learning facility**

The Pan African e-learning center under the e-VidyaBharati and e-AarogyaBharati Network (e-VBAB Network Project) was on Friday 12th November 2021 launched at the college. The e-learning center will serve as the regional coordinating center for receiving and broadcasting lectures from India to the other African countries. The aim of this initiative is to share Indian expertise in the fields of tele-education and tele- health care through web-based infrastructure with the African countries in order to accelerate socio- economic development of Africa.

The center was officially opened by the Indian Minister of state for External Affairs and Parliamentary Affairs Hon.V. Muraleedharani and Uganda's Minister of State for Higher Education Hon. Dr. John Chrysestom Muyingo. The Ugandan High Commissioner to India, the Vice Chancellor Makerere university, Prof. Barnabas Nawangwe, the

Principal CoCIS Prof. Tonny Oyana also graced the occasion.

The launch of the center coincided with the university celebrations to mark the 100 years of her existence. The (e-VBAB) program had already started offering free online classes in the previous two intakes in the year 2020. This learning center will help facilitate the registered students in conducting examinations with online programs and any program in providing tele-educational services marking the beginning of a successful journey of many Ugandans benefiting from free online education from prestigious Indian universities.

Government of India has always supported Uganda and his people through education and capacity building. Every year, over 30 Ugandans are offered undergraduate, post graduate and PhD scholarships under the program of the Indian Counsel of Cultural relations to study in India.



**Hon Dr. John Chrysestom Muyingo, Prof. Barnabas Nawangwe, Hon. V. Muraleedharani and the Indian technologist Amtrack Pankay Raj Kundra touring the e-learning facility**

## 7.2: Acquisition of the SMART Lab

The college acquired the state –of-the- art SMART Laboratory under a partnership from UNESCO-ICHEI (International Center for Higher Education Innovations) for practical innovations specifically advocating for digital learning. The project is being led by Prof. Tonny Oyana. The lab is scheduled for commissioning.



## 7.3: HUAWEI Lab

The Huawei Lab was acquired under the project which is being led by Prof. Tonny Oyana.

## 7.4. Four Laptops procured for staff

Four staff in the Department of LIS received teaching laptops in the 2020/2021 financial year; Dr. Joyce Bukirwa, Mr. Joshua Justin Kidaaga, Ms. Lois Mutibwa and Mr. Batte Richard.



## 7.5 Budgetary and infrastructure requirements, challenges

### 7.5.1: Requirements:

1. EASLIS building is pending renovations. The contractor (Kemtec Uganda Limited) is awaiting a contract renewal considering the contract period for the renovations expired during the lockdown. Block A renovations were completed
2. Service providers are facing a challenge of payments for services provided. A major concern is the Giant cleaning services responsible for maintaining cleanliness at the College.
3. Students support services including library and teaching aids i.e Library and teaching aids are still inadequate for the students.

### 7.5.2: Budgetary requirements

1. Office chairs for 16 staff in EASLIS are required.
2. Students' workshop on careers industries.
3. Designing online course content
4. Industry engagement on impact on COVID-19 on RAM and LIS.
5. Finalizing curriculum review for undergraduate and graduate programmes.
6. Having Guest lecturers from the industry and

graduate career talks for the students.

7. Recruit Graduate fellows attached to each department and organize monthly Graduate research seminar series to review progress and receive/provide feedback
8. Industry engagement on impact on COVID-19 on RAM and LIS.

### 7.5.3: Challenges EASLIS

- i. Renovations for the EASLIS building have been slow since April 23rd 2021
- ii. The online examinations via MUELE were handled with effect from 13<sup>th</sup> September ending on 30<sup>th</sup> September 2021, with many challenges of poor network, congestion of the system and limited data.
- iii. Some students missed the online examinations due to lack of gadgets and data; while the students who attempted the online examiners some failed to submit their examinations in time. The noted glitches were handled accordingly by the examination team.
- iv. Getting placements for Field Attachment exercise 2021 in this partial lockdown is challenging because organisations are operating with 20% staff and thus rejecting interns.
- v. EASLIS has continued to face challenges of inadequate staffing especially at PhD level.



**Table 8****General Activities for the College 2020 / 2021**

Vote	Code	Warrant	Payments	Funds Available	Percentage (%)
Allowances	211103	1,122,433,956	1,118,824,902	3,609,054	99.7
Advertising and Public Relations	221001	69,500,000	69,318,310	181,690	99.7
workshops and seminars	221002	30,000,000	24,540,000	5,460,000	81.8
Staff training	221003	277,800,000	252,104,900	25,695,100	90.8
Books, periodicals and newspapers	221007	11,400,000	10,637,112	762,888	93.3
Computer supplies and IT	221008	132,700,000	132,441,551	258,449	99.8
Welfare and entertainment	221009	200,000,000	178,162,042	21,837,958	89.1
Printing, Stationery, Photocopying and binding	221011	50,000,000	49,947,201	52,799	99.9
Subscriptions	221017	20,000,000	6,453,920	13,546,080	32.3
Telecommunications	222001	30,000,000	30,000,000	0	100
Postage and courier	222002	4,000,000	-	4,000,000	-
Guard and security Services	223004	33,000,000	32,741,394	258,606	99.2
Insurances	226001	4,000,000	3,999,999	1	100
Travel Inland	227001	40,000,000	26,835,000	13,165,000	67.1
Travel abroad	227002	0	0	0	0
Fuel, Lubricants and Oils	227004	40,000,000	48,000,000	0	100
Maintenance - Civil	228001	106,000,000	105,934,037	65,963	99.9
Maintenance-vehicles	228002	0	0	0	0
Maintenance - Machinery, equipment	228003	489,300,000	478,751,264	10,548,736	97.8
Scholarships and related costs	282103	489,300,000	478,751,264	10,548,736	97.8
<b>TOTAL</b>		<b>2,793,776,222</b>	<b>2,694,173,225</b>	<b>99,602,997</b>	



### 9.1: Academic staff

The college has a total staffing of about 150. The established academic staff strength of the College is about 80 teaching staff including 11 visiting and local professors. Over twenty of these staff members hold doctorates, with many others in advanced stages of completing their PhD studies. Table 8 shows staff statistics in the college while graph 1 and 2 shows academic staff by rank in the two schools.

To facilitate a first-class student environment, the College has several service departments that focus on: ICT Support Services; Innovations and Software Development; Finance; Registry; Research; Human Resource; International/Corporate/Public Relations; and Quality Assurance.

**Table 9** CoCIS Staff statistics as of 2022

	RANK	MALE	FEMALE	TOTAL
1	Professor	3	0	3
2	Associate Professor	4	3	7
3	Senior Lecturer	2	3	5
4	Lecturer	17	15	32
5	Assistant Lecturer	21	15	36
6	Administrative staff	8	8	16
7	Support Staff	25	24	49
	<b>TOTAL</b>	<b>80</b>	<b>68</b>	<b>148</b>

### 9.3: Staff promotions, Appointments, Confirmations

A number of staff ascended in their academic ranks, some appointed and confirmed into university service while others were internationally recognized for outstanding performance.

#### a) Department of Information Technology

1. Dr. Evelyn Kigozi Kahiigi was promoted to the rank of Senior Lecturer
2. Dr. Esther Namirembe was promoted to the rank of Lecturer

3. Dr. Innocent Ndibatya was promoted to the rank of Lecturer
4. Dr. Alice Mugisha was promoted to the rank of Lecturer

#### b) Department of Networks

1. Dr. Mary Nsabagwa was promoted to the rank of Lecturer
2. Dr. Muwonge Bernard Ssabajjabi was promoted to the rank of Lecturer
3. Dr. Rashidah Kasauli Namisanvu was promoted to the rank of Lecturer

### c) Department of Computer Science

1. Dr. Rose Nakibuule was promoted to the rank of Lecturer
2. Dr. Michael Kizito was promoted to the rank of Lecturer

### d) Department of Information systems

1. Dr. Rehema Baguma was promoted to the rank of Associate Professor

2. Dr. Emily Bagarukayo was promoted to the rank of Senior Lecturer
3. Mr. Mark Magumba was promoted to the rank of Lecturer

### e) Department of Records and Archives Management

1. Dr. David Luyombya was promoted to the rank of Associate Professor

## 10.0

## OTHER SUPPORT FUNCTIONS AND PROFESSIONAL SKILLS DEVELOPMENT

### 10.1 Department of ICT Support Services

1. The Department of ICT and Support Services (DISS) staff manages College's computing facilities which include three local area networks and wireless access points. Our computing infrastructure consists of three student labs with 462 computers, projectors (instructional technology), printers, computer network inventory and 104 computers for the Center for Innovations and Professional Skills Development (CIPSD).
  2. This unit also manages various online applications like a college inventory management system, library management information system(s) and the college timetabling system.
  3. The unit also administers and maintains student and staff email addresses, as well as, mailing lists.
  4. It also offers end-user support to approximately 4000 students, and about 120 members of staff.
  5. The unit additionally plays a key role in revenue generation in terms of renting out the computer labs to the public to run various online assessment exercises.
- a. COCIS <> DICTS with deployment of a powerful Nexus switch now running a capacity of 10G between the College and the University network
  - b. Block A Level 4 <> DICTS with the deployment of the CISCO 3850 series switch with optional modules to run 10G
  - c. Block A Level 3 <> DICTS with the deployment of the CISCO 3850 series switch with optional modules to run 10G
  - d. Extension of fiber network (3 new segments) from the data center in Block B to Level 3 research Labs (WIMEA and Software Center) and to the AI Lab
2. The Unit cleaned up the Block A network eliminating a number of redundant links and devices which would later be deployed in Block B and EASLIS
  3. The College data center was also cleaned up with only the operational devices powered and working optimally.
  4. Supported tax training of over 300 students from the College of Business & Management Sciences
  5. Provide ICT support to Uganda Revenue Authority in conducting their online recruitment activities of over 8000 participants under the recent framework contract.

#### 10.1.1 Accomplishments

1. The Unit upgraded the following sections of the network

## Message from the Unit Head



**Barbara Nalubega**

**Annual Budget:** 780,863,600

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The Center for Innovations and Professional Skills Development (CIPSD) provides individuals with practical computer knowledge and skills to support a 21<sup>st</sup> century knowledge-based economy. The Center strategically offers training that is responsive to the needs of the society. This is achieved through tailoring courses towards what the industry demands. The Centre has been at the forefront to assist government and other organizations to build human capacity with various ICT skills. The Center has the capacity to enroll 5000 students per annum because it has support of large-sized computer laboratories with a 525-seater capacity.

The CIPSD's mission is two-fold: 1) to offer ICT professional skills development and incubation of new ideas, as well as, nurture new technology-based businesses; and 2) to augment theoretical computing knowledge among individuals and ground them with relevant professional ICT skills for industries. For example, under Prof. Hugh Cameron's leadership and our Software Business Incubation programme, the Center has incubated over 150 startups, 15 of which have been investible since 2010. Many spinoffs include Kampala startup

hubs such as Hive Colab, Mobile Monday, Outbox, Mara Launchpad, and Grameen Applab. Other accomplishments comprise two published refereed conference articles on business incubation at Makerere university, Global Business Labs 2011–2016 (Inter-College collaboration: CoBAMS-CoCIS (Global Business Labs), CEDAT-CoCIS (Software Business incubation), Resilient Africa Network (incubation), Thought Works (Uganda) 2012–2014 and UCC 2013–2014 (training).

The Center provides first class training and consultancy services and delivers state-of-the-art training in Microsoft IT Academy Program for Microsoft related courses such as Microsoft Azure /Microsoft Infrastructure, Digital literacy in IC3 or International Computer Driving License course, Oracle Certified Training courses and Graphics and image editing Training among others; on the IC3 program, we are proud to have trained 430 MasterCard foundation scholars in the period Jan 2020-2021. The Centre is privileged to have trained over 2000 undergraduate students during the recess term at CoCIS over the past couple of years.

As an authorized Global Test Center, the unit hosts Pearson VUE, Prometric, ICDL, IC3, Huawei ICT Academy and Kryterion and ISACA certification examinations. The professionals from all over East and Central Africa sit their international exams in this Center because we are a strong and credible unit with a successful track record of more than twenty years.

### 11.1 Unit Objectives

- a. Provide IT professional training with emphasis on imparting workplace skills
- b. Provide linkage of College to the public and private sectors through innovation activities
- c. The College runs a Center for Innovations and Professional Skills Development (CiPSD), through which the College addresses various industrial challenges like skills development, incubation of new ideas and nurturing of new technology-based business.

### 11.2 College and Huawei Inc. Partnership

### 2021 Accomplishments

1. The Unit received equipment worth USD 15,000 to set up an ICT Academy Lab and the setup is underway
2. Building Materials have been procured and work on the laboratory has started. The Centre also recommended 170 students to participate in the Huawei ICT academy global competition. So far 88 students successfully completed the registration and will soon participate using the online mode in areas of AI, Online networking, Cloud Computing and HCIA R&S
3. The Amity University Partnership revenue from continuing students stands at UGX 201,132,200.
4. EVBAB Project arrears stand at UGX 70,814,807 as of 15<sup>th</sup> July 2021
5. The EVBAB and Amity University online students completed their exams without incident.
6. The EVBAB project team set up a new laboratory and studio on ground floor Block A.

### LAB SET - UP WORKS









### 11.3 Collaboration with MasterCard foundation

1. We successfully trained 212 MasterCard foundation scholars in IC3 digital literacy programme.
2. But we are yet to administer the Cyber security exams to those 212 stellar performers in IC3 and to get paid the outstanding balance by MasterCard foundation amounting to USD 43,600 for training cohort 5' 165 scholars and cohort 6' 53 scholars.
3. We switched to online teaching and learners have started embracing it.
4. With time the new normal will take root. Students have started making payments to study.

5. 6.The center received 5 new desktop computers for use in the CCA lab
6. We added a new course category in the Testing center called ISACA and clients have started taking tests

### 11.4 Challenges & Way Forward

1. Online teaching and learning has not yet been embraced by majority of parents and learners.
2. Due to the system migration going on within the entire University it is difficult to sort data depicting income from short courses but nonetheless students pay using the digital tuition fees system.

### Activities and outputs for July 2021 to 30<sup>th</sup> June 2022

Planned Activities	Key Tasks	Outputs	Budget	Responsibility
Visit Cisco Networking academies an ASC to interest them in embracing online teaching	Marketing	Increased student enrolment	2,000,000	Business Development Officer and CIPSD team
Vigorously engage in digital Marketing, and engaging the informal sector in markets and supermarkets in at least 4 districts	Marketing	Increased student enrolment	10,000,000	CIPSD staff
PC hardware training	Training TVETs and schools	Improving upon and increasing digital literacy and numbers on the Cisco program	10,000,000	CiPSD staff
ICT youth digital awareness	Marketing	Increasing digital literacy	10,000,000	CiPSD staff
Cisco Instructor Training in Devops and Cyber Ops Associate	Instructor Training	Improving Instructor' professionalism and revenue base for the college through increasing numbers for Netacad	Budget is yet to be sent from Cisco systems EMEAR	CiPSD staff

Mastercard Foundation Scholars Training	Administering Security and IC3 Exams	Training 218 scholars was done but we are yet to be paid	2,000,000	Business Development Officer and CIPSD team
Demanding arrears from the e-Vbab project team in India	N/A	N/A	Arrears stand at UGX 70,814,807 as of 15th July 2021	Head CIPSD and Mr. Mwanje

## 11.5 Planned activities for AY 2022 / 2023

Planned Activities	Key Tasks	Outputs	Budget	Responsibility
Visit secondary schools especially	Marketing	Increased student enrolment	2,000,000	Business Development Officer and CIPSD team
Vigorously engage in digital Marketing and radio ads	Marketing	Increased student enrolment	10,000,000	CIPSD team
Continue training Huawei courses online and later introduce students to the new Huawei equipment	Marketing and training	Increasing digital literacy		CiPSD staff
Huawei Training and completion of setting up the Huawei lab and commissioning it	Training in cloud computing and HCIA R&S	Receive funding from Huawei	USD 15,000	CIPSD team
Bringing new programming languages on board to step up income in the testing Centre is the new initiative we are pursuing				CiPSD team
Send out proposals to institutions such as banks to train their clients and staff respectively in Cyber Security , Devnet Ops			20,000,000	CIPSD team

## 11.6 Budgetary activities, changes / requirements

Activity/ course	Training	Numbers	Numbers	Planned	Actual	Comments
Cisco Cyber Security / and digital literacy training programme using grant money promised by Hital Muraj	Cisco IT ESSENTIALS training programme for 5000 high schools in Kampala, Jinja and Mukono and Kasese using the Cisco-IT Essentials curriculum	5,000 applicants to be trained by COCIS in collaboration with other academies		\$ 10,000	\$ 10,000	Receipt of funds is pending
Short courses Training	Training various short professional courses in the Center (CCNA, CCNP, CCA, IT essentials, ICDL, IC3, Oracle, Graphics and image Editing etc)			UGX 330,000,000	The fee collection process will be gradual	Due to the COVID-19 pandemic that led to closure of the University studies were interrupted but studies resumed.
Testing Centre certification exams	Several exams delivered e.g., Oracle, CCNA, CCNA Security, Cyber Security Ops, CCNP, GMAT, MCSE, ISACA groups, CISA			UGX 18,000,000	UGX 18,000,000	More marketing needed
Amity Makerere – MOU Implementation	Continuation of students who are on several Post graduate Diplomas, Degree programs and Master's programs	We planned for about 140 students Per semester for all the remaining intakes to continue successfully	We have remitted fees for this semester (and so far, we have graduated 90 students	UGX 46,573,600	NB: The Amity Income from continuing students has been at UGX 20,113,200.	Dismal performance because new applicants on this Program have transferred to the EVBAB project.

Huawei ICT Academy	Trained over 2000 students and 100 certified	100 certified	100 certified	USD 15,000	USD 15,000	
ISO collaboration	ISO standards training started but were staggering in terms of numbers	Planned for about 50 participants from the public and private sectors			N/A	Program suffered the COVID-19 Pandemic and is yet to recover

## 11.7 Progress with Strategic Planning

- CCNA Version 7 has one composite exam called 200-301 CCNA
- CCNP has evolved into two: CCNP Enterprise and Advanced Routing
- Linux has evolved into DG LINUX
- Cyber Security evolved into Cyber Ops Associate

## 11.8 Innovations in teaching and learning

- We are about to start training Devnet associate
- Training has been going on using the online model via zoom and webex for all the Cisco programs, and others such as MCSE AZURE, GRAPHICS etc.
- Amity MOU continuing students are having their studies for a new semester resuming soon.

## 11.9 Program impacts on society

- High school students were digitally skilled in CCNA, ITE, and cyber security courses free of charge with funding support from Cisco Networking Academy.
- Sister Universities with networking academies

like ISBAT University, Kampala International University and UCU rely on our expertise and get skills courtesy of our partnership with the Cisco networking Academy –EMEAR.

- Implementing the E-VBAB project has already started benefiting above 1100 Uganda students from the Industry.

## 11.10 Collaboration continued

- We are implementing the MOU signed between the Government of India and that of Uganda to operationalize the E-VBAB project. The start has been very challenging continues to be but we hope to settle in the next few months; So far, a total of 1100 students have been admitted and studies are continuing.

## 11.11 Support functions and Administrative Changes

### a) Staffing

- We are well staffed and well skilled

### b) Laboratory improvements (New equipment)

- Five new computers were procured for the department
- Works in the Huawei lab is underway
- Work in the EVBAB lab is nearing completion

# Courses Offered Under the CIPSD



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5. CCNA Cyber Security Operations (Ugx 700,000)
6. CCNA Security (Ugx 550,000)
7. International Computer Driving License (Ugx 800,000)
8. ORACLE (Ugx 800,000)
9. Dynamic Website Development (Ugx 500,000)
10. Graphics and Image Editing (Ugx 450,000)
11. CISCO Certified Networking Professional (Ugx 1,000,000)
12. Video Editing & Motion Graphics (Ugx 500,000)
13. Geographical Information Systems (Ugx 600,000)
14. Linux systems Administration (Ugx 500,000)
15. Mobile Applications Development (Ugx 500,000)
16. Programming (Ugx 600,000)

## Contacts

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ORACLE





### 12.1 Launching Luganda on the Common voice platform

The main objective of this project was to collect and validate Luganda text from different sources with a CCO license. As a first step, the Common Voice platform was localized to Luganda, after which several Luganda sentences were pushed to Common Voice. The next step involved community mobilizations to allow for as many Luganda voice contributions as possible to generate a parallel Luganda Text and Speech corpus. The Luganda

Text and Speech pairs are important in building general purpose Automatic Speech Recognition Systems (ASR). As part of the campaign drive, we officially launched Luganda on the Commonvoice platform which was marked by an event that was held in Bulange Mengo. At the end of the launch, a Memorandum of Understanding was signed between Makerere University and the Buganda Kingdom. Makerere University was represented by the Prof. Tonny Oyana and the Kingdom of Buganda was represented by the Katikkiro Charles Peter Mayiga.

#### HIGHLIGHTS FROM THE COMMON VOICE LAUNCH



Speeches given by Dr. Joyce Nakatumba (L), Owek. David Kiwalabye (L) and the Katikkiro Charles Peter Mayiga (R)





The signing of the MOU between Makerere University and the Buganda Kingdom Recommender system



## 12.2 Barriers to eHealth Adoption in Routine Antenatal Care Practices: Perspectives of Expectant Mothers in Uganda - A Qualitative Study Using the UTAUT Model – Dr. Hasifah K Namatovu, Prof. Tonny J Oyana and Henk G Sol

This study explores the challenges that impede eHealth adoption in women’s routine antenatal care practices in Uganda. A qualitative approach using semi-structured interviews was employed to document challenges. These challenges were classified based on unified theory of acceptance and use of technology (UTAUT) constructs. One hundred and fifteen expectant mothers, aged between 18 and 49 years, who spoke either English or Luganda were included in the study that took place

between January to May 2019. Thematic analysis using template analysis was adopted to analyze qualitative responses. Challenges were categorized based on five principal UTAUT constructs namely: performance expectancy, effort expectancy, social influence, facilitating conditions and behavioral intention. Facilitating conditions had more influence on technology acceptance and adoption than the other four constructs. Specifically, the lack of training prior to using the system, technical support, computers and smart phones had a downhill effect on adoption. Subsequently, the cost of data services, internet intermittency, and the lack of systems that bridge the gap between mothers and health providers further hindered technology uptake. In conclusion, strategies such as co-development, training end-users, garnering support at national and hospital level should be advocated to improve user acceptance of technology.



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