

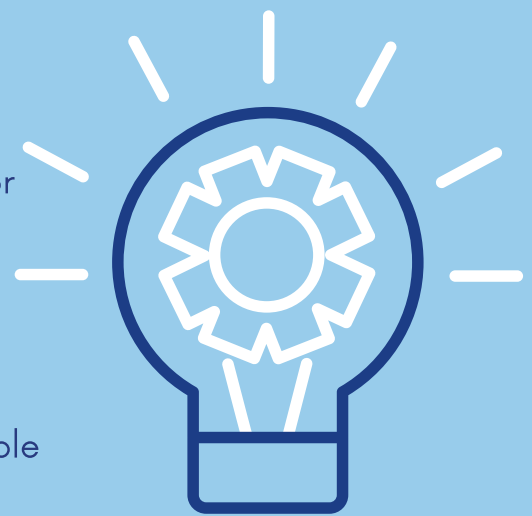
# Data Science for Solution-Driven and Sustainable Response to Current Developing World Challenges

DEC 3 - 4, 2020

**Goals:** To provide a platform to increase knowledge in Data Science with focus on Big Data, Analytics and Artificial Intelligence and to explore how these technologies have addressed impact of and response to COVID-19, alongside with provision of sustainable solutions, while building multidisciplinary and international collaborations.

## Specific Objectives:

- provide a platform to exchange ideas and improve the interactions among young scientists;
- discuss current trends of research and build capacity for researchers in Data Science with regards to COVID-19 and Sustainability;
- identify niche areas of Data Science that could result in cross-border scientific collaborations;
- initiate collaborations to address regional issues particularly in the areas of the United Nations Sustainable Development Goals (UN-SDG)



## Sub-Themes

- Data Science for COVID-Response
- Data Science for COVID Impact
- Data Science for Bioinformatics and Genome Sequencing
- Data Science for Health Related Applications
- Data Science for Societal Building
- Data Science for Security Management
- Data Science for Environmental Modelling
- Data Science for Sustainable Agriculture
- Data Science for E-Commerce, E-Governance and Smart Energy Solutions

## Keynote & Plenary

- Prof. Tshilidzi Marwala
- Dr. Jacques Ludik
- Dr. Ruth Lennon
- Prof. Dr. Fernando Buarque
- Prof. Olawande Daramola
- Prof. Carlos A. Coello Coello
- Dr. Bolanle Ojokoh
- Dr Emile Chimusa
- Dr. Valere Salako
- Dr Kashifu Abdullahi
- Dr. Mustafa Ozuysal
- Dr. Selma Tekir
- Dr Enzo Ferrantes
- Prof. Alaa Khamis
- Prof Ming Zhang
- Dr Lipika Deka
- Dr. Utku Kose
- Dr. Vicky Nembaware
- Dr. Max Paoli
- Prof. Virgilio Almeida
- Prof. Hesham El-Askary



**Ruth Lennon** is the director of Craobh Technology Consulting providing personalised solutions to industry problems. Ruth is a Lecturer has 20 years of experience as a lecturer in the Department of Computing in Letterkenny Institute of Technology, Ireland. Ruth research interests focus on enterprise scale systems with particular focus on DevOps and Cloud technologies. She has been a member of many technical panels and committees including NSAI/TC 2/SC 11 on cloud and distributed systems, NSAI/TC 2/SC 2 on Software Engineering and ISO/IEC JTC 1/AG 3 "Open Source Software". Ruth is a member of the working group developing the P2675 DevOps standard. Ruth's goal in DevOps is to ensure that security and performance are seen as core to development projects just as it is in configuration projects. Ruth has worked on security projects in the area of applying DevOps to support Data Science. In addition, Ruth is a member of the ACM, ACM-W, IEEE, IEEE-WIE and the IEEE Computer Society. Ruth is the Chair of the ACM-W Europe.



**Dr Jacques Ludik** is a smart technology entrepreneur, Artificial Intelligence (AI) expert, author, investor, AI ecosystem builder, and award-winning AI Leader with a Ph.D. in Computer Science (AI) and 25+ years' experience in AI & Data Science and its applications. He is currently the Founder & CEO of Cortex Group and Founder & CEO of Cortex Logic that is focused on providing scalable ultra-personalized AI-enabled wellness solutions and the Founder & President of the Machine Intelligence Institute of Africa (MIIA) that focuses on transforming Africa through A. I.

Dr. Ludik is also involved in building AI-based Wellness, AI-based Trading, Smart Healthcare and Smart Education based companies with data rich platforms that leverages AI technologies to unlock business, customer and societal value. He has also founded CSense Systems (Africa's first AI company that was sold to a multi-national company, specifically General Electric in 2011), Journey, Bennit.AI, Mosaic, and SynerG. Apart from his executive management roles in these companies, he was previously Vice President Data Science & Chief Data Officer at Jumo, Director and Big Data & Analytics Leader at General Electric and Senior Lecturer and Researcher at Stellenbosch University.

Dozens of his papers on AI were published in Journals and International Conferences as well as a book, Neural Networks and Psychopathology, published by Cambridge University Press (UK). Dr Ludik is currently writing a book on Transformative Human-Centric Artificial Intelligence, scheduled to be published in 2021. He also has a patent filed for Knowledge Fusion. Jacques holds a B.Sc. (Cum Laude), Hons. B.Sc. (Cum Laude), M.Sc. (Cum Laude), and Ph.D. degrees in Computer Science from Stellenbosch University. Dr Ludik currently also serves on the Advisory Boards of Cirrus, AI Africa Expo and Data Science Nigeria and has launched AIAfrica.wiki via MIIA. In 2019, he is also the recipient of Africa's AI Leader of the Year Award. His massive transformative purpose is to help shape a better future in the Smart Technology Era, and specifically to help business & society thrive in Smart Technology Era. He is also passionate to help transform Africa through Smart Technologies such as AI, building AI communities and exponential organizations.



**Prof. Justine Olawande Daramola** is a Computer Scientist with research specialisations in Applied Software Engineering (ASE) and Artificial Intelligence (AI). ASE involves the application of artificial intelligence (AI) methods for the design and development of intelligent software systems. As an NRF-rated researcher, he is particularly interested in the use of semantic technologies like ontologies, knowledge graphs for enabling intelligent capabilities in software systems that are relevant to real-world domains such as healthcare, education, government, trade

and commerce and so on. He is also an active researcher in the fields of Artificial Intelligence, Machine Learning, Big Data Analytics. Some of my ongoing research projects include Explainable AI (XAI), AI for Healthcare, and Health Data Science. He has successfully supervised many postgraduate students at the masters and doctoral levels, and served as an External Examiner to many universities across Africa, India, and Europe.

**Proposed Topic: Data Science for COVID-Response**



**Carlos Artemio Coello Coello** received a PhD in Computer Science from Tulane University (USA) in 1996. His research has mainly focused on the design of new multi-objective optimization algorithms based on bio-inspired metaheuristics (e.g., evolutionary algorithms), which is an area in which he has made pioneering contributions. He currently has more than 500 publications, including more than 160 journal papers and 55 book chapters. He has published a monographic book and has edited 3 more books with publishers such as World Scientific and Springer.

He has also published a book on the history of computing in Spanish, which has sold more than 3000 copies. He has supervised 21 PhD theses (including 3 in Argentina), 46 Masters thesis (including one in France) and 8 Undergraduate theses. Several of the PhD theses that he has supervised, have received awards in national competitions. He has also received (with his students) several "best paper awards" at different international conferences, including the prestigious Genetic and Evolutionary Computation Conference (GECCO), which is the most important in his field. He is also the only Latin American who has been awarded twice the "best paper award" of the IEEE Transactions on Evolutionary Computation. His publications currently report 52,662 citations in Google Scholar. According to Scopus, Dr. Coello has 18,782 citations, excluding self-citations and citations from all his co-authors. His h-index is 92, according to Google Scholar, 60 according to Scopus and 52 according to the ISI Web of Science. In the ShanghaiRanking's Global Ranking of Academic Subjects 2016 developed by Elsevier, he appears as one of the 300 most highly cited scientists in the world in "Computer Science", occupying the first place in Mexico. He has received several awards, including the National Research Award (in 2007) from the Mexican Academy of Science (in the area of exact sciences), the 2009 Medal to the Scientific Merit from Mexico City's congress, the Ciudad Capital: Heberto Castillo 2011 Award for scientists under the age of 45, in Basic Science, the 2012 Scopus Award (Mexico's edition) for being the most highly cited scientist in engineering in the 5 years previous to the award and the 2012 National Medal of Science in Physics, Mathematics and Natural Sciences from Mexico's presidency (this is the most important award that a scientist can receive in Mexico). He also received the Luis Elizondo Award from the Instituto Tecnológico de Monterrey in 2019. He is the recipient of the prestigious 2013 IEEE Kiyu Tomiyasu Award, "for pioneering contributions to single- and multiobjective optimization techniques using bioinspired metaheuristics" and of the 2016 The World Academy of Sciences (TWAS) Award in "Engineering Sciences". Since January 2011, he is an IEEE Fellow. He is also Associate Editor of several international journals including the IEEE Transactions on Evolutionary Computation, Evolutionary Computation and the IEEE Transactions on Emerging Topics in Computational Intelligence. He is Full Professor with distinction (Investigador Cinvestav 3F) at the Computer Science Department of CINVESTAV-IPN in Mexico City, Mexico.

**Proposed Topic: An Overview of Evolutionary Multi-Objective Optimization**



**Dr. Utku Kose received** the B.S. degree in 2008 from computer education of Gazi University, Turkey as a faculty valedictorian. He received M.S. degree in 2010 from Afyon Kocatepe University, Turkey in the field of computer and D.S. / Ph. D. degree in 2017 from Selcuk University, Turkey in the field of computer engineering. Between 2009 and 2011, he has worked as a Research Assistant in Afyon Kocatepe University. Following, he has also worked as a Lecturer and Vocational School – Vice Director in Afyon Kocatepe University between 2011 and

2012, as a Lecturer and Research Center Director in Usak University between 2012 and 2017, and as an Assistant Professor in Suleyman Demirel University between 2017 and 2019. Currently, he is an Associate Professor in Suleyman Demirel University, Turkey. He has more than 100 publications including articles, authored and edited books, proceedings, and reports. He is also one of the series editors of the Biomedical and Robotics Healthcare Series by CRC Press. His research interest includes artificial intelligence, machine ethics, artificial intelligence safety, optimization, the chaos theory, distance education, e-learning, computer education, and computer science. He has also works regarding the field of Literature.



**Professor Tshilidzi Marwala** is Vice-Chancellor of the University of Johannesburg. He was a Deputy Vice-Chancellor and Dean of Engineering at the University of Johannesburg. He was a full Professor of Electrical Engineering, the Carl and Emily Fuchs Chair of Systems and Control Engineering as well as the South Africa Chair of Systems Engineering all at the University of the Witwatersrand in Johannesburg. Before this, he was an executive assistant to the technical director at the South African Breweries. He holds a BSc in

Mechanical Engineering (magna cum laude) from Case Western Reserve University, a Master of Mechanical Engineering from University of Pretoria, PhD in Engineering from University of Cambridge and was a post-doctoral associate at Imperial College. His research interests include applications of computational intelligence to engineering, computer science, finance and medicine. He has extensive track record in human capacity development having supervised 47 Masters and 30 PhD graduates to completion. Some of these students have proceeded with their doctoral and post-doctoral studies at leading universities such as Harvard, Rutgers, Purdue, Oxford, Cambridge, British Columbia and Concordia. He has published 20 books, over 300 papers in journals, proceedings and book chapters and holds three international patents. He is an associate editor of the International Journal of Systems Science (Taylor and Francis Publishers) and was an associate editor of the South African Journal of Science. Marwala is a registered professional engineer in South Africa, a Fellow of The Academy of Sciences for the Developing World, Academy of Science of South Africa, South African Academy of Engineering and a distinguished member of the Association for Computing Machinery. He has received more than 45 awards including the Order of Mapungubwe from the South African Government and the President's Award from the National Research Foundation.



**Dr. Mustafa Özuysal** received his Masters degrees from the METU Vision Laboratory at the Middle East Technical University, Ankara, Turkey in the Department of Electrical and Electronics Engineering and his Ph.D. degree from the Computer Vision Laboratory at the Ecole Polytechnique Fédérale de Lausanne, Switzerland in Computer Communication, and Information Sciences. His Ph.D. focused on object tracking-by-detection, camera egomotion estimation and augmented reality, specifically learning features from image and video sequences

for fast and reliable object detection. He is currently an assistant professor. He has co-founded two techno-park companies funded by the Ministry of Science, Industry, and Technology of Turkey. He has been a full-time faculty at the Department of Computer Engineering of the Izmir Institute of Technology since 2013. He is a reviewer for all major Computer Vision conferences and journal including CVPR, ICCV, ECCV, PAMI, CVIU and TIP.



**Dr Enzo Ferrantes** completed his PhD in Computer Sciences at Université Paris-Saclay (CentraleSupélec / INRIA) in Paris, and his undergrad in Systems Engineering at UNICEN University (Tandil, Argentina). He worked as a postdoctoral researcher at Imperial College London (BioMedia Lab) in the UK. He returned to Argentina in 2017, where he holds a research scientist position from the Argentina's National Research Council (CONICET) and a lecturer position at Universidad Nacional del Litoral. He leads the Machine Learning for Biomedical Image Computing research

line in the Research Institute for Signals, Systems and Computational Intelligence, sinc(i). His research interests span both artificial intelligence and biomedical image analysis, with focus on deep learning methods.

**Proposed Topic: Fairness in AI for healthcare: Gender imbalance in medical imaging datasets produces biased classifiers for computer-aided diagnosis**



**Fernando Buarque de Lima Neto** is Brazilian, with a PhD in Artificial Intelligence from the University of London (2002), Diploma from Imperial College London-DIC in Artificial Neural Networks (2002), master's degree in Computer Science from the Federal University of Pernambuco (1998) and a degree in Computer Science from the Catholic University of Pernambuco (1990). He read Philosophy of Science and Neuroscience at Imperial College London, and studied one-year Lato Sensu in Business Administration at the School of Administration at the University of

Pernambuco-UPE. In 2020 he was elected a permanent member of the Pernambucan Academy of Sciences-APC. In 2019, he visited the Electrical and Computing Engineer at the University of Florida, as a CAPES-PVE Senior Scholar. In 2018 he was appointed for five years to the Superior Council of Science Foundation of the State of Pernambuco (FACEPE), and appointed for two years Research Ambassador at the University of Münster-WWU. In 2014-15 he did a sabbatical senior visit at the European Center for Information Systems-WWU. He is Senior Associate Professor at UPE with habilitation at the centennial Polytechnic School of Pernambuco-POLI, as well as a permanent member of the Doctoral Program in Computer Engineering.

He holds four active international academic positions: (i) Honorary Professor at CEMPS at the University of Exeter / UK, (ii) VIP ('Visiting Int. Professor-Gastprofessor') in WWU / Germany Economics-Administration, (iii) Adjunct Professor at Electrical and Computer Engineering at Texas A&M University / USA, and (iv) Visiting Professor at Electrical Engineering at the University of Johannesburg. Professor Buarque is Alexander von Humboldt Fellow / Germany, Senior Member of IEEE / USA, and was CNPQ PQ Accredited Researcher (2010-2018). He speaks fluently Portuguese, English and Spanish, and understands French, German and Italian; has more than 220 published works; and successfully supervised about 45 theses and dissertations, 40 graduation works in Computer Engineering and 40 scientific initiations.

His three current lines of research are (1) Artificial Intelligence (AI) / Computational (IC): Evolutionary, Social and Hybrid Metaheuristics, (2) Modeling / Simulation of Complex Real Problems, and (3) Explainable Decision Systems via Computational Semiotics. He regularly receives foreign visitors to his laboratory out of his extensive collaboration network with 12 universities (10 abroad).



**Max Paoli**. With a B.Sc. Hons. in Biochemistry and a D.Phil. in Chemistry, Max Paoli worked in the area of protein structure and molecular recognition for almost 20 years. His research work took him from York, UK, to laboratories in New Zealand and the US, including the Harvard Medical School. With academic positions in Australia and in the UK, he was also a BBSRC David Phillips Research Fellow at the University of Cambridge, UK, for 5 years.

Max and his group solved the structures of several protein-ligand complexes and published research articles in peer-reviewed international journals. He taught both entry level and advanced university courses, and supervised over a dozen PhD and MSc students. He was a course convener in Australia where he developed a lecture series on proteomics. In Cambridge, he was a tutor at St. John's College.

Max Paoli has worked with The World Academy of Sciences (TWAS) for the last three years, serving as Programme Coordinator. He is in charge of overlooking the activities of the Academy, such as the PhD and Postdoctoral Fellowships, Research Grants, Exchanges, Prizes. In addition, he delivers regular lectures and presentations on various topics related to sustainability, sustainable development and education for a sustainable future.

Max is interested in various issues related to the use of science and scientific education for sustainable development, and for the implementation of the SDGs.



**Bolanle Ojokoh** is currently an Associate Professor in the Department of Information Systems of the Federal University of Technology, Akure (FUTA), Nigeria. She is a member of the Nigeria Computer Society (NCS), Organization of Women in Science for the Developing World (OWSD), Computer Professionals Registration Council of Nigeria (CPN) and Association of Computing Machinery (ACM). She has mentored up to 20 Masters students and 8 Ph.D students to graduation. She is currently focusing on Data Science and its applications to issues in developing economies. She has been an invited speaker on topics related to Big Data, Analytics and Artificial Intelligence in several international events. She has participated in several funded projects including the National High Technology Research and Development, MOE China, TWAS-COMSTech and TETFUND Nigeria. She has over 80 publications in reputable journals and conferences, and has been a reviewer for several journals. She is currently an Executive Board Member of the TWAS Young Affiliates Network (TYAN). She was the Scientific Chair for OWSD- Nigeria in 2015, and a Program Committee of the ACM/IEEE Joint Conference of Digital Libraries, (JCDL) – New Jersey, 2016 and Toronto, 2017.



**Dr. Emile Chimusa** received Ph.D. from the prestigious University of Cape Town, South Africa. He has extensive experience in designing and applying statistical methods and machine intelligence algorithms to large multi-omics datasets for genome-wide association studies, ancestry inference, admixture mapping, mapping complex diseases and population structure. He is leading computational population genetics and genetics Epidemiology (CPGEG) research group of more than 20 postgraduate students at UCT. He is program convener of (1) Honours in

Honours in Human Genetics, (2) He is coordinating and leading the education platform, “UCT Applied Genomics” and research platform “Computational and Statistical methodologies for human and environmental health prediction” at the CSIR Centre for High Performance Computing (CHPC), Cape Town. He led various projects that yield to the design and development of critical genomic machine learning software tools. He is an active Member of both TYAN and TWAS-SAREP region.



**Dr. Cabrerizo** is a research member of The National Scientific and Technical Research Council (CONICET, Argentina) and Associate Professor at National University of San Martín (UNSAM, Argentina). He earned a BSc in Chemistry (2002) at the National University of La Plata (UNLP). In 2005 he obtained his Ph.D. degree in chemical science from the physical chemistry and photochemistry division of The Research Institute of Theoretical and Applied Physical Chemistry (INIFTA, UNLP, Argentina). He was a Postdoctoral Research Fellow at the Center for

Research in Carbohydrates (CIHIDECAR) at National University of Buenos Aires (UBA) (2005 – 2006). He has carried out multiple short-term research stays abroad (Germany, Japan, Denmark and China). Since 2006 he has been a research member of CONICET at CIHIDECAR (UBA). In 2010 he took the position as the director of Photochemistry and Molecular Photobiology Research Group, at IIB-INTECH (CONICET - UNSAM). His current research focuses on understanding the molecular aspects of mechanisms underlying the processes triggered by UVA and/or visible light. This knowledge provides valuable information for the development of different biotechnological applications that might contribute to attend unresolved and/or neglected socially relevant local and global problems related to some infectious and chronic diseases as well as to changes in the current energy matrix towards more sustainable and renewable sources of energy. He was awarded the “G. Cilento Award” (by The Inter-American Photochemical Society, 2006); the “Ranwel Caputto Award” (by the National Academy of Science of Argentina, 2009), the “Dr. Eduardo Gros prize” (by the National Academy of Exact, Physics and Natural Sciences, ANCEFN, Argentina, 2015), the “Dr. Eduardo Gros Award” (by the Argentine Society of Research in Organic Chemistry, 2015), Young Affiliated Member of The World Academy of Science TWAS (2015-2020), among others.



**Selma Tekir** studied B.S. in Computer Engineering at Ege University. She received her M.S. in Computer Engineering from Izmir Institute of Technology. In 2009, she worked as a visiting researcher at Faculty of Computer Science Chair for Databases, Data Analysis and Visualization at University of Konstanz-Germany. Tekir received a PhD in computer engineering from Ege University in 2010. Her research interests include machine learning for natural language processing (NLP), NLP applications, the combination of NLP with symbolic reasoning, and news analysis. Currently, she is working as an assistant professor at Izmir Institute of Technology Department of Computer Engineering.



**Ming Zhang** received her Bachelor, master and PhD degrees in Computer Science from Peking University respectively. She is a full professor at Department of Computer Science, Peking University. Prof. Zhang is a member of Advisory Committee of Ministry of Education in China, a member of ACM Education Advisory Committee (formerly Ed Council) and the Chair of ACM SIGCSE China. She is a member of the ACM/IEEE CC2020 steering group. She has published more than 200 research papers on Machine Learning in the top journals and conferences, such as ICML, NeurIPS, KDD, ICLR, WWW, ACL, AAAI, IJCAI, ICCV and TKDE. She won the best paper of ICML 2014 and best paper nominee of WWW 2016. Prof. Zhang is the leading author of several textbooks on Data Structures and Algorithms in Chinese, and the corresponding course is awarded as the National Elaborate Course, National Boutique Resource Sharing Course, National Fine-designed Online Course and National First Class Undergraduate Course by MOE China.



**Dr. Vicky Nembaware** was appointed as the Project Manager for Sickle Data Coordinating Center (SADaCC) in November 2017 after resigning as the H3Africa training coordinator. In her current SADaCC role, she oversees capacity development and training in Sickle Cell Disease specifically in study design, Big Data Analytics, ontology development and application. She earned her first degree in Chemistry and Microbiology from the University of Cape Town and then graduated Cum Laude for her Hons and MSc degrees from the University of Western Cape (South African Bioinformatics Institute). Vicky was awarded a PhD in Bioinformatics in 2008 from the University of Cape Town. In addition to her didactic training in Bioinformatics and Monitoring and Evaluation, Vicky has research experience in Bioinformatics, Genomics and in the Public Health field. She also has experience in designing, monitoring and evaluation of projects in the Information Communication Technology field (particularly in mHealth). Vicky has conducted numerous mHealth projects which include a public participatory project in the development of the South African National Strategic Plan on AIDS, TB and HIV (2012-2015). To this end, she developed a mobile phone app in collaboration with various stakeholders which is aimed primarily to train researchers how to engage and educate the general public on heredity and health in Africa. "...I am passionate about evidence-based training and mentoring of the next generation of African health researchers..."



**Lipika Deka** is a Senior Lecturer in Computer Science at the School of Computer Science and Informatics and a member of the Institute for Artificial Intelligence at De Montfort University (DMU), Leicester, UK. Lipika's research interest primarily lies in the area of concurrency control techniques such as for the purpose of concurrent access of the file system (say for backup) and more importantly for online software updates in for example the autonomous vehicles or sensors in the IoT context. In parallel, Lipika is interested in the development of efficient and suitable machine learning techniques for Intelligent Transportation Systems and downstream space applications such as smart agriculture (particularly for adaptation to climate change) as well as soil and water analysis.

Lipika holds a PhD in Computer Science and Engineering from Indian Institute of Technology (IIT) Guwahati, India in the area of Concurrency control techniques and developed her interest in the intersection of machine learning and a number of global challenges as a Post Doc at Loughborough University UK before joining DMU. Lipika is an ACM and ACM-W member and holds the position of Vice-Chair of the ACM-W UK Chapter. She organised ACM-W UK's annual INSPIRE event in 2018 and also supported the WomENCourage 2018 and WomENCourage 2020 as the chair for workshop and tutorial committee.



**Virgilio Almeida** is a Professor Emeritus of Computer Science at the Federal University of Minas Gerais (UFMG). He is also Faculty Associate at the Berkman Klein Center at Harvard University. Virgilio received his PhD degree in Computer Science at Vanderbilt University, a Master's degree in computer science at PUC-Rio and a bachelor degree in Electrical Engineering from UFMG. He held visiting positions in several universities and research labs, such as Harvard University (School of Engineering and Applied Sciences), New York University, Boston

University, Santa Fe Institute and HP Labs. Virgilio was the National Secretary for Information Technology Policies of the Brazilian government from 2011 to 2015. He was the chair of the Brazilian Internet Steering Committee (CGI.br) from 2011-2016. He was also the chair of NETmundial, the Global Multistakeholder Conference on the Future of Internet Governance, that was held in Sao Paulo in 2014. Virgilio was one of the commissioners of the Global Commission for the Stability of Cyberspace ([cyberstability.org/](http://cyberstability.org/)). Virgilio is member of the Brazilian Academy of Sciences (ABC) and the World Academy of Sciences (TWAS). His research interests are focused on social computing, digital governance, algorithms, modeling and analysis of large scale distributed systems. Professor Virgilio is the co-author of five books dealing Web technologies, e-commerce, performance modeling and capacity planning, published by Prentice Hall. The books were translated into Portuguese, Korean and Russian. Virgilio has published over 150 articles in journals and conferences, that received 14042 citations according to Google Scholar (as of 2020, June 22th). Virgilio's h-index is 58. Virgilio graduated 55 Master students and doctoral students and more than 30 undergraduate students. Virgilio has a broad and intense international collaboration activity, publishing articles with 26 researchers from different universities and research institutes, such as Max Plank Institute, KAIST-South Korea, Carnegie Mellon, George Mason, Boston University, Northeastern University, New York University, Cambridge University, Pompeu Fabra University (Barcelona), Indraprastha Institute of Information Technology, Delhi and HP Research Labs.



**Prof. Hesham El-Askary** Professor of Remote Sensing and Earth System Science, Center of Excellence in Earth Systems Modeling and Observations; and Director, Graduate Programs in Computational and Data Sciences; Schmid College of Science and Technology, USA. Prof. El-Askary received his PhD in Computational Sciences and Informatics from George Mason University, in 2004; along with his two MS degrees in Computational Sciences and Earth Systems Sciences. He is also a Professor of Environmental Physics on leave with the Department of



Environmental Sciences, Faculty of Science, Alexandria University, Egypt. Prof. El-Askary was also affiliated with the National Authority of Remote Sensing and Space Sciences (NARSS), Cairo. Dr. El-Askary has been also elected on a national basis to be a member of 30 in the Ministry of Justice consultant team for Environmental Affairs since 2008 to–date. He is the 2015 recipient of the Chapman University's elite Senior Wang-Fradkin Professorship award. He was named as one of six “Game Changers: Orange County Leaders Transforming the World” by the Orange County Business Council. Prof. El-Askary also served as the regional coordinator on a \$3 million Euro grant from the European Union (EU) Horizon 2020 that started February 2016. The three–year project, known as GEO-CRADLE (Coordinating and integrating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle east, and Balkans and Developing Links with GEO related initiatives toward GEOSS). Currently, he is serving as the Vice-Leader to the WG3 Dissemination and capacity building work package in the InDUST cost imitative amongst leading scientists from Europe. His research interests include dust storms monitoring and detection using different remote sensing technologies, as well as studying other extreme events. He is also involved in studying air pollution problems over mega cities due to natural and man-made effects, as well as climate change and its impacts on sea level rise and coral reefs for coastal areas. In 2019, Prof. El-Askary contributed, among only 200 scientists worldwide, to the (IPCC) report on the Desertification Chapter. The Intergovernmental Panel on Climate Change (IPCC) is the official entity that issues the state of the climate report once every 5 years that must get approved, acknowledged and acted upon by all nations of the world. He was also invited by the UN Secretariat to the COP14 meeting in New Delhi to present on the sand and dust storms side event to be part of the global sand and dust storms coalition. Prof. El-Askary has published over a 100 refereed research publications, conferences, full paper and book chapters in these research areas. Dr. El-Askary's research has been supported by National Science Foundation, NASA, United States Department of Agriculture and European Union. Dr. El-Askary has received the Saudi Arabia award hosted by the Arab Administrative Development Organization (ARADO) affiliated with the League of Arab States for the best published article in Environmental Management among 150 articles in 2006. He is also member of the Institute of Electrical and Electronics Engineers (IEEE), AGU, EGU, COSPAR, and Phi Beta Delta Honor Society. Today, Prof. El-Askary views himself as an Earth System Scientist with a major interest in hazards, atmospheric events and climate. He is particularly interested in events that have a glocal impact (going from global to local) and mixing scenarios between natural and anthropogenic generated aerosols.



**Prof. Alaa Khamis**, Senior AI Expert at General Motors, Canada received his B.Sc. degree with "Distinction with Honor's Degree" in Electrical Engineering from Alexandria University, Egypt, in 1993, the M.Sc. degree in Electrical Engineering from Suez Canal University, Egypt in 1998, and the Ph.D. degree in Systems Engineering from Charles III University of Madrid, (ranked number one in Spain for research competitiveness and most innovative), in 2003. In 2001, he was selected as distinguished scholar in the DAAD-Programme "International Quality Network"

(IQN) to share in research projects related to remotely controlled experiments at Faculty of Applied Science, FH Ravensburg-Weingarten, Germany. During the academic year 2003-2004, he worked as a postdoctoral fellow in the RoboticsLab, Department of Systems Engineering and Automation, Charles III University of Madrid, Spain. During the academic year 2004-2005, he was postdoctoral fellow and coordinator of Autonomous Systems and Real Time Distributed Design (ASRTDD) Focus Group, Pattern Analysis and Machine Intelligence Lab (PAMI), Department of Electrical and Computer Engineering, University of Waterloo, Canada. During the academic year 2005-2006, he was a Visiting Professor in Department of Systems Engineering and Automation, Charles III University of Madrid, Spain. From 2006 to 2008 he was an Assistant Professor at Suez Canal University and German University in Cairo (GUC), Egypt. From 2008 to 2010 he was a Research Assistant Professor at University of Waterloo, Canada. During this period, he coordinated an ORF-RE project and NSERC CRD project. He also wrote a proposal for the establishment of University of Waterloo Center of Pattern Analysis and Machine Intelligence (CPAMI).

## Confirmed Speakers

## 2ND AFRICAN SYMPOSIUM AND 3RD TYAN INTERNATIONAL THEMATIC VIRTUAL WORKSHOP ON BIG DATA, ANALYTICS, AND MACHINE INTELLIGENCE.

CPAMI has started officially in March 1, 2011 and he currently serves as an affiliated member of this center. He also serves as an affiliated member of the RoboticsLab. From 2010 to 2013 he was working as Associate Professor and acting chair of Engineering Science Department at Suez University. He was also director of Robotics and Autonomous Systems (RAS) research group at German University in Cairo. From 2013 to 2015, he worked as a Senior Research Scientist at Vestec, Inc and AI Consultant at Menya Solutions Inc., a Robotics & Automation Consultant at InnoVision Systems, Smart Mobility group coordinator in University of Waterloo Center of Pattern Analysis and Machine Intelligence (CPAMI) and principal consultant of Machine Intelligence and Optimization (MIO), Waterloo, Canada. He worked as Associate Professor and Head of Engineering Science Department at Suez University, AI Head at Sypron Solutions and Adjunct Professor of Autonomous Vehicles at Zewail City of Science and Technology and Nile University. He is currently working as Senior AI Expert at General Motors Canada. He also teaches a grad course about AI for smart mobility at University of Toronto.

He is a Senior Member in the IEEE, editor of Springer Lecture Notes in Electrical Engineering (LNEE), an associate editor for the International Journal of Robotics and Automation and founder and chair of IEEE Robotics and Automation Society (RAS) Egypt Chapter (recipient of the 2015 IEEE RAS Chapter of the Year Award and 2012 Chapter of the Year Award in IEEE Region 8). He is a member of Autonomous Robotics Group of IEEE RAS Standards and 2016 Advisory Committee Member of IEEE RAS-SIGHT (Special Interest Group on Humanitarian Technology) and a member of IEEE SIGHT Partnerships SubCommittee. He is the 2018 recipient of the 2018 IEEE Member and Geographic Activities (MGA) Achievement Award.

## Sponsoring and partnering organisations

- TWAS SAREP region
- TWAS LACREP region
- TWAS AREP region
- Association for Computing Machinery - Women Europe



# Data Science for Solution-Driven and Sustainable Response to Current Developing World Challenges

DEC 3 - 4, 2020

This is a virtual event. Information about joining this virtual event will be communicated after registration.

## Participation in the event

- Participants: Participation is by selection and invitation after registration. Every potential participant is expected to submit a 200-300 word abstract of a presentation of his/her work on a related topic to one or more of the themes of the event during the registration process, but not mandatorily.
- Participants will be made up of early career researchers, PhD students, Senior Researchers, Professors, Professional data scientists from the Industry from Africa, Arab region, Latin America, Caribbean and beyond.
- Registration opens Oct. 20, 2020.
- [Visit tyan.twas.org/event/virtualevent](http://tyan.twas.org/event/virtualevent)



## Organizing Chairs

- Assoc. Prof. Bolanle Ojokoh, Federal University of Technology, Akure, Nigeria (TYAN Exco Member, TWAS-SAREP Region)
- Assoc. Prof. Emile Chimusa, University of Cape Town, South Africa (TYAN Member, TWAS-SAREP Region)
- Assoc. Prof. Franco Cabrerizo, National University of San Martin, Buenos Aires, Argentina, TYAN Exco member TWAS LACREP region

## Program Committee

Dr. Oluwafemi Sarumi, Federal University of Technology, Akure  
Dr. Arome Gabriel, Federal University of Technology, Akure  
Dr. Olatunji Omisore, Shenzhen Institute of Advanced Technologies, CAS, China  
Dr. Abiola Taiwo, Landmark University, Omu-aran, Nigeria.  
Dr. Selma Tekir, Izmir Institute of Technology, Turkey  
Dr. Abimbola Afolayan, Federal University of Technology, Akure  
Dr. Frederick Adzitey, University for Development Studies, Tamale, Ghana  
Dr. Folasade Isinkaye, Ekiti State University, Ado-Ekiti, Nigeria  
Dr. Oluwarotimi Samuel, Shenzhen Institute of Advanced Technologies, CAS, China

**Hackathon Chair:** Sola Babalola, Elizade University, Ilara-Mokin

**Registration System Chair:** Tobore Igbe, Shenzhen Institute of Advanced Technologies, CAS, China

**Technical Committee:** Citp Ayodele Kupoluyi Director, Computer Resource Centre, Federal University of Technology, Akure, Nigeria

## Tentative Schedule (GMT)

<b>Thursday (Day 1) 3<sup>rd</sup> Dec.</b>	
7:00 – 7:30	Opening Ceremony Moderator – TBD
	<i>Theme I – Data Science for COVID response and Impact</i> Moderator – Dr. Selma Tekir Rapporteur – Dr. Oluwafemi Sarumi
7:30 – 8:00	Keynote Presentation I – Prof. Olawande Daramola <i>Topic: Data Science for COVID Response</i>
8:00 – 8:15	<i>Invited Sessions</i> I. Dr. Utku Kose <i>Topic: Data Science for the World After COVID-19</i>
8:15 – 8:30	II. Dr. Bolanle Ojokoh <i>Topic: Data Science for COVID Impact on Agriculture and Agro-allied in selected West African Countries</i>
8:30 – 8:40	Q&A
8:40 – 8:50	<i>Oral Presentations I</i> I. Dr. Valere Salako <i>Topic: On the reliability of predictions on Covid-19 dynamics: a systematic and critical review of modelling techniques</i>
8:50 – 9:30	<i>Oral Presentations II – V</i> TBD
9:30 – 9:40	Q&A
9:40 – 10:00	<i>Break/ Networking/Exhibition</i>
	<i>Plenary Session I</i> <i>(Theoretical Concepts of Data Science and other Applications)</i> Moderator – Dr. Bolanle Ojokoh Rapporteur – Dr. Arome Gabriel
10:00 – 10:25	I. Prof. Carlos Coello <i>Topic: An Overview of Evolutionary Multi-Objective Optimization</i>
10:25 – 10:50	II. Prof. Fernando Buarque <i>Topic: Curbing the data volume and combinatorial complexity on Gene Regulatory Networks with Swarm Intelligence</i>
10:50 – 11:15	III. Prof. Ming Zhang <i>Topic: Graph Representation Learning for Drug Discovery</i>
11:15 – 11:30	<i>Break/ Networking/Exhibition</i>
	<i>Theme II – Data Science for Environmental Modelling</i> Moderator – Dr. Fred Adzitey Rapporteur – Dr. Abimbola Afolayan
11:30 – 12:00	Keynote Presentation II – Prof. Tshilidzi Marwala <i>Topic: TBD</i>
12:00 – 12:15	<i>Invited Sessions</i> I. Dr. Lipika Deka <i>Topic: Data Science for Sustainable Agricultural Practices</i>
12:15 – 12:30	II. TBD
12:30 – 12:40	Q&A
12:40 – 13:30	<i>Oral Presentations I – V</i> TBD
13:30 – 13:40	Q&A
13.40 – 13.50	<i>Break/ Networking/Exhibition</i>
13:50 – 14.40	<i>Poster Session</i> Moderator – Dr. Emile Chimusa Rapporteur – Dr. Abiola Ezekiel
14.40 – 15:40	<i>Workshop I – Young Scientists' Collaboration and Interaction: Way Forward (3 Break-out Sessions)</i> Moderators – Prof. Sok Ching Cheong/Dr. Olatunji Omisore Prof. Collet Dandara/ Dr. Folasade Isinkaye Dr. Olaniyi Fawole/ Dr. Oluwarotimi Samuel
15:40 – 15:50	<i>Break /Networking/Exhibition</i>
15:50 – 16:50	<i>Exhibition/Hackathon</i>

<b>Friday (Day 2) 4<sup>th</sup> Dec</b>	
7:00 – 7:20	SDG Session – Dr. Max Paoli Topic: TBD Moderator – Dr. Bolanle Ojokoh Rapporteur – Dr. Arome Gabriel
	<b>Theme III – Data Science for Health related applications</b> Moderator – Dr. Emile Chimusa Rapporteur – Dr. Folasade isinkaye
7:20 – 7:50	<b>Keynote Presentation III – Dr. Jacques Ludik</b> Topic: TBD
7:50 – 8:05	<b>Invited Sessions</b> I. Dr. Mustafa Ozuysal Topic: TBD
8:05 – 8:20	II. Dr. Oghenejokpeme Orhobor Topic: <b>Generating Explainable and Effective Data Descriptors using Relational Learning: Application to Cancer Biology</b>
8:20 – 8:30	Q&A
8:30 – 9:20	<b>Oral Presentations I – V</b> TBD
9:20 – 9:30	Q&A
9:30 – 9:40	<b>Break /Networking/Exhibition</b>
	<b>Plenary and Invited Sessions</b> <i>(Data Science: Multidisciplinary view)</i> Moderator – TBD Rapporteur – Dr. Abiola Taiwo
9:40 – 10:05	<b>Plenary Session</b> I. Prof. Virgilio Almeida Topic: <b>Social and Ethical Impacts of Algorithms</b>
10:05 – 10:30	II. Prof. Hesham El-Askary Topic: TBD
10:30 – 10:45	<b>Invited Session</b> I. Dr. Enzo Ferrantes Topic: <b>Fairness in AI for healthcare: Gender imbalance in medical imaging datasets produces biased classifiers for computer-aided diagnosis</b>
10:45 – 11:00	II. Prof. Aman Dekebo Topic: <b>Establishment of Natural Product Bank of Bioactive compounds</b>
11:00 – 11:10	Q&A
11:10 – 11:30	<b>Break /Networking/Exhibition</b>
	<b>Theme IV- Data Analytics for Solution-oriented results</b> Moderator – TBD Rapporteur – Dr. Oluwafemi Sarumi
11:30 – 12:00	<b>Keynote Presentation IV – Dr. Ruth Lennon</b> Topic: <b>DevOps for Security Analytics</b>
12:00 – 12:15	<b>Invited Sessions</b> I. Dr. Selma Tekir Topic: <b>Text Analytics for Credibility Assessment: A Case Study of Grey Literature</b>
12:15 – 12:30	II. TBD
12:30 – 12:40	Q&A
12:40 – 13:30	<b>Oral Presentations I – V</b> TBD
13:30 – 13:40	Q&A
13.40 – 13.50	<b>Break /Networking/Exhibition</b>
13:50 – 14.50	<b>Workshop II – Advancing Science for Sustainability in the Developing World (3 Break-out Sessions)</b> Moderators – Dr. Rolando Gittens/ Dr. Olatunji Omisore Dr. Yraima Cordeiro/ Dr. Oluwarotimi Samuel Dr. Franco Cabrerizo/ Dr. Arome Gabriel
14.50 – 15:50	Closing and Award Ceremony

## Important Dates

Applications open: October 20, 2020  
Submission of abstracts start: October 20, 2020  
Event date: December 3 - 4, 2020

Be part of a data science hackathon. Bring your team or join a team to build technologies providing answers to some of Africa's challenges in healthcare, education, and agriculture. We seek interesting ideas that will:-

- Help roll-back the impact of COVID-19 on individuals and their livelihoods
- Identify vulnerability due to COVID-19 pandemic
- Measure the impact of interventions
- Identify opportunities arising from COVID-19
- Help to understand and analyse COVID-19 X-wave outbreaks

### Conditions

- Female-led teams comprising two to five members per team
- Be available for the period of the hackathon which starts Dec. 1 and ends Dec. 2, 2020

Mentors will be available for persons who may be taking first steps in data sciences. Judges will be drawn from academia, the focus industries and business.

**Registration at [tyan.twas.org/event/virtualevent](https://tyan.twas.org/event/virtualevent)**

## Organizing Contact

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