

IST-Africa 2020 Final Programme

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18 - 22 May 2020

Hosted by



MINISTRY OF SCIENCE, TECHNOLOGY
AND INNOVATION
REPUBLIC OF UGANDA

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Introduction

Due to the unprecedented circumstances during the COVID-19 pandemic, **IST-Africa 2020** will take place as a virtual event from 18 - 22 May. An activity of **IST-Africa**, **IST-Africa 2020** is the fifteenth in an Annual Conference Series bringing together senior representatives from leading public, private, education & research organisations, to discuss ICT policy, showcase research results and share knowledge.

European research activities are structured around consecutive multi-annual programmes, or so-called Framework Programmes. Horizon 2020 sets out the Priorities and thematic areas, including ICT, for 2014 - 2020. Horizon 2020 is fully open to international co-operation with the aim to jointly address major challenges where significant added value is expected to be gained from a world-wide R&D cooperation. In this context, the European Commission co-funded **IST-Africa** from 2006 - 2018, to promote African - European research cooperation and support Information Society and ICT aspects of the Africa-EU Strategic Partnership.

Hosted by the Government of Uganda through the Ministry of Science, Technology and Innovation, Supported by the European Commission and African Union Commission, IEEE Society on Social Implications of Technology, IEEE Africa Council, IEEE Uganda Section and IEEE Humanitarian Activities Committee, **IST-Africa 2020** focuses on the Role of ICT, Research and Innovation in Africa's Development and specifically on Applied ICT research in the areas of eHealth, eGovernment, eInfrastructures, Technology Enhanced Learning and ICT Skills, Cyber Security, Next Generation Computing, eAgriculture, Societal Implications of Technology, International Cooperation and ICT4D. **IST-Africa 2020** will provide a collegiate setting for presentations and discussions of national & regional developments, issues of concern & good practice models, and networking with peers. **IST-Africa 2020** will also provide an opportunity to identify potential partners for future proposals under Horizon Europe.

IST-Africa directly supports Information Society, Innovation and ICT aspects of the Africa-EU Strategic Partnership, the Science, Technology and Innovation Strategy for Africa (STISA-2024), the Digital Transformation Strategy for Africa (2020-30) and the UN Sustainable Development Goals.

The goals of the **IST-Africa** Conference Series are Community Building to facilitate EU-African research cooperation and successful exploitation of Research and Innovation results, to stimulate take-up of RTD results, to promote knowledge sharing between commercial, government and research organisations, to exchange experiences about the current state of eAdoption at a sectoral, national or regional level, to support International Cooperation and open up the European Research Area (ERA) to Africa.

Who will you meet?

IST-Africa 2020 Conference attracts policy makers, practitioners, and researchers from leading commercial, government and research organisations around the world. Unlike many research conferences, **IST-Africa** provides an opportunity to meet with senior managers, practitioners, project managers, software engineers and researchers from industry, government and research organisations. Delegates and speakers attend to share knowledge, experience and lessons learnt, and network with their peers from around the world.

IST-Africa 2020 Conference also provides the unique opportunity to identify partners and opportunities to co-operate in international ICT research projects co-funded by the European Commission under Horizon 2020. The Programme also facilitates sharing of interim results from ongoing Horizon 2020 projects as well as projects supported by national and international funding sources.

Virtual Event

Due to the unprecedented circumstances during the COVID-19 pandemic, **IST-Africa 2020** will take place as a virtual event from 18 - 22 May.

The Programme

The 5-day programme features an invigorating mix of business and government case studies, technical and policy papers and interactive workshops. As well as opening and closing plenary sessions, delegates may participate in 31 thematically focused sessions featuring different aspects of eGovernment, eHealth, eInfrastructures, Technology Enhanced Learning and ICT Skills, CyberSecurity, Next Generation Computing, ICT4D, eAgriculture, Content Technologies, Entrepreneurship and Societal Implications of Technology.

Plenary presentations will provide insights into how Research, Innovation and Entrepreneurship is being supported in Uganda, the Digital Transformation Strategy for Africa (2020-30), Research and Innovation for Sustainable Development, AfricaConnect, Support for Innovation and Entrepreneurship in Southern Africa and how IEEE is supporting Sustainable Development and activities in Africa.

The programme is subject to change and the **IST-Africa 2020** Organising Committee reserves the right to alter the contents and/or speakers. This Programme is accurate as at 17 May 2020. **The timing of all sessions are based on Uganda Time (GMT+3).**

Plenary Speakers

Plenary Speakers as at 17 May 2020 include:

- **Dr. Elioda Tumwesigye**, Minister for Science, Technology and Innovation, Uganda
- **Daan du Toit**, Deputy Director-General: International Cooperation and Resources, Department of Science and Innovation, South Africa
- **Moctar Yedaly**, Head, Information Society, African Union Commission
- **Dr Fadila Boughanemi**, Deputy Head, International Cooperation II (Asia, Africa, Middle East & External Relations), DG Research and Innovation, European Commission
- **Prof. Magdalena Salazar Palma**, Director, IEEE Region 8
- **Moses Bayingana**, Senior Policy Officer for ICT, African Union Commission
- **Tom Fryer**, Head of International Relations, GÉANT
- **Ilari Lindy**, SAIS2, Namibia
- **Paul Kostek**, IEEE Humanitarian Activities Committee Events Chair
- **Vincent Kaabunga**, IEEE Africa Council Chair

International Programme Committee

A distinguished Programme Committee reviewed and provided feedback on blind peer reviewed papers.

The **IST-Africa 2020** International Programme Committee includes

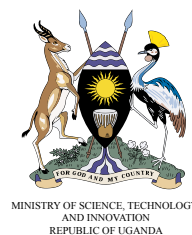
- **Paul Cunningham** (Conference Chair), IST-Africa Institute / IIMC, Ireland
- **Tiwonge Banda**, UbuntuNet Alliance, Malawi
- **Dr Donia Smaali Bouhlila**, University of Tunis El Manar, Tunisia
- **Laurens Cloete**, University of Pretoria, South Africa
- **Miriam Cunningham**, IST-Africa Institute / IIMC, Ireland
- **Kim Davis**, Research Council of Norway, Norway
- **Dr Emmanuel Eilu**, Uganda Christian University, Uganda
- **Prof. Jejel Ezzine**, ENIT, Tunisia
- **Prof. Kenneth Foster**, North Carolina State University, USA
- **Dr Charmayne Hughes**, Health Equity Institute, San Francisco State University, USA
- **Prof. Mohamed Jmaiel**, University of Sfax, Tunisia
- **Dr Chipo Kanjo**, Chancellor College, University of Malawi, Malawi
- **Vasilis Koulolias**, eGovLab / DSV, Sweden
- **Kristiina Lahde**, Saliens Ltd, Finland
- **Ilari Lindy**, SAIS II, Namibia
- **Prof. Johann Marquez-Barja**, University of Antwerp - imec Belgium
- **Prof. Maurice Mars**, University of KwaZulu-Natal, South Africa
- **Dr Tendani Mawela**, University of Pretoria, South Africa
- **Morten Møller**, GREINEN, Denmark
- **Dr Tshiamo Motshegwa**, University of Botswana, Botswana
- **Esteban Municio**, University of Antwerp - imec, Belgium
- **Dr Joshua Ndiege**, United States International University - Africa, Kenya
- **Dr David Padi**, DOS, United Nations, USA
- **Dr Fungai Bhunu Shava**, Namibia University of Science and Technology, Namibia
- **Martin Ujakpa**, International University of Management (IUM), Namibia
- **Prof Darelle van Greunen**, Nelson Mandela University, South Africa

Organising Committee

- **Miriam Cunningham**, IST-Africa Institute / IIMC, Ireland
- **Paul Cunningham**, IST-Africa Institute / IIMC, Ireland
- **Emmanuel Freddie Mugunga**, Ministry of Science, Technology and Innovation, Uganda
- **Dr Maxwell Otim**, Ministry of Science, Technology and Innovation, Uganda

Conference Secretariat

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MINISTRY OF SCIENCE, TECHNOLOGY
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Monday,
18 May, 2020

09:00 Opening Plenary 1

Welcome Address

Paul Cunningham, IST-Africa Institute, Ireland

Welcome Address

Moctar Yedaly, Head, Information Society, African Union Commission

Welcome Address

Prof. Magdalena Salazar Palma, Director, IEEE Region 8

Welcome Address

Dr. Elioda Tumwesigye, Minister for Science, Technology and Innovation, Uganda

09:30 Session 2: [eInfrastructure](#)

Advancing Rural Connectivity in South Africa through Policy and Regulation: A Case for Community Networks

Shaun Pather, University of the Western Cape, South Africa

Telecentre Users as Mediators of Empowerment of Rural Communities in Malawi

Sellina Khumbo Kapondera, Royal Holloway University of London, United Kingdom

Silent Adoption of Bring-Your-Own-Device in Tanzania Higher Learning Institutions - Adoption Policies

Mawazo Magesa, Sokoine University of Agriculture, Tanzania

Electricity and Solar Power in Health Institutes, complexities in rural Zimbabwe

Ronald Manhibi, SolidarMed, Zimbabwe

10:45 Break

10:50 Session 3: [Global Development Applications and Case Studies](#)

Unmanned Aerial Vehicles: Opportunities for Developing Countries and Challenges

Sheila Mugala, Makerere University, Uganda

Transforming Paratransit in Africa's congested Cities: An ICT-enabled Integrated Demand Responsive Transport (iDRT) Approach

Innocent Ndirabatya, Stellenbosch University, South Africa

Assessment of the Value of an Academic Preparation for Short-Term International Humanitarian Missions

Bernard Cohen, Neurological Monitoring Associates, LLC, United States

12:00 Plenary 4

IST Diplomacy in the Fight against Covid-19 - Perspectives from South Africa

Daan du Toit, Deputy Director-General: International Cooperation and Resources, Department of Science and Innovation, South Africa

12:25 Lunch Break

13:25 Session 5: [Societal Implications of Technology - Supporting Financial Transactions](#)

Role of Mobile Applications in Mitigating Challenges Faced by Informal Saving Groups

Patrick Kanyi Wamuyu, USIU-Africa, Kenya

Towards Small-Scale Farmers Fair Credit Scoring Technique

Benjamin Otieno, Kibabii University, Kenya

An Information Technology Controls Evaluation Prototype for Financial Institutions in Kenya

Bernard Shibwabo, Strathmore University, Kenya

Predicting Online Purchase Intentions in Business Administration Graduate Students

Joseph Kizito Bada, Makerere University Business School, Uganda

14:40 Break

14:45 Session 6: [Societal Implications of Technology - Supporting ePayments](#)

eReadiness of Namibian SME Retailers to Adopt B2C eCommerce

Kululeko Mthembo, Namibia University of Science and Technology, Namibia

Mose: A Mobile Application for Women Street Vendors in Cape Town

Tavonga Majoni, The University of the Western Cape, South Africa

Using Mobile Biometrics and Management Information Systems to Enhance Quality and Accountability of Cash transfer in a Girls' empowerment Program in Rural and Urban Poor Settings

Eva Muluve, Population Council, Kenya

Towards Creating Transparency in Loyalty Payments in Music Streaming Platforms in Kenya

Mzee Awuor, Kisii University, Kenya

16:10 Break

16:15 Session 7: [Societal Implications of Technology 3](#)

Managing the Challenges of the Digital Divide among First Year Students: A Case of UKZN

Temitayo Faloye, University of KwaZulu-Natal, South Africa

Industry 4.0: University Students' Perception, Awareness and Preparedness - A Case of Namibia

Aussie Mutalya, International University of Management, Namibia

Semantic Web and Grid Technology use in Collaborative Researches for Universities in Kenya

Julius Murumba, The Technical University of Kenya, Kenya

17:30 End of Sessions



Tuesday,
19 May, 2020

09:00 Session 8: [eGovernment](#)

Evaluating a Citizen-Centric e-Government Solution in Practice
Karin Fröhlich, Aalto University, Finland

Digital Ecosystems for Public Enterprises: Prospects and Challenges

Simon Shikongo, Namibia University of Science and Technology, Namibia

Open Innovation in Government Services: An Empirical View of Citizens' Participation

Collins Oduor Ondiek, United States International University- Africa, Kenya

Smart City Citizens' Service Provision using Participatory Design and Participatory Sensing: Lessons for Developing Cities

Stephen Kyakulumbye, University of the Western Cape, South Africa

Increasing Participation and Security in Student Elections through Online Voting: The Case of Kabarak University

Moses Thiga, Kabarak University, Kenya

10:40 Plenary 9

The Digital Transformation Strategy for Africa (2020-30)

Moses Bayingana, Senior Policy Officer for ICT, African Union Commission

11:00 Break

11:05 Session 10: [Content Technology Applications](#)

Towards a Sign Language Hand Gesture Recognition Design Framework

Casam Nyaga, University of the Free State, South Africa

Instagram as a New Marketing Platform for Informal Traders in Tanzania

Nasibu Mramba, College of Business Education, Tanzania

A Framework for Items Recommendation System Using Hybrid Approach

Samuel Wairegi, Jomo Kenyatta University of Agriculture and Technology, Kenya

Question Answering using Automatically Generated Semantic Networks – the case of Swahili Questions

Barack Wanjawa, University of Nairobi, Kenya

12:30 Lunch Break

13:30 Plenary 11

Research and Innovation for Sustainable Development-Future Perspectives

Fadila Boughanemi, Deputy Head, International Cooperation II (Asia, Africa, Middle East & External Relations), DG Research and Innovation, European Commission

13:55 Session 12: [eHealth Issues and Applications 1](#)

Prediction of Cancer Basing on Risk Factors using Ensemble Learning

Ruth Wario, University of the Free State, South Africa

A Dictionary Learning Approach for Noise-Robust Image Reconstruction in Low Field Magnetic Resonance Imaging
Emmanuel Ahishakiye, Mbarara University of Science and Technology, Uganda

WIDGET: the Watrilmed knowleDGe Exploration Tool
Borlli Michel Jonas Some, Université Nazi BONI, Burkina Faso

Identification of the Limitations of Healthcare Service/Insurance Industry ERPs on Data Flow using QlikView and MS Excel

Mwirigi Kiula, JKUAT, Kenya

15:15 Break

15:20 Session 13: [eHealth Issues and Applications 2](#)

Challenges Affecting the Effective Communication of PHI to Non-Medical Users: A Contextual Inquiry.

Laura Cheptegei, Kabarak University, Kenya

Towards Implementation of an Information Dissemination Tool for Health Publications: Case of a Developing Country

Christine Mulunda, University of Nairobi, Kenya

eSurveillance for Investigating Capacity of Health Systems to Detect and Control Infectious Diseases of Poverty- A Case of Kitui South Sub-County

Elizabeth Muli, Technical University of Kenya, Kenya

16:20 Break

16:25 Session 14: [eHealth Issues and Applications 3](#)

Integration of DHIS2 and Climatic Data for Disease Prediction: A Case of Malaria Occurrence in Gulu District, Uganda

Justine Fay Katwesige, School of Public Health, Makerere University, Uganda


Continued mHealth Technology Usage: Pilot Study of e-Tracker Implementation in Ghana

Flora Asah, University of Oslo, Norway

A Web Based Application for National Healthcare System

Mateus Padoca Calado, Universidade Agostinho Neto, Angola

17:30 End of Sessions



Wednesday, 20 May, 2020

09:00 Session 15: [Entrepreneurship in Uganda](#)

IEEE Entrepreneurship at a Glance
Janati Nakimera, IEEE Uganda Section, Uganda
Online Digital Payments that Every Startup Should Consider
Kenneth Bintu, Cavendish University Uganda, Uganda

09:45 Plenary 16

SAIS Programme - Supporting Innovation and Entrepreneurship in Southern Africa
Ilari Lindy, SAIS2, Namibia

10:10 [Break](#)

10:20 Session 17: [Next Generation Computing](#)

Using the Internet-of-Things and Clustering Algorithms to Help Allocate Temporary Work to the Unemployed
Laurie Butgereit, Nelson Mandela University, South Africa
Towards a Strategic Application of IoT and Big Data for African Societal Solutions
Jackson Machii, The Technical University of Kenya, Kenya
Checkpointing as a Counter to Security Issues in Cloud Computing Infrastructures
John Msagha Mbogholi, Maseno University, Kenya
Personal Cloud Computing Adoption: Integrating IT Mindfulness with TAM
John Oredo, University of Nairobi, Kenya
A Prototype of an Android Application Controlled Lawnmower
Valerianus Hashiyana, University of Namibia, Namibia

12:00 [Lunch Break](#)

13:15 Plenary 18

IEEE Humanitarian Activities Committee - Supporting Sustainable Development
Paul Kostek, IEEE Humanitarian Activities Committee Events Chair

13:30 [Break](#)

13:35 Session 19: [Cyber Security Issues - 1](#)

Secure Information Infrastructure Framework Components for a Smart City: A Case Study of Windhoek
Fungai Bhunu Shava, Namibia University of Science and Technology, Namibia
Design and Implementation of an IPSec Virtual Private Network: A Case Study at the University of Namibia
Flavia Kyeyago Ouma, Uganda Bureau of Statistics, Uganda
A Systematic Review: Vulnerability Assessment of Wi-Fi in an Educational Institution
Emily Bagarukayo, Makerere University, Uganda
A Methodology for Evaluating Security in MNO Financial Service Model
Sigsbert Rwiza, University of Dar es Salaam, Tanzania

15:00 [Break](#)

15:05 Session 20: [Cyber Security Issues - 2](#)

A Two-tier Fragile Audio Watermarking Algorithm Final
Dumisani Mfuno, Mzuzu University, Malawi
Social Engineering Based Cyber-Attacks in Kenya
James Obuhuma, Africa Nazarene University, Kenya
Using Apriori Algorithm Technique To Analyze Crime Patterns for Kenyan National Crime Data: A County Perspective
Edigar Adero, Technical University of Kenya (TUK), Kenya
A Real-Time Location Based Prototype for Notification of Crime Hotspots Using Crowdsourcing
Bernard Alaka, Strathmore University, Kenya
Emerging Network Security Issues in Modern Tertiary Institutions
Knowledge Rusere, University of South Africa, Namibia

16:45 [End of Sessions](#)



Thursday,
21 May, 2020

15:55 Session 26: [Technology-Enhanced Learning 5 - Issues and Applications](#)

An Empirical Approach to Mobile Learning on Mobile Ad Hoc Networks (MANETs)

Ichaba Mutuma, KCA University, Kenya

Development of an Open Source Desktop Application Client Software for Running Internet Enabled Laboratories

Joel Tibabwetiza Muhanguzi, Makerere University, Uganda

Barriers to the Implementation of Big Data Technology in Education: An Empirical Study

Jude Osakwe, Namibia University of Science and Technology, Namibia

E-complaints: A Semi-structured E-forum at University

Maria Ntinda, University of Namibia, Namibia

09:00 Session 21: [Technology-Enhanced Learning 1 - Supporting Skills Development](#)

Starting from Scratch: Introducing Primary School Learners to Programming

Afikile Sikwebu, Nelson Mandela University, South Africa

Learning to program on KaiOS: a Hands-on Coding School for Developing Climate Service Apps

Ville Myllynpää, University of Turku, Finland

Co-designing a European Future Tech Lab in Africa as a Place for Open Innovation

Marko Lahti, University of Turku, Finland

17:30

End of Sessions

10:15 Plenary 22

AfricaConnect: a Past, Present and Future Success Story for African Research and Education

Tom Fryer, Head of International Relations, GÉANT

10:40

Break

10:45 Session 23: [Technology Enhanced Learning in Schools 2](#)

A Mobile Ad-hoc Strategy to Enhance ICT Based Education in Zimbabwean Rural Schools

Beauty Mugoniwa, UNISA, Zimbabwe

eReadiness Assessment Tool for Schools

Alida Veldsman, Nelson Mandela University, South Africa

SESEMAT In-service Pedagogical Strategies and Student Achievement in Science at Ordinary Level in Tororo SESEMAT Region

Deborah Manyiraho, Busitema University, Uganda

12:00

Lunch Break

13:15 Session 24: [Technology-Enhanced Learning 3 - Applications](#)

Nigerian Instructors' Acceptance of Learning Management Systems: A structural Modelling Approach

Mohammed Yakubu, American University of Nigeria, Nigeria

An Adaptive Gamification Model for e-Learning

Samuel Muthée Kamunya, SEKU University, Kenya

An Innovative Blended Learning Model for Information Technology Courses for a South African University

Nosipho Mavuso, Walter Sisulu University, South Africa

14:30

Break

14:35 Session 25: [Technology-Enhanced Learning 4 - Issues and Applications](#)

Manahij App as a Tool to Enhance Students' Performance Utilizing Data Analytics and Academic Supervision - Case Study: National University Sudan

Muna Mohamed Mahmoud Abu Gosseisa, Ibn Sina University, Sudan

Automated Graduate Training Monitoring: The Case of Gulu University and Strategies for Institutional Adoption

Benedict Oyo, Gulu University, Uganda

Awareness, Accessibility and Usability of eResources: University Students Perspective

Bonnie Obeka Obande, University of Agriculture Makurdi, Nigeria

15:50

Break



Friday,
22 May, 2020

Incorporating Indigenous Knowledge within Appropriate Technologies for Promoting Awareness of Water Resource Issues

Dumani Kunjuzwa, Nelson Mandela Metropolitan University, South Africa

Understanding the Influence of ICT in Development: A Study of Uganda's Water Sector

Musa Chemisto, Islamic University In Uganda, Uganda

16:00

End of Sessions

09:00 Session 27: **eAgriculture**

Blockchain based Milk Delivery Platform for Smallholder Dairy Farmers in Kenya: Enforcing Transparency and Fair Payment
Dorothy Rambim, Masinde Muliro University of Science and Technology, Kenya

Co-design of an Agricultural Management Application for Small-Scale Farmers
Martin Ujakpa, International University of Management, Namibia

Computer Vision for Smart Farming and Sustainable Agriculture
Ronald Tombe, University of Kwazul Natal, South Africa

10:00 Plenary 28

IEEE Africa Council

Vincent Kaabunga, IEEE Africa Council Chair

10:20

Break

10:25 Session 29: **Green-energy driven Technology Solutions for Sustainable Small-scale Farming**

Introduction of LEAP-AGRI Programme

Darelle van Greunen, Nelson Mandela University, South Africa

Project Africa

Waldir Moreira, Fraunhofer AICOS, Portugal

IoT Sensing Platform for e-Agriculture in Africa

Waldir Moreira, Fraunhofer AICOS, Portugal

Mobile Applications in Support of Small-scale Crop Farming

Darelle van Greunen, Nelson Mandela University, South Africa

Wrap Up

12:00

Lunch Break

13:15 Session 30: **eAgriculture & Environmental Sustainability**

Use of Participatory Approach to Determine Adoption of ICTs Agricultural Services

Jasper Ondulo, Masinde Muliro University of Science and Technology, Kenya

Usability as Critical Success Factor of Mobile App for Pesticides Authenticity Verification: Reducing Risks for Farmers in Tanzania

Catherine Cleoplace Ngirwa, Dar es salaam University College of Education, Tanzania

Development of an Integrated Framework for Knowledge Sharing and Integration on Land use and Land Management in West-Africa

Mahamadou Belem, Université Nazi Boni, Burkina Faso

14:15

Break

14:20 Session 31: **Environmental Sustainability**

ITIKI Success Story: Classic Application of Design Thinking

Muthoni Masinde, Central University of Technology, South Africa

Evaluation of Requirements for the Design of Water Resource Management ICT Model for Integrated Water Resources

Management: The Case of Management of Lake Victoria Basin
Godfrey Odongtoo, Busitema University, Uganda