Mrs. Philippa Ngaju Makobore BSc Electrical Engineering, MSE Biomedical Engineering Candidate, Project Lead

Mrs. Philippa Makobore is the Department Head of the Instrumentation Division under the Technology Development Center at the Uganda Industrial Research Institute. She received a BSc in Electrical Engineering from the University of Alberta, AB, Canada in 2008 and a Professional Certificate in Embedded Systems Engineering from the University of California, Irvine in 2016. She is currently pursuing a Master of Science in Engineering (MSE) with a concentration in Biomedical Engineering at Purdue University, West Lafayette, USA.

Her core expertise is the design of electronic applications/embedded systems for low resource settings with a focus on healthcare. The Instrumentation Division has designed and developed three medical devices, a diagnostic tool for pneumonia, an automated infusion set and a test kit for aflatoxin B1. The Instrumentation Division won a 1st place Innovation Award for its automated infusion set from the Patient Safety Movement Foundation at the 4th World Patient Safety Science and Technology Summit in Dana Point, CA, USA. The Instrumentation Division is also a recipient of an EU Horizon 2020 grant together with University of Pisa, Italy (coordinator), Kenyatta University, Kenya, KTH Royal Institute of Technology, Sweden, University of Madrid, Spain, University of Tartu, Estonia and Agile works to develop an e-platform for the development of open source medical devices for both Africa and Europe (http://ubora-biomedical.org/). She is a member of the African Biomedical Engineering Consortium (ABEC), Canadian Medical and Biological Engineering Society (CMBES) and the IEEE Engineering in Medicine and Biology Society.

Dr.Sabrina Bakeera-Kitaka MBChB, MMed (Paediatrics and Child Health), Consultant Paediatrician, Makerere University College of Health Sciences

Dr. Sabrina Bakeera-Kitaka is currently a Senior Lecturer of Paediatrics and Adolescent Health Medicine at the Makerere University College of Health Sciences in Kampala, Uganda. She received her Medical degree and Masters of Paediatrics and Child Health from Makerere University in 1995 and 2002 respectively. She then completed a fellowship in Paediatric Infectious Diseases in 2006. Her particular research area of interest is paediatric HIV with particular emphasis on HIV infected adolescents. Her overall goals are to improve the health and well-being of children and adolescents affected by HIV through appropriate care and treatment.

She has been a PI, Co-PI, and key investigator on various studies specific to adolescents with HIV and has published over 12 manuscripts in peer reviewed journals. Dr. Bakeera-Kitaka is also a member of the Diarrhoea and Pneumonia Technical Committee of the Ministry of Health in Uganda which is responsible for developing guidelines on prevention and treatment of these two diseases. Since 2003, she has taken on the responsibility of directing the adolescent programs at the Paediatric Infectious Diseases Clinic (PIDC), based at the Baylor-Uganda Clinical Center of Excellence at Mulago National Referral Hospital. She has also participated in global consultative meetings, and provided technical support for developing guidelines specific to the betterment of adolescents living with HIV. As a result of these previous experiences, she is aware of the importance of looking at adolescents living with HIV as a unique and vulnerable population who need to be supported to maintain their health, and engage in positive prevention efforts.

Professor Peter Rolfe BSc, PhD, FRSM, FIAMBE

Professor Peter Rolfe is a Biomedical Engineer with a career, in both academe and industry, spanning more than 40 years. He graduated in Electrical Engineering in 1963 and worked in aircraft control systems and automatic test instrumentation. In 1967 he then studied physiology and biophysics at the University of London, completing his PhD at the Royal Postgraduate Medical School (Imperial College of Science, Technology and Medicine), on the subject of *"Physiological Measurement in Newborn Babies".* He established the Neonatal Bioengineering Unit at Oxford University and John Radcliffe Hospital in 1975 working in the field of neonatal and fetal physiological technology, establishing an international conference series in this subject. In the 1980s he became a Consultant to the World Health Organisation and, with colleagues at WHO and in China, Mongolia, Nepal, India, Malawi, Somalia, and Thailand, developed international research projects on *Appropriate Technology for Pregnancy and Perinatal Care*. He became Director of the WHO Collaborating Centre at Oxford University to further this work, whilst also maintaining his core research on physiological measurement technologies, developing micro sensors for invasive measurement and near infra-red spectroscopy (NIRS) for the non-invasive study of neonatal brain haemorrhage. In 1984 he was the Founder Director of the Biomedical Engineering Centre at Oxford. He then moved to Keele University in 1987 and established the Centre/Institute for Science and Technology in Medicine. Professor Rolfe is currently Director of Oxford BioHorizons Ltd in the UK, and he holds Professorial positions in China and Japan. He is a Founding Fellow, *International Academy of Medical and Biological Engineering*. (http://www.iambe-ifmbe.org/Fellows.html - Fellow_Rolfe)

Technologies Successfully Developed

Neonatal apnoea monitors; lung function computer; intra-arterial sensors for pressure, oxygen, carbon dioxide, glucose, pH, K^+, Na^+; fetal scalp pH, PO_2, PCO_2 sensors; biosensors for bacteria; NIRS instruments for non-invasive biochemical monitoring; electrical impedance plethysmograph and imager; non-invasive intra-cranial pressure sensor.

Journal Publications - from more than 200

1. **P Rolfe** (2012) Micro- and Nanosensors for Medical and Biological Measurement. *J Sens. Mat.* Vol 24, No 6, 275-302.

2. Zhang, Y., Sun, J., and **Rolfe, P**. (2011) Reduction of global interference in functional multidistance NIRS using empirical mode decomposition and recursive least squares: a Monte Carlo study. *J. Eur. Opt. Soc.,* **6**, 11033.

3. **P. Rolfe**; Yan Zhang; Jinwei Sun; *et al* (2010) Invasive and non-invasive measurement in medicine and biology: calibration issues. *SPIE Proc* Vol. 7544; pp. 754454-754454-9

4. **P Rolfe** (2010) Impact of Micro and Nano Sensors on Biomedical Measurement. Key Engineering Materials, Vol 437:299-303.

5. Scopesi F, and **Rolfe P**. (2009) Misinterpreted signals during guarantee volume ventilation in the newborn. *Pediatr Pulmonol.* Jul 13; 44(8):835-836.

6. **P Rolfe**, J Sun, F Scopesi, et al (2009) Bioengineering aspects of Sensors and Instruments for Continuous Monitoring of a Ventilated Newborn. *Int J Prec Eng & Man.* Vol 10 (1):49-54.

7. **Rolfe P.**, Scopesi F. and Serra G. (2006) Biomedical Instruments for Fetal and Neonatal Surveillance. Journal of Physics, 48:1131–1136

8. Khodadadeh Y and **Rolfe P** (1998) Evolution of Appropriate Technology: Preventing Hypothermia of Neonates During Transport in Developing Countries. *J Clin Eng.,* Sept., pp 1-7

Books

Rolfe P (Ed) “Fetal and Neonatal Physiological Measurements” Pitman Medical, Tunbridge Wells

Rolfe P (Ed), “Fetal Physiological Measurements”, Butterworths, Guildford

Rolfe P (Ed), “Neonatal Physiological Measurements”, Butterworths, Guildford

Rolfe P (Ed); “Non-Invasive Physiological Measurements, Vol I” Academic Press, London

Rolfe P (Ed), “Non Invasive Physiological Measurements, Vol II” Academic Press, London

Professor Charles Ibingira, MB ChB, MMed, FCS Principal, College of Health Sciences, Makerere University

Professor Ibingira is an Associate Professor and Dean, School of Biomedical Sciences at the College of Health Sciences at Makerere University. He graduated with a Degree in Medicine from Makerere University in 1988 and went on to do his Masters in General Surgery at the same institution in 1996. He obtained his FCS from the Fellowship of the College of Surgeons of East, Central and Southern Africa (COSECSA) in 2003 and a Diploma in International Research Ethics from the University of Cape Town in 2007. He is an active, well trained specialized general surgeon and experienced bioethicist, as well as a researcher and manager, having been a principal investigator and co- investigator on several projects. He has a wealth of experience in research administration, having been the IRB chair for the Faculty of Medicine Research and Ethics committee for 4 years and chairperson higher degrees research and ethics committee Makerere University College of Health Sciences. He has handled a wide range of research proposals at the PhD level, and other collaborative research as well as organized and made several presentations on ethical issues in more than 15 ethics conferences and workshops. He is also a consultant ethics reviewer for the Fred Hutchinson Centre, Seattle, WA, USA. In addition to accomplishing various ethical consultations locally, he has served on a number of management boards for private and public companies. He headed a university department for 3 years and held administrative and management positions as Deputy Dean, Associate Dean Research for the Faculty of Medicine, and Dean School of Biomedicine since 2007 and in 2008 trained in leadership and management by MSH. He pioneered the establishment of a Biomedical Engineering Program under the School of Biomedical Sciences, Makerere University of which he currently serves as the Dean. His key result areas are strategic planning and management having been a faculty of medicine coordinator for Swedish International Development Cooperation Agency (SIDA) research capacity building grant for 3 years coordinating all planning, administration, training activities, mentorship, monitoring and evaluation. This broad experience gives him an edge in providing administrative and managerial expertise for this award. Furthermore he is able to provide research oversight guidance, and will devote all his skills to achieving the overall goal of this application.

Selected Journal Publications

1. **Ibingira CBR**. Long term complications of Inguinal Hernial repair. *East African Medical Journal*, 1999, Pp 28 – 31.
2. **Ibingira CBR**. A rare Association of major congenital malformations; a case report. *East and Central African Journal of Surgery*, Vol. 5, No. 2, 2000, Pp 41–43.
3. **Ibingira CBR**. Management of Cancer of the stomach in Mulago Hospital Kampala, Uganda. *East Africa Medical Journal*, 2001, Pp 1-5.
4. **Ibingira CBR**. Management of Testicular

Torsion in Mulago Hospital over a period: *East and Central African Journal of surgery*, Vol. 6, No. 2, 2001, pp. 101-105.
5. **Ibingira CBR**. Chronic Osteomyelitis in a Ugandan rural setting. *East African Medical Journal* of Surgery Vol. 80, No. 5, 2003, Pp 242–246.
6. **Ibingira CBR**. Gross anatomical variations and congenital anomalies of surgical importance in hepato biliary surgery in Uganda. *Eastern and Central African Journal of Surgery*, Vol 12, No. 1, 2007, Pp 93-98.
7. Ochieng J, **CBR Ibingira.** Sternal anomalies with supernumerary and subnumerary vertebrea and ribs – Case Reports. *Eastern and Central African Journal of surgery*, Vol 12, No. 1, 2007, Pp 99-104.
8. Sugarman J, **CBR Ibingira,** et al. Ethical oversight of multinational collaborative research. Lessons from Africa for building capacity and policy. *Research and Ethics Review*, Vol 3, No. 7, 2007, Pp 84-86.

Dr. Aaron Kyle BS, PhD

Dr. Kyle has over 8 years of experience in the research and development of biomedical devices and techniques. He has expertise in modeling acoustical propagation in liquid-filled tubes, acoustical signal processing, the effects of pulsed electromagnetic fields on vascular progenitor cells, and the development of algorithms for robust analysis of ECGs. Dr. Kyle graduated magna cum laude from Kettering University (formerly GMI Engineering and Management Institute) with a B.S. in Electrical Engineering. During his undergraduate education, Dr. Kyle was a co-op student at Square D Company in Lincoln, NE, where his final project was the design and implementation of a machine vision system for stamped parts. Upon graduation, he worked as a summer student in the Low Power X-ray Sources division at Los Alamos National Laboratory in Los Alamos, NM. He next enrolled in the Ph.D. program in the Department of Biomedical Engineering (now called the Weldon School of Biomedical Engineering) at Purdue University. He conducted his dissertation research, “An Acoustical Transmission Line Model for Liquid-Filled Tubes”, under Profs. George Wodicka and J. Stuart Bolton. The overarching goal of this project was to develop a pulse-echo guidance system for in-dwelling catheters. Dr. Kyle focused on the development and implementation of a lumped parameter model to predict distortion that occurred on axial propagating acoustical waves in liquid-filled, compliant-walled tubes. During his pre-doctoral research, Dr. Kyle received numerous awards for outstanding teaching and research, including a Best Student Paper Award at the 151st Meeting of the Acoustical Society of the America (2006) and a School of Engineering Outstanding Graduate Student Award (2006). He is also a member of Tau Beta Pi and Eta Kappa Nu engineering honor societies.

Upon completion of his Ph.D. research in 2007, Dr. Kyle joined Dr. Keith March’s lab as a postdoctoral fellow at the Indiana Center for Vascular Biology (ICVBM), in the Department of Cardiology at the Indiana University School of Medicine in Indianapolis, IN. His postdoctoral research primarily entailed investigating the potential *in vitro* and *in vivo* angiogeneic benefits of low energy pulsed electromagnetic fields. During his postdoctoral training, Dr. Kyle developed a set of algorithms that were used to perform analysis of long duration ECG records obtained from ambulatory pigs and to detect premature ventricular contractions in these long-duration records. This work was presented and well-received at the 2009 IEEE Engineering in Medicine and Biology Conference in Minneapolis, MN.

Dr. Kyle is presently Lecturer in Discipline in the Department of Biomedical Engineering at Columbia University. His duties entail teaching undergraduate laboratory and Senior Design courses, developing new courses and teaching modalities, and acquiring funding for improvement of the undergraduate educational program at Columbia. In addition to his teaching duties, Dr. Kyle is currently focused on integrating global health technologies into the BME curriculum. He and colleagues are currently supervising the development of basic diagnostic and therapeutic devices for neonates in Uganda. He also recently co-founded the HYPOTHEkids (Hk) Maker Lab, a summer STEM training program for underrepresented minority high school students.

Selected Journal Publications

1. S. Han, P.I. Rogers, J. Kihlken, J. Wafel, C. Bull, M. Deuter-Reinhard, D. Feng, J. Xie. **A. Kyle**, S. Merfeld-Clauss, B.H. Johnstone, D.O. Traktuev, P.S. Chen, J.R. Lindner, K.L. March, "Intravenous xenogeneic transplantation of human adipose-derived stem cells improves left ventricular function and microvascular integrity in swine myocardial infarction model", *Catherization and Cardiovascular Interventions*, accepted for publication.
2. M.B. Bouchard, M.E. Downs, D.C. Jangraw, **A.M. Kyle**, "A hands-on course teaching bioinstrumentation through the design and construction of a benchtop cardiac pacemaker," *Conf Proc IEEE Eng Med Biol Soc*., Osaka, Japan, July 2013.
3. **Kyle A.**, Bouchard, M., Downs, M., Jangraw, D., "Biomedical Instrumentation from Start to Finish: A Project-Based Undergraduate Course," *BMES 2012 Annual Meeting*, Atlanta, GA, Oct. 2012.
4. **A.M. Kyle**, N. Leahy-Glass N, W. Combs W, K.L. March, "Potential of Gallium-Based Leads for Cardiac Rhythm Management Devices," *Conf Proc IEEE Eng Med Biol Soc*., Boston MA, August 2011.
5. **A.M. Kyle**, P.I. Rogers, S. Han, P.-S. Chen, K.L. March, "LifeShirt Acquisition System to Monitor ECG from Ambulatory Swine and the Implementation of an Arrhythmia Detection Algorithm," *Proceedings of the 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Minneapolis, MN*, Minneapolis, MN, September 2009.
6. **A.M. Kyle**, G. Albors, G.R. Wodicka, E.J. Juan, "Sound Propagation in Liquid-Filled Arterial Segments: Measurements and Model Predictions", *Proceedings of the 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Lyon, France, August 2007.
7. G. Albors, **A.M. Kyle**, G.R. Wodicka, E.J. Juan, "Computer Simulation Tool for Predicting Sound Propagation in Air-Filled Tubes with Acoustic Impedance Discontinuities", *Proceedings of the 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Lyon, France, August 2007.

Dr. Dick M. Kamugasha, MEng (Hons) Chemical Engineering and Environmental Technology, PhD Chemical Engineering, Director, Technology Development Centre (TDC), UIRI

Dr. Dick M. Kamugasha holds a Masters of Engineering in Chemical Engineering and Environmental Technology from the University of Manchester Institute of Science & Technology (UMIST) and a PhD in Chemical Engineering from the University College London (UCL). As the Director, Technology Development Centre (TDC) at UIRI, he manages the transfer, acquisition and/or development and adaptation of technologies and production plants for value addition and industrial application. The Instrumentation Division falls under TDC and reports directly to him. His work experience includes working as a Lead Development Engineer at Technometrics Ltd, London, UK (2000-2003) and lecturing as a Senior lecturer on Particulate Systems and Instrumentation at the School of Process Engineering in the Faculty of Engineering at UCL (2003-2005). While lecturing at UCL, Dr. Kamugasha served as a Faculty Business Fellow responsible for promoting and co-coordinating industry interaction with the School of Process Engineering, in collaboration with the London Technology Network (LTN), a UK government-funded initiative that aimed to improve the profitability and efficiency of businesses by creating effective linkages with London-based Universities. In addition to directing TDC at UIRI (from 2006), Dr. Kamugasha has offered a range of consultancy services, notably Southern Africa Region Consultant for United Nations Economic Commission for Africa (UNECA) on best practice and business model development for Science/Technology Parks, Business Incubation Centres and Centres of Excellence in Southern Africa (2008), Processing and Industrial Production Consultant for Uganda Coffee Development Authority (UCDA) on the techno-economic evaluation of the feasibility of establishing a 5,000 tons/year soluble coffee production plant in Uganda (2008) and the design and development of a Large-scale Potato Processing Plant for UIRI (2006).