



Second Biennial Conference

Africa and the Fourth Industrial Revolution: Defining a Role for Research Universities

University of Nairobi
18-20 November 2019

Programme

Day 1: Monday, 18th November 2019

(Conference Opening: Chandaria Auditorium)

9.00 am	Introductory Remarks:	Professor Madara Ogot , Deputy Vice Chancellor (Research) University of Nairobi and Chair of Local Organising Committee Professor Ernest Aryeetey , ARUA Secretary-General
	Welcome Remarks:	Professor Isaac Mbeche , Acting Vice Chancellor, University of Nairobi
	Brief Remarks:	Professor Idowu Olayinka , Vice Chancellor, University of Ibadan and Board Chair, ARUA
9.20 am	First Keynote Address:	Professor Zblon Vilakazi , Deputy Vice Chancellor (Research and Innovation), University of the Witwatersrand
9.50 am	Opening of Conference:	Hon. Prof. George Magoha , Cabinet Secretary Ministry of Education, Republic of Kenya
10.00 am	Tea/Coffee Break	

10.30 am	First Plenary Session: (Chandaria Auditorium)	<p>Universities and the Fourth Industrial Revolution: Any Best Practices? (Chair: Professor Barnabas Nawangwe, Vice Chancellor, Makerere University)</p> <ol style="list-style-type: none"> 1. Professor Margaret J. Dallman, Imperial College, London; <i>The STEM and Skills Drivers of the Fourth Industrial Revolution - An International Perspective</i> 2. Professor Njuguna N'dungu, Executive Director, African Economic Research Consortium, Nairobi, Kenya; <i>The Challenges and Opportunities of Technological Change and the Fourth Industrial Revolution in Africa</i> 3. Professor Jan Palmowski, Guild of European Research Universities, <i>Preparing for the Fourth Industrial Revolution: The case of Universities and Research Funders in Europe</i>
12.00 am	First Parallel Sessions	
1.30 pm	Lunch	
2.30 pm	Second Keynote Address: (Chandaria Auditorium)	<p>Professor Andrew Thompson, Oxford University, <i>The Age of the "Techno-cene": Why We Will Need the Arts and Humanities to Tame the Tiger of the 4th Industrial Revolution and AI</i></p>
3.05 pm	Second Plenary Session: (Chandaria Auditorium)	<p>The Humanities and Social Sciences in the Fourth Industrial Revolution (Chair: Professor Adam Habib, Vice Chancellor University of the Witwatersrand)</p> <ol style="list-style-type: none"> 1. Professor Tade Aina, Executive Director, Partnership for African Social and Governance Research, Nairobi, Kenya; <i>In the End, Would We Still be Human?</i> 2. Professor Fraser McNeill, University of Pretoria; <i>Posthumanism, Industrial Revolutions and the New Politics of Difference</i> 3. Professor Paul Tiyambe Zeleza, United States International University, Nairobi
4.30 pm	Tea/Coffee Break	

- 5.00 pm Second Parallel Sessions
- 6.30 pm Light Refreshment/Cocktails
- 7.15 pm Meeting of ARUA VCs/DVCs and UKRI at Safari Club Hotel (By Invitation)
Meeting of ACU and ARUA Centre Heads at Safari Club Hotel (By Invitation)

Day 2: Tuesday, 19th November 2019

- 9.00 am Third Keynote Address: (Chandaria Auditorium) **Professor Alison Lewis**, Dean, Faculty of Engineering and the Built Environment, University of Cape Town; *Leaders, Followers or Spectators: African Research Universities and 4IR*
- 9.40 am Third Plenary Session (Chandaria Auditorium) **Strengthening STEM Education in Africa** (Chair: **Professor Idowu Olayinka**, Vice Chancellor, University of Ibadan and Chair of ARUA Board)
1. **Professor Alex Ezeh**, Drexel University; *Priorities for Strengthening Institutional Research Capacity in Africa*
 2. **Dr. Karin Wolff**, Stellenbosch University; *Insights into STEM education in Africa for the 21st century*
 3. **Professor Bitange Ndemo**, University of Nairobi
- 11.15 am Tea/Coffee Break
- 11.45 am Third Parallel Session:
- 1.15 pm Lunch
- 2.15 pm Fourth Plenary Session: (Chandaria Auditorium) **Ethics and the Fourth Industrial Revolution** (Chair: **Professor Tassew Woldehanna**, President, Addis Ababa University)
1. **Professor Moses Chimbari**, University of KwaZulu Natal; *The African Paradox of Wanting to Become Relevant Before Catching Up*
 2. **Ms Jessica Breakey**, School of Electrical and Information Engineering, University of Witwatersrand; *Teaching Justice in a Time of AI*

3. **Professor Modupe Omirin**, University of Lagos;
Ethical Considerations and Preparing for the 4IR in Urban Land Management

- 3.45 pm Tea/Coffee Break
- 4.15 pm Fourth Parallel Sessions
- 6.00 pm Buses Depart for Conference Dinner at Safari Park Hotel
(Dinner Speech by **Professor Adam Habib**, Vice Chancellor, University of the Witwatersrand)

Day 3: Wednesday, 20th November 2019 (Centre of Excellence Workshops for Young Researchers)

- 9.00 am
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| <ol style="list-style-type: none"> 1. Climate Change (Room: MLT 401) 3. Water (Room: MLT 402) 5. Energy (Room: MLT 403) | <ol style="list-style-type: none"> 2. Migration and Mobility (Room: MLT 404) 4. Unemployment and Skills Development (Room: MLT 405) 6. Post-Conflict Societies (Press Room) |
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- (There will be a Special Workshop on Research Management with IREX at this time)***
- 10.30-10.45 am Tea/Coffee Break
- 12.30 pm Lunch
- 1.30 pm
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| <ol style="list-style-type: none"> 7. Non-Communicable Diseases (Room: MLT 401) 9. Materials Development and Nanotechnology (Room: MLT 402) 11. Food Security (Room: MLT 403) 13. Urbanisation and Habitable Cities (MLT 404) | <ol style="list-style-type: none"> 8. Poverty and Inequality (Room MLT 405) 10. Good Governance (Press Room) 12. Notions of Identity (VIP Room) |
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- 4.00 pm Tea/Coffee Break
- 4.30 pm Keynote Address by **Professor Jeffrey Sachs**, Columbia University (Chandaria Auditorium)
- 5.00 pm **Policy Roundtable and Wrap-Up** (Chandaria Auditorium)
(Chair: **Professor Oluwatoyin Ogundipe**, Vice Chancellor, University of Lagos)
1. **Dr Lusenga Maluleke**, Statistician-General and Head of Statistics South Africa
 2. **Professor Philip Cotton**, Vice Chancellor, University of Rwanda
 3. **Professor William Anangisye**, Vice Chancellor, University of Dar es Salaam
 4. **Professor Nana Poku**, Acting Vice Chancellor, University of KwaZulu-Natal
 5. **Professor Tally Palmer**, Water Centre of Excellence, Rhodes University
- 5.00 pm Special Meeting of UKRI and ARUA Heads of Centres
- 6.30 pm End of Conference and Workshop/Light Refreshment

ARUA CONFERENCE
SCHEDULE OF PARALLEL SESSIONS
Monday, 18th November 2019

<p style="text-align: center;">Parallel Session 1.1: 12.00 pm Economic Performance, Diversification and Employment</p> <p style="text-align: center;">Chair: Ernest Aryeetey (Room: MLT 401)</p>	<p style="text-align: center;">Parallel Session 1.2: 12.00 pm Food Security and Digital Technologies</p> <p style="text-align: center;">Chair: Madara Ogot (Room: MLT 402)</p>	<p style="text-align: center;">Parallel Session 1.3: 12.00 pm New Approaches to Higher Education</p> <p style="text-align: center;">Chair: Beatrice Muganda (Room: MLT 403)</p>	<p style="text-align: center;">Parallel Session 1.4: 12.00 pm Climate Change and the Fourth Industrial Revolution</p> <p style="text-align: center;">Chair: Eugene Cloete (Room: MLT 404)</p>	<p style="text-align: center;">Parallel Session 1.5: 12.00 pm Energy and the Fourth Industrial Revolution</p> <p style="text-align: center;">Chair: Cuthbert Kimambo (Room: MLT 405)</p>
<p>Kwabena Gyimah-Brempong, University of South Florida; Service Exports, and Youth Unemployment in Africa</p>	<p>Hettie Schönfeldt, University of Petoria; Challenges and Opportunities for Food Security and Health in Africa</p>	<p>Mojisola Aderenike Bolarinwa, University of Ibadan; The Impact of Educational Technology in South-Western Nigeria: Case Study of Final Year Engineering Students from University of Ibadan</p>	<p>Shem O. Wandiga, University of Nairobi; Africa and the Fourth Industrial Revolution: Climate Change Challenges Demand Shifts in Education Models</p>	<p>Arinola B. Ajayi, University of Lagos; Sustainable Renewable Energy Solutions for GSM Base Stations</p>
<p>Romanus Osabohien, Covenant University, Ota, Nigeria; Agricultural Transformation Agenda in Africa: Redirecting Social Protection Programmes for Rural Agripreneurial Engagement</p>	<p>Patrick Miremebe, Uganda Technology and Management University;</p>	<p>G. Outa, University of Nairobi; Humanities-Science and Social Research Collaboration: An Agenda for the Africa Research University in Pursuit of the Fourth Industrial Revolution</p>	<p>Britta Rennkamp, University of Cape Town; Gearing the Fourth Industrial Revolution Towards Climate Compatible Development in Africa</p>	<p>Amsalu Mossissa, Stellenbosch University; Biogas Application in Agriculture Value Chains</p>
<p>Peter Quartey, University of Ghana; Technological Innovation, Firm Value-Added and Employment in Ghana</p>	<p>Jane Ambuko, University of Nairobi;</p>	<p>Anastacia Mamabolo, University of Pretoria; Bridging Africa Skills 4.0 Gap: Repositioning Learning, Teaching and Research of Skills in African Higher Education Institutions</p>	<p>Adelina Mensah, University of Ghana; The 4IR: The Case for Disruptive Universities in Africa</p>	<p>Jan Greyling, Stellenbosch University; Digital field trials using IOT sensor arrays</p>

<p>Parallel Session 2.1: 5.00 pm Higher Education Responses to the 4IR</p> <p>Chair: Oluwole Familoni (Room: MLT 401)</p>	<p>Parallel Session 2.2: 5.00 pm Producing Goods in the 4IR</p> <p>Chair: Kwabena Gyimah-Brempong (Room: MLT 402)</p>	<p>Parallel Session 2.3: 5.00 pm Governance Challenges and the 4IR</p> <p>Chair: Nelson Ijumba (Room: MLT 403)</p>	<p>Parallel Session 2.4: 5.00 pm Organising Research for the 4IR</p> <p>Chair: Nelson Torto (Room: MLT 404)</p>	<p>Parallel Session 2.5: 5.00 pm Social Issues and the 4IR</p> <p>Chair: Umar Kakumba (Room: MLT 405)</p>
<p>Oluwole Coker, Obafemi Awolowo University; Indigenising Research in African Universities for Sustainable Development: The Missing Link</p>	<p>Emmanuel Abbey, University of Ghana; Exploring Differences in Innovation between Start-Ups and Established Firms: The Case of Ghana and Kenya</p>	<p>Oluwatobi A. Ajayi, Obafemi Awolowo University; Governance and Disruption: Redefining Public Engagement and Policymaking in Africa in the 4IR</p>	<p>Abel E. Ezeoha, Ebonyi State University Abakaliki; R&D Investments and Industrial Productivity in Africa: The Intervening Role of University-based International Centres of Excellence, Nigeria</p>	<p>Lukman Abdulrauf, University of Ilorin; Personal Information as the 'New Oil' of the Digital Economy: Is Africa Ready for the Ensuing Risks?</p>
<p>Noel Drake Kufaine, University of Malawi; The Impact of Internationalisation on Higher Education Response to the 4IR</p>	<p>K.K. Nyirenda, University of Malawi; Harnessing the Potential of Nanomaterials from African Biodiversity for Biomedical Applications</p>	<p>Tendai Chigware, University of Fort Hare; A Reflection on Africa's Universities Capacity to Embrace the 4IR</p>	<p>Wilson Okaka, Ebonyi State University Abakaliki; Effectiveness of Communication Strategy for University Community Research for Emerging Research Universities in Uganda</p>	<p>Nonhlanhla Cynthia, Futurehands Junior Researchers; The Idea and Preparations for 4IR in Rural Areas</p>
<p>Rasheed Olaniyi, University of Ibadan; The 4IR: Reversing Brain-Drain in African Universities</p>	<p>Karen-Ann Dicken, University of Dundee; Digital Tooling</p>	<p>John A. Mushomi, Makerere University; Re-imagining the 4IR Higher Education Space and Place Dynamics in Sub-Saharan Africa</p>	<p>Watu Wamae, University of Oxford; Research and the African University: Shaping Trajectories for Alternative Futures</p>	<p>Afatakpa Fortune, University of Ibadan; Artificial Intelligence and the Future of Nigerian Youth</p>

Parallel Sessions: Tuesday, 19th November 2019

<p align="center">Parallel Session 3.1: 11.30 am The Research Environment</p> <p align="center">Chair: Mitike Molla (Room: MLT 401)</p>	<p align="center">Parallel Session 3.2: 11.30 am African Spatial Development and the 4IR</p> <p align="center">Chair: Timothy Nubi (Room: MLT 402)</p>	<p align="center">Parallel Session 3.3: 11.30 am STEM Education and the 4IR</p> <p align="center">Chair: Zebulon Vilakazi (Room: MLT 403)</p>	<p align="center">Parallel Session 3.4: 11.30 am Social Issues and the 4IR (2)</p> <p align="center">Chair: Sarah Ssali (Room: MLT 404)</p>	<p align="center">Parallel Session 3.5: 11.30 am Universities and the World of Work</p> <p align="center">Chair: Sunday Adebisi (Room: MLT 405)</p>
<p>Tracey October, Clarivate Analytics; Navigating Scholarly Publishing: Opportunities and Pitfalls</p>	<p>Francois Viruly, University of Cape Town; The Implications of the 4IR for Real Estate Markets in Africa</p>	<p>Simon Ngalomba University of Cape Town; Developing Undergraduate Biomedical Engineering Curriculum for the 4IR in Tanzania and Kenya</p>	<p>Sandra Bhatasara, University of Zimbabwe; The Gender and Labour Question in the future of Work Discourses within the 4IR in Southern Africa</p>	<p>Oluyemi Theophilus Adeosun, University of Lagos; University Internship Systems and Preparation for the World of Work in the 4IR</p>
<p>Maliamungu Habib Uthuman; Africa and the 4IR: Defining a Role for Research Universities</p>	<p>Luke Boyle, University of Cape Town,; In Pursuit of an African Smart City</p>	<p>Adetunmbi I Akinyemi , University of Ibadan; The Effect of Game-based Learning (GBL) and Gamification on Students' Academic Achievement, Attitude and Motivation in Learning Physics</p>	<p>Manase Kudzai Chiweshe, University of Zimbabwe,; 4IR and Academia in Africa: Does Sociology Have a Role to Play in Zimbabwe?</p>	<p>J.O. Okebiorun, University of Lagos; Strengthening Universities' Education for the 4IR through Lifelong and Life-Wide Learning</p>
<p>Akon O. Ekpezu, University of Ghana; Addressing Educational Needs for Industry 4.0 in Africa: The Role of Recommender System</p>	<p>Taibat Lawanson, University of Lagos; Why urban research matters for Africa's 4th industrial revolution</p>	<p>Jeremy Takrama, Central University, Ghana; National Centres of Excellence in Molecular Biology and Genomics for Next Generation African Scholars</p>	<p>Katharina Vones, University of Dundee; Whose Revolution? Utilising Maker Spaces as Locations for Building Ethical Communities</p>	<p>Amaka G. Metu, Nnamdi Azikiwe University; The 4IR and Industrial Labour Employment in SSA: The Role of Tertiary Education</p>

Parallel Sessions: Tuesday, 19th November 2019

<p>Parallel Session 4.1: 4.30 pm Water and the 4IR</p> <p>Chair: Stephanie Burton (Room: MLT 401)</p>	<p>Parallel Session 4.2: 4.30 pm Materials Development, Nanotechnology and 4IR</p> <p>Chair: Lesley Cornish (Room: MLT 402)</p>	<p>Parallel Session 4.3: 4.30 pm Inequalities, Innovations and the 4IR</p> <p>Chair: Murray Leibbrandt (Room: MLT 403)</p>	<p>Parallel Session 4.4: 4.30 pm The Role of Universities</p> <p>Chair: Deresh Ramjugernath (Room: MLT 404)</p>	<p>Parallel Session 4.5: 4.30 pm Enhancing Productivity</p> <p>Chair: Sue Harrison (Room: MLT 405)</p>
<p>Jane Tanner, Rhodes University; Water Resources Assessment Uncertainty in Africa and the Promise of Global Datasets</p>	<p>David Dodoo-Arhin, University of Ghana; Innovative Materials Science and Engineering towards the 4IR</p>	<p>Priscilla Twumasi Baffour, University of Ghana; Innovation and Employment in Sub-Saharan Africa</p>	<p>David Mills, University of Oxford; The Epistemic Politics of Doctoral 'Capacity-Building' in Africa's Research Universities <i>(By Skype)</i></p>	<p>Girma Fana Dinsa, University of Dundee; Can Molecular Breeding Cooperation between Ethiopia and the UK Help Unlock Genetic Information to Feed the Increasing Population?</p>
<p>Isa Kabenge, Makerere University; Big Data and Cloud Computing in Water Resources Management: A Case Study on Land-Use Change in Planted Forests. Considerations for African Universities</p>	<p>Ernest N. Kamavuako, King's College, London; Affordable Embroidered EMG Electrodes for Myoelectric Control of Prostheses</p>	<p>Robert Osei, University of Ghana; Understanding the Relationship between Economic Inequality, Inequality of Opportunity and Inequality of Education Outcomes</p>	<p>Norman Nhede, University of Pretoria; Re-defining the Role of Universities in the Era of Digitisation</p>	<p>Adebusuyi Olubusayo Foluso; In-Service Teachers Technological Pedagogical Content Knowledge and Students Learning Outcomes in Practical Chemistry Classroom</p>
<p>Serigne Faye, Université Cheick Anta Diop; The Value of Bibliometric Methods to Track and Assess High Impact Research in African Soil and Water Literature</p>	<p>Sella Terrie Jwan, Moi University; The 4IR: Preparedness of African Research Universities</p>	<p>Moses Uloma, University of Calabar; Evaluating the Potential Impact of Cryptocurrencies on the Nigerian Economy</p>	<p>Martin A.M. Khamala, Technical University of Kenya; Adapting Technology Enhanced Learning for Future Minds: The PedAL Experience with African Universities</p>	<p>Joshua Temitope Owolabi, University of Lagos; Emerging Technologies and the 4IR: Implications for Human Resource Management in Nigeria</p>