

IST-Africa 2022 Final Programme

16 - 20 May 2022

Hosted by



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

ISTO frica

Supported by



AFRICAN UNION

Introduction

Due to the unprecedented circumstances during the COVID-19 pandemic, **IST-Africa 2022** will take place as a virtual event from 16 - 20 May. An activity of **IST-Africa**, **IST-Africa 2022** is the seventeenth 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.

Hosted by the Government of South Africa through the Department of Science and Innovation, Supported by the European Commission and African Union Commission, **IST-Africa 2022** focuses on the 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 2022** 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 2022** 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 2022 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 2022 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 Europe. 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 2022** will take place as a virtual event from 16 - 20 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 29 thematically focused sessions:

Monday 16 May - eGovernment, Collaborative Open Innovation and ICT-enabled Entrepreneurship, CyberSecurity

Tuesday 17 May - eHealth

Wednesday 18 May - Content Technologies, Next Generation Computing

Thursday 19 May - Technology-enhanced Learning, Societal Implications of Technology

Friday 20 May - eAgriculture

Plenary presentations will provide insights into policy issues related to research and innovation, lessons learnt and experiences from the National Integrated Cyber-Infrastructure System, C4IR SA Achievements to Date and Way Forward, Foundational Digital Capabilities and Big Data Dimension of SKA.

The programme is subject to change and the **IST-Africa 2022** Organising Committee reserves the right to alter the contents and/or speakers. This Programme is accurate as at 13 May 2022. ***The timing of all sessions are based on South Africa Time (GMT+2).***

Conference Proceedings

The **IST-Africa 2022** conference proceedings will be published on an open access basis in the Paper Repository on the Conference Portal.

Papers that are physically presented during the event will also have the option after the event for their paper to be included in the **IST-Africa 2022** Conference Proceedings submitted for publication in IEEE Xplore. Each presenter will present one paper.

Plenary Speakers

Plenary Speakers as at 13 May 2022 include:

- **Welcome Address** - Hon. Dr. Blade Nzimande, Minister of Higher Education, Science and Technology, South Africa - represented by Dr Daan du Toit
- **Closing Address** - Daan du Toit, Deputy Director-General: International Cooperation and Resources, Department of Science and Innovation, South Africa
- African Union Commission - representative to be confirmed
- **Towards an Open Science Policy for South Africa** - Dr Daniel Adams, Chief-Director: Basic Sciences and Infrastructure, Department of Science and Innovation, South Africa
- **Development of Cyber-Infrastructure in Africa integrated with Large Scale Science Projects**, Dr Happy Sithole, Centre Manager: National Integrated Cyber-Infrastructure System (NICIS), South Africa
- **Inclusive Digital Society in Africa based on Affordable Connectivity & Sustainable Digital Businesses**, Dr Fisseha Mekuria, Chief Researcher, Next Generation Enterprises and Institutions, Council for Scientific and Industrial Research (CSIR), South Africa
- **SAIS 2 - Supporting Innovation and Entrepreneurship in Southern Africa**, Ilari Lindy, SAIS 2, Namibia
- **C4IR SA Achievements to Date and Way Forward**, Dr Ntsibane Ntlatlapa and Obakeng Hlatshwayo, C4IR South Africa
- **Long term Potential and Sustainability of Space Science and Technology**, Carla Sharpe, Africa Programme Manager, South African Radio Astronomy Observatory
- **Enabling Regulatory Environment for ICT in Africa**, Declan Korrane Africa-Europe Science Collaboration and Innovation Platform (AERAP), Belgium

International Programme Committee

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

The **IST-Africa 2022** International Programme Committee includes

- **Prof. Paul Cunningham** (Conference Chair), IST-Africa Institute / IIMC, Ireland
- **Miriam Cunningham** (Technical Programme Co-Chair), IST-Africa Institute / IIMC, Ireland
- **Prof. Mouna Baklouti**, National Engineering School of Sfax, Tunisia
- **Dr Hatem Ben Sta**, University of Tuis El Manar, Tunisia
- **Dr Fungai Bhunu Shava**, Namibia University of Science and Technology, Namibia
- **Laurens Cloete**, University of Pretoria, South Africa
- **Dr Jan-Carel Diehl**, Delft University of Technology, Netherlands
- **Dr Julieta Dominguez-Soberanes**, Universidad Panamericana, Mexico
- **Prof. Love Ekenberg**, DSV, Stockholm University, Sweden
- **Prof. Kenneth Foster**, North Carolina State University, USA
- **Felix Holl**, DigiHealth Institute, Neu-Ulm University of Applied Sciences, Germany
- **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
- **Bessie Malila**, University of Cape Town, South Africa
- **Prof. Maurice Mars**, University of KwaZulu-Natal, South Africa
- **Morten Møller**, GRENN, Denmark
- **Dr Tshiamo Motshegwa**, University of Botswana, Botswana
- **Dr Roberto Murphy**, INAOE, Mexico
- **Dr Joshua Ndiege**, United States International University - Africa, Kenya
- **Dr Abel Nyamapfene**, University College London, United Kingdom
- **Martin Ujakpa**, Ghana Communication Technology University, Ghana
- **Prof Darelle van Greunen**, Nelson Mandela University, South Africa
- **Dr Mohammad Zeyad**, Computational Biology and Data Science Laboratory, Bangladesh

Organising Committee

- **Miriam Cunningham**, IST-Africa Institute / IIMC, Ireland
- **Prof. Paul Cunningham**, IST-Africa Institute / IIMC, Ireland
- **Vinny Pillay**, Department of Science and Innovation, South Africa
- **Daan du Toit**, Department of Science and Innovation, South Africa

Conference Secretariat

IIMC Ltd / IST-Africa Institute
Docklands Innovation Park, 128 East Wall Road,
Dublin 3, Ireland
Tel: +353 (0) 1 8170607, Fax: +353 (0) 1 8170606
e-mail: secretariat@IST-Africa.org

www.IST-Africa.org/Conference2022



science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



Monday,
16 May, 2022

09:30 Opening Plenary 1

Welcome Address

Paul Cunningham, IST-Africa Institute, Ireland

Welcome Address

Hon. Dr. Blade Nzimande, Minister of Higher Education, Science and Technology, South Africa - represented by Mr Daan du Toit

09:15 Session 2: [eGovernment 1: Issues & Case Studies](#)

The Benefits of Digital Transformation addressing the hindrances and challenges of e-Government services in South Africa: A Scoping Review

Keneilwe Maremi, CSIR, South Africa

Evaluating the Impact of e-Government Initiatives on Citizens: Empowerment or Tokenism?

John Oredo, University of Nairobi, Kenya

Leveraging Technology to enhance Effective Electronic Policing in Developing Countries

Ester-Omma Nelago, Namibia University of Science and Technology, Namibia

11:00

Break

11:10 Session 3: [eGovernment 2: Issues & Applications](#)

Intention to Adopt e-Voting: A Perspective of South African Youth

Pitso Tsibolane, University of Cape Town, South Africa

A Smart City Maturity Assessment Model for South African Municipalities

Silma Koekemoer, Nelson Mandela University, South Africa

Effectiveness of Outsourced Information Systems in Public Sector

Petrus Helao Haixula, Namibia University of Science and Technology, Namibia

The Use of Electronic Notification Systems (e-Notification system) for Registering Births and Deaths: Findings from a Developing Country

Maria Shilamba, Namibia University of Science and Technology, Namibia

12:40

Lunch

13:45 Session 4: [Collaborative Open Innovation and ICT-enabled Entrepreneurship](#)

Collaborative Open Innovation through Open API Approach to Enable the Development of Financial Technology Infrastructure: Case of Botswana.

Thotobolo Morapedi, RoutePAY Botswana, Botswana

Non-Financial Support Needs of Tech Start-ups to Minimise Risk of Failure

Julien Ntamakemwa, University of Western Cape, South Africa

TechTribe: Developing an Innovation Platform for Startups and High Growth SMEs

Buntu Majaja, TechTribe, South Africa

Assessment of Regional Attractiveness for Tourism

Otakar Cerba, Plan4all z.s., Czech Republic

Determinants of Information Systems Resources for Business Organisations' Competitive Advantage: A Resource-Based View Approach

Iyaloo Waiganjo, International University of Management, Namibia

15:30

Break

15:35 Session 5: [Plenary 2](#)

Development of Cyber-Infrastructure in Africa integrated with Large Scale Science Projects

Dr Happy Sithole, Centre Manager: National Integrated Cyber-Infrastructure System (NICIS), South Africa

15:55

Break

16:00 Session 6: [Cyber Security](#)

A Smart Contract Approach to Cyber Threat Intelligence Sharing in Kenya

Wilson Maina, Jomo Kenyatta University of Agriculture and Technology, Kenya

Towards a New Taxonomy of Insider Threats

Sarathiel Chaipa, University of South Africa, Zimbabwe

Factors Influencing Smartphone End-User Security Behaviour – The Case of Young Adults in South Africa

Raeesa Behardien, University of Cape Town, South Africa

Towards a Cybersecurity Culture Framework for Mobile Banking in South Africa

Thembakazi Kangapi, University of Fort Hare, South Africa

Security Concerns on Social Media Customer-to-Customer

Stanford Musarurwa, International Training College Lingua, Namibia

17:50

End of Sessions



Tuesday,
17 May, 2022

09:15

09:15: Session 7: Plenary 3

Next Generation DNA Sequencing Technologies and Implementation Science in Reducing the Impact of Familial Colorectal Cancers in Developing Countries

Raj Ramesar, University of Cape Town, South Africa

Towards AI Based Diagnosis of Rheumatic Heart Disease: Data Annotation and View Classification

Lorna Mugambi, Centre for Data Science and Artificial Intelligence (DSAIL), Dedan Kimathi University of Technology, Kenya

Tackling Occupational and Nosocomial Infection using Vitex-Medical Assistant Tool

Faith-Michael Uzoka, Mount Royal University, Canada

Enterprise Medical Imaging in the Global South: Challenges and Opportunities

Ernest Obbie Zulu, University Teaching Hospitals, Zambia

16:55

End of Session

09:35

Break

09:40 Session 8: eHealth 1

mHealth Enablers and Inhibitors in Rural Poor Setting

Anuradha Khoda, University of the Western Cape, Kenya

Assessing Strategic Priority Factors in eHealth Policies of Four African Countries

Dillys Larbi, University Hospital of North Norway, Norway

Strategic Partnerships in e-health in Low and Lower Middle-Income Countries in Africa

Rayhane Koubaa, HealthTECH Cluster, Tunisia

Community of Practice in Practice: Successful Implementation of Integrated Community Health Information Systems

Chipo Kanjo, University of Malawi, Chancellor College, Malawi

11:25

Break

11:30 Session 9: eHealth 2

Toward Improved Data Quality in Public Health: Analysis of Anomaly Detection Tools applied to HIV/AIDS Data in Africa

Folashikemi Maryam Asani Olaniyan, African Village, Nigeria

Deep Learning Based Algorithms for Detecting Chronic Obstructive Pulmonary Disease

Endashaw Amsalu Melese, Mbarara University of Science and Technology, Uganda

A Remote Blood Pressure Data Collection and Monitoring System for Expectant Mothers

Moses Thiga, Kabarak University, Kenya

A Mobile Application to Empower Diabetic Patients Enrolled in a Therapeutic Education Programme in Mauritius

M Shaad Ally Toofanee, Université des Mascareignes, Mauritius

Maternity Management Information System for the Katutura Hospital Maternity Department, Windhoek, Namibia

Sashah Mutasa, International University of Management, Namibia

13:15

Lunch

14:15 Session 10: Plenary 4

SAIS 2 - Supporting Innovation and Entrepreneurship in Southern Africa

Ilari Lindy, SAIS 2, Namibia

14:35

Break

14:40 Session 11: Plenary 5

Inclusive Digital Society in Africa based on Affordable Connectivity & Sustainable Digital Businesses

Dr Fisseha Mekuria, Chief Researcher, Next Generation Enterprises and Institutions, Council for Scientific and Industrial Research (CSIR), South Africa

15:00

Break

15:05 Session 12: eHealth 3

GenoTrack, a webtool to geospatially link bacterial genomes from environmental and clinical settings

Mutshiene Deogratias Ekwanzala, Tshwane University of Technology, South Africa



Wednesday,
18 May, 2022

Bibliometric Analysis of the Application of Blockchain Technology for Data Security: Case Study of Global Mission Services' Digital Platform
Yves Bizumuremyi, Central University of Technology, Swaziland

17:20

End of Sessions

09:15 Session 13: **Plenary 6**

Enabling Regulatory Environment for ICT in Africa
Declan KIRRANE Africa-Europe Science Collaboration and Innovation Platform (AERAP), Belgium

9:35

Break

09:40 Session 14: **Content Technology: Applications and Case Studies**

Perceptual Impacts of Wireless Network Impairments on Video Streaming QoE using Taguchi Approach

Alex Mongi, University of Dodoma, Tanzania

A Multilevel Clustering Model for Coherent Topic Discovery in Short Texts

Emmanuel Muthoka Maithya, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

Stacked Language Models for an Optimized Next Word Generation

Ednah Olubunmi Aliyu, University of Free State, South Africa

Public Sentiments in User Generated Content amid COVID-19 Pandemic in Ghana

Emmanuel Awuni Kolog, University of Ghana, Ghana

11:10

Break

11:15 Session 15: **Next Generation Computing 1**

Towards Developing a Broadband Infrastructure Dashboard Framework

Nosipho Mthethwa, CSIR, South Africa

Development of an Interactive Remote iLab for a Wind Energy System

Yusuf Kyambadde, School of Engineering, Makerere University, Uganda

Land Registry Using a Distributed Ledger

Nolwazi Ncube, NUST, Zimbabwe

12:30

Lunch

13:45 Plenary Session 16: **Plenary 7**

C4IR SA Achievements to Date and Way Forward

Dr Ntsibane Ntlatlapa and Obakeng Hlatshwayo, C4IR South Africa

14:15 Session 17: **Next Generation Computing 2**

Preliminary Experiments on the Performance of Machine Learning Models

Misheck Banda, University of South Africa, South Africa

Multi-MelGAN Voice Conversion for the creation of under-resourced child speech synthesis

Avashna Govender, CSIR, South Africa

Word-Based Bantu Language Identification using Naïve Bayes

Boago Okgetheng, University of Botswana, Botswana

Case Study on Data Collection of Kreol Morisien, a Low-Resourced Creole Language

David Bastien, Hydrus Labs Ltd, Mauritius

15:45

Break

15:50 Session 18: **Next Generation Computing 3**

Responsible AI, SDGs, and AI Governance in Africa

Kutoma J. Wakunuma, De Montfort University, United Kingdom

An IoT Based Web Application for Tracking and Managing Covid-19 Related Data. A Case of Kenyan Learning Institutions

Jafer Abdikadir, Strathmore University, Kenya

Design of an AMR using Image Processing and Deep Learning for monitoring safety aspects in warehouse

Nabeelah Pooloo, Université des Mascareignes, Mauritius



Thursday,
19 May, 2022

15:40 Session 24: [Societal Implications of Technology](#)

SignSupport: An Emergency Mobile Application for the Deaf
Olasupo Ajayi, University of the Western Cape, South Africa

Accessibility Friendly? A Case of Namibian Online Stores
Katazo Amunkete, Namibia University of Science and Technology, Namibia

Towards User Experience Heuristics for Engagement and Interaction

Yemisi Oyedele, Nelson Mandela University, South Africa

Impact of Technophobia on the Digital Divide. A Preliminary Case Study in the Eastern Cape Province of South Africa
Samuel Faloye, University of KwaZulu-Natal, South Africa

17:10

End of Sessions

09:15 Plenary Session 19: [Plenary 8](#)

Towards an Open Science Policy for South Africa

Dr Daniel Adams, Chief-Director: Basic Sciences and Infrastructure,
Department of Science and Innovation, South Africa

09:35 Coffee Break

09:40 Session 20: [Technology Enhanced Learning 1: Issues & Applications](#)

Equitable Access to eLearning during Covid-19 Pandemic and beyond. A Comparative Analysis between Rural and Urban Schools in Zimbabwe

Gerald Tsimba, Midlands State University, Zimbabwe

Constructivist learning during the COVID-19 pandemic: Teaching and assessment skills in Post Graduate Certificate of Education students

Tafirenyika Mafugu, University of the Free State, South Africa

Mask-Up: Face Mask Alert App Using Machine Learning

Nesisa Moyo, National University of Science and Technology, Zimbabwe

11:10 Break

11:15 Session 21: [Technology-Enhanced Learning 2 - Applications and Case Studies](#)

Uses of Knowledge Management Systems in the African Context: Implementation Gap, Challenges and Prospects

Edison Wazoel Lubua, Institute of Accountancy Arusha, Tanzania

Development of the Greenwell Matongo Community Library Management Information System (LMIS)

Martin Mabeifam Ujakpa, Ghana Communication Technology University (GCTU), Ghana

School Management Information System (SMIS) for the Elite College

Aussie Mutalya, International University of Management, Namibia

Impact of Social Media on Student's Academic Performance in Higher Education Institution

Nosipho Mavuso, Walter Sisulu University, South Africa

12:45 Lunch Break

13:45 Session 22: [Plenary 9](#)

Long term Potential and Sustainability of Space Science and Technology

Carla Sharpe, Africa Program Manager, South African Radio Astronomy Observatory

14:05 Session 23: [Technology-Enhanced Learning 3 - Applications and Case Studies](#)

Technology and Pedagogical Factors to be Considered When Building a Resilience Framework for Integrating and Using Mobile Technologies in South African Rural Schools

Sifiso Dlamini, CSIR, South Africa

Gamifying Learning in High Schools: Perceptions of Students in Selected African Countries

Jovita Mateus, Namibia University of Science and Technology, Namibia

Determination of Per-Phase Equivalent Circuit Parameters of Three-Phase Transformer Using MATLAB/Simulink

Francis Katende, Namibia University of Science and Technology, Namibia

Learning Analytics Tools for Enhancing Students' Performance: A Global Perspective

Teresia Ankome, Namibia University of Science and Technology, Namibia

15:35 Coffee Break



Friday,
20 May, 2022

09:15 Plenary Session 25: **Plenary 10**

Closing Address

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

09:35

Coffee Break

09:40 Session 26: **eAgriculture 1**

ICT Adoption Challenges: Case of Rural Small-Scale Farmers in the Amathole District Municipality of South Africa

Agyei Fosu, Nelson Mandela University, South Africa

Development of English-isiZulu language translator to bridge language barrier between EWS and Bantu language Speaking farmers. Case of Swayimane, KwazuluNatal, South Africa

John Makhetha Nyetanyane, Central University of Technology, South Africa

Intent to Use a Smartphone App as a University-Community Engagement Tool by Kabarole Farmers in Uganda

Alice Sheila Nyanzi, Vrije Universiteit Brussel and Mountains of the Moon University, Uganda

The Development of a Livestock Farm Management Information System (LFMIS)

Serenia Ngola, International University of Management, Namibia

Optimization of African LULC Database for Sustainable Development

Karel Charvat, WirelessInfo, Czech Republic

11:30

Break

11:35 Session 27: **eAgriculture 2**

Data Product Model for boosting Agricultural Productivity in Sub-Saharan Africa.

Chinecherem Umezuruike, Kampala International University, Uganda

Internet of Things, Big Data Analytics and Deep Learning for Sustainable Precision Agriculture

Jackson Machii, The Technical University of Kenya, Kenya

A Regularized Multi-task Neural Networks Convolutional Learning Model for Maize Disease Identification

Diane Niyomwungere, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

Design, Construction and Testing of a Cocoa Pod Breaking Machine to Improve Cocoa Processing

Daniel Amoshie, Ashesi University, Ghana

Design of a Tomato Harvesting Robot for Agricultural Small and Medium Enterprises (SMEs)

Mohammad Shoaib Ibne Saleem Casseem, University of Mauritius, Mauritius

13:25

Lunch

14:00 Session 28: **eAgriculture 3**

Intelligent and Flood Resilient Agriculture

Ayodele Periola, University of Johannesburg, South Africa

Awareness and Perceptions of Smart Irrigation Technologies by Small Scale Farmers in Rural South Africa

James Njenga, University of the Western Cape, South Africa

Water Quality Management Using IoT & Machine Learning.

Andrew Omambia, University of Eastern Africa, Baraton, Kenya

Application of Convolutional Neural Networks to the Quantification of Tick Burdens on Cattle using Infrared Thermographic Imaging

Fhulufhelo Mudau, Stellenbosch University, South Africa

15:30

End of Sessions