

## **CURRICULUM VITAE**



**PROF. BERNARD O. C. ADUDA**

### **SUMMARY**

Professor Bernard O. C. Aduda is a full professor of Physics of Materials since 2005. He has a PhD in Materials Science from Imperial College, University of London (UK) (1991), and a Diploma of Imperial College (DIC).

Prof. Aduda has over 18 years successful administrative experience in University administration which include ten (10) years as Principal - College of Biological and Physical Sciences (1<sup>st</sup> March 2011 – 28<sup>th</sup> February 2021), 3.5 years as Associate Dean (Science) - Kenya Science Campus 3.5 years, and Chairman of the Department of Physics respectively. As the Principal (the administrative and academic head of the College) he (1) was Chairman of the College management Board (CMB) and a member of the University Executive Board (UEB); (2) managed about 500 academic and support staff, and about 4500 undergraduate and 1300 postgraduate students enrolled in diverse academic programmes spread in 6 Schools/Institute/Centre and 4 Departments; (3) prudently steered the College financial resources running into millions of shillings with net positive balances; (3) guided the procurement processes for which from 2005 - 2015 he was a member of and from 2011 he chaired the College Procurement Committee; (4) managed assets/infrastructure worth billions of shilling. As a member of University Executive Board (UEB), and Senate he successfully served in or chaired several UEB and Senate committees or undertaken special assignments. Thus Prof. Aduda has (i) demonstrable leadership and management capacity, and competence in finance management at University level; (ii) an excellent understanding of Public Procurement and Asset Disposal processes, Public Finance Management, and Human Resource Management.

Nationally, he has served as a member of the Kenya Polytechnic University College (2009 – 2013) during which time he played a key role in the transformation of the University College into the Technical University of Kenya (TUK). Additionally he served as a member of Council of the National Council for Science and Technology (NCST) for three years (2010 – 2013) – a period noted for the vibrancy of the NCST with notable outcomes such as increased and expeditious release of grants to researchers with strict monitoring and evaluation mechanisms put in place, the initiation of the construction of the NCST (now NACOSTI) headquarters at Kabete, mainstreaming the establishment of the National Physical Sciences Laboratory, and nanotechnology education in Kenya, the birthing of the Science, Technology and Innovation (ST&I) Act (2013) that led to the restructuring of NCST into the National Commission for Science, Technology and Innovation (NACOSTI), the establishment of the National Research Fund (NRF), and the Kenya National Innovation Agency (KENIA). He has also been a resource person (evaluator of programmes) for the Commission for University Education (CUE). He is a Fellow of the

Kenya National Academy of Sciences (KNAS) and for which he has chaired many committees, and edited the KNAS publications (journals, conference proceedings and other popular publications.)

Professor Aduda as a scholar has supervised to completion 9 PhD and 16 MSc students and he has a proven track record of research and publications and has published widely (61 papers) in peer reviewed journals besides making presentations (> 31) in, and organizing many learned international and local conferences, edited one book, and published two monographs (modules) used in teaching undergraduate physics units. He has had prestigious post-doctoral trainings at International Centre for Theoretical Physics (ICTP) (ICTP, Associateship Program), Uppsala University (International Science Program Fellowship), Imperial College (Commonwealth Scholarship Fellowship) and Princeton University (America Science Foundation). He reviews for a number of international journals. Besides, he has served as an external examiner in several local and regional universities. As the Chairman, Department of Physics, he steered the successful review of the BSc and MSc Physics syllabi. As the Associate Dean (Kenya Science Campus) he oversaw the development and launch of the B. Ed (ICT) programme, and as Principal he was the academic head of the College and thus presided over the College Academic Board which ensured smooth running of the academic programmes, revision/review/development and Senate approval of several syllabi. He shepherded the creation and housing of the Institute for Climate Change and Adaptation and having its programme, which is a milestone. He chaired Staff and Students Disciplinary Committees within stipulated guidelines and timelines. As a founder member and Chief Coordinator (2018 - 2020) of MSSEESA (a regional Eastern and Southern Africa Network for Scientists working on Materials Science and Solar Energy) he has contributed and significantly influenced the postgraduate Physics syllabi offered in the Network participating Universities – Dar es Salaam, Makerere, University of Nairobi and University of Zambia) and training of postgraduate students and technologists. Therefore Professor Aduda has (iv) demonstrated record of strategic leadership in formulation and implementation of academic, administrative, planning and financial programmes, development and institutional linkages.

When serving as the Associated Dean (Science) he played key role in ensuring appropriate and adequate infrastructure (Science laboratories, lecture hall and well-stocked library) was put in place at Kenya Science Campus to support the nascent B. Ed (Science) Programme introduced therein in 2007. In his role as the Principal he ensured that the learning infrastructure, facilities and environment were well maintained, and the unfinished floors of the Examination Centre were completed and used for classrooms and staff offices.

Professor Aduda has networked widely - internationally, regionally and locally. He has attracted research funding of over KSh200 million used to buy state-of-the-art research equipment alongside fellowships for staff (8) fellowships/partial financial for postgraduate (MSc/PhD) students (>15) in the Department of Physics where as a Professor he leads a very active research Group. This research group he leads (thus University of Nairobi, Department of Physics) was competitively selected by the REGIONAL SCHOLARSHIP AND INNOVATION FUND (RSIF) UNDER THE PARTNERSHIP FOR SKILLS IN APPLIED SCIENCES, ENGINEERING AND TECHNOLOGY (PASET) in 2019 to be a Center of Excellence in Energy to host the RSIF-PASET 11 PhD sponsored students from Africa. Riding on this success of positive RSIF-PASET evaluation the Group has won further funding of US\$90,000 for institutional capacity building.

In 2007 together with the Director of the International Science Program (ISP), he successfully lobbied SIDA for the continued financial support for research Groups in Kenya (University of Nairobi and Moi University) that resulted in 8 research Groups (2 in the Dept. of Chemistry, 2 in the Department of Physics, 1 Department of Geology, 1 in the Institute of Nuclear Science, 1 in the School of Mathematics –

at the University of Nairobi, and 1 at Moi University) continue to receive millions of Kenya shilling from SIDA (Sweden) through the International Science Program (ISP). Has built personnel and infrastructure capacity and then initiated (2012) the Solar Academy training programme (on the sizing, installation and maintenance of Photovoltaic (PV) systems in Kenya) that has trained over 600 hundred PV technologists and raised about KSh. 20 million, in the last eight years and installed a 3kW grid-connected Solar Panels in the Department of Physics since 2019. He has also initiated a number of research collaborations regionally and internationally that have benefitted both students and staff. As a founder member and a Chief Coordinator of MSSEESA (a regional Eastern and Southern Africa Network for Scientists working on Materials Science and Solar Energy) he is in the forefront of soliciting for funds to support postgraduate students and technologists training, regional collaboration and research infrastructure acquisition, maintenance or upgrading. In 2018 – 2020 during his tenure as MSSEESA Chief Coordinator he raised approximately KSh. 18 million and successfully initiated and had held the 1<sup>st</sup> and 2<sup>nd</sup> Young Scientists' MSSEESA Conference on Materials for Solar Energy Conversion in Nairobi in 2018 and 2020 respectively, and a two-day (MSSEESA) - Postgraduate Students Seminar held in Nairobi in 2019.

Prof. Aduda has held senior administrative positions in the University of Nairobi, and has served as a member of Council in two National Institutions. As a University manager, he has always met and surpassed most of the set strategic objectives as set in the College Strategic Plans (2008 – 2013, 2013 – 2018, 2018 - 2023). For example, he has overseen rapid transformation and strategic growth of the College as evidenced by: growth in student numbers from 2,877 (in 2010/2011) to 6,477 (2017/18); efficient management of the College and enhanced the College resource base (as measured by Appropriation-in-Aid from KSh 343 million in 2010/2011 to KSh. 704.6 million in 2016/17, the period in which the College Research Grant portfolio component grew from KSh. 26.6 million to KSh. 316.9 million), enriched students' experience for holistic growth within the College, enhanced completion rates for PhDs (number PhD graduands of increased from 13 in 2013 to 29 in 2017), increased publication of papers in refereed journals (from 100 in 2013 to > 200 in 2017/18), number of funded research projects (44 in 2016/17, 7 of which were internationally funded versus 18 in 2012/13) and collaborations and linkages (33 in 2016/17). Thus Prof. Aduda has presided over the College to consistently very high performance (always ranked in the top three positions in Performance Contracting Ranking from 2010/11 – 2019/20 FYs, and in positions three (3) and one (1) respectively during the 2018, and 2019 University of Nairobi Sports day competitions), outstanding beauty and serenity, and a disciplined student populace and staff.

Hence the foregoing show that Prof. Aduda has demonstrable (v) record experience in networking, fundraising and resource mobilization for research, scholarship and development; (v) understanding of and ability to promote and enhance the existing and emerging technological innovations for better learning and management of the University.

The rich experiences and varied achievements as a University administrator, research group leader and research funds mobilizer, conference organizer, Fellow (KNAS) and treasurer (Network of African Academy of Sciences – NASAC), and Chief Coordinator of a Regional Network have provided him with (vi) considerable experience and knowledge in public financial management and strategic people management; and demonstrate that Prof. Aduda is results-oriented and has demonstrable experience in transformative and strategic leadership.

Prof. Aduda is a person of high integrity guided the principles of the Christian faith he professes (and serves as a member of the Development Committee – Africa Inland Church, Milimani – Nairobi) and is guided by the principles and values espoused in the Kenya Constitution on Leadership and Integrity. He

has managed the assets, financial and human resources and academic programmes of the College with the highest prudence, frugality and integrity. This has enabled the College to operate efficiently and meet its financial obligations to staff, students and suppliers.

## **CORE COMPETENCIES**

The educational background, training, professional and administrative experiences, nurturing and personality traits have combined to enable Prof. Aduda acquire amongst others the following competencies: 1) Ability to portray and project positive national image in and outside Kenya, and is able to work in a multi-cultural and multi-ethnic environment; 2) Being visionary and results-oriented leader; 3) Excellent organizational, interpersonal and communication skills; 4) Capacity to work under pressure and within set timelines; 5) Being transparent and fair but firm in his management style.

## **DETAILED CURRICULUM VITAE**

### **BACKGROUND**

1. **NAME:** Bernard Odhiambo Caleb Aduda
2. **DATE OF BIRTH:** 3rd Dec. 1958
3. **PLACE OF BIRTH:** Kisumu County, KENYA
4. **MARITAL STATUS:** Married
5. **PRESENT ADDRESS**
  - 5.1 **Work:**  
Department of Physics, University of Nairobi, P.O. BOX 30197 – 00100 Nairobi, Kenya
  - 5.2 **Private:** P.O. BOX 54139 – 00200, Nairobi, Kenya.
  - 5.3 **E-mail:** [boaduda@uonbi.ac.ke](mailto:boaduda@uonbi.ac.ke) or [adudaboc.ba@gmail.com](mailto:adudaboc.ba@gmail.com)
  - 5.4 **Telephone Contact:** **Office** (020 4447552); **Mobile** (0721 267 858);
  - 5.5 **ORCID identifier** is 0000-0001-8915-9162, and the full ORCID ID and the link is <https://orcid.org/0000-0001-8915-9162> (primary email address: [boaduda@uonbi.ac.ke](mailto:boaduda@uonbi.ac.ke)).
6. **ACADEMIC HISTORY**
  - 6.1 **CPE**, Sota Primary School (1973) – 34 Points
  - 6.2 **EACE**, Mawego Technical School (1974 – 1977) – Division One (16 points)
  - 6.3 **EAACE**, Mombasa Polytechnic (1978 – 1979) – 3 Principals, 1 subsidiary
  - 6.4 **B.Ed. (Physics and Mathematics)** Upper 2<sup>nd</sup> Honours, *University of Nairobi (1984)*
  - 6.5 **M.Sc. (Physics)** *University of Nairobi (1984 – 1987)*
  - 6.6 **Non-Destructive Testing (NDT) Level One** (1987)
  - 6.7 **Diploma of Imperial College (DIC)** – Imperial College (1991)
  - 6.8 **PhD (Materials Science)** *Imperial College London (University of London), (1988 -1991)*
7. **SCHOLARSHIP AWARDS**
  - 7.1 **DAAD Scholarship** (1984-86) - To pursue M. Sc degree
  - 7.2 **British Council (ODA) Scholarship** (1988-91). – To pursue PhD degree
  - 7.3 **Overseas Research Student (ORS) award (1989/90 and 1990/91 academic years)** awarded by the Committee of Principals and Vice Chancellors of Colleges and Universities in Britain (Awarded while pursuing PhD).
8. **POST-DOCTORAL AND SABBATICAL**
  - 8.1 **America Science Foundation Fellowship** at Princeton University (1<sup>st</sup> Sept – 1<sup>st</sup> Nov. 2007)
  - 8.2 **Commonwealth Scholarship Fellowship** tenable at Imperial College (March 2002 to March

- 2003)
- 8.3 **International Programme in Physical Sciences (IPPS)** Fellowship, Materials Department, Uppsala University, Sweden, Sept to Nov. 1999.
- 8.4 **International Centre for Theoretical Physics (ICTP)**, 3-month Associateship every year at the Trieste – Italy from 1993 - 1995 and 1998 - 2003

## **9. MEMBERSHIP IN LEARNED AND PROFESSIONAL SOCIETIES**

- 9.1 Member, Kenya National Academy of Science (KNAS) since 2005; Fellow (2011)
- 9.2 Member, the Nondestructive Testing Society of Kenya, since 1992
- 9.3 Member of the Kenya Physical Society (KPS), since 1992
- 9.4 Member, the Materials Research Society (MRS) - Africa Chapter, since 2005
- 9.5 Member, European Physical Society

## **10. ACADEMIC CAREER PROFILE**

- 10.1 **Professor** (December 2005 - Present)
- 10.2 **Associate Professor** (January 1999 – December 2005)
- 10.3 **Senior Lecturer** (1994 - 1999)
- 10.4 **Lecturer** (1992 - 1994)
- 10.5 **Tutorial Fellow** (1988 - 1992)
- 10.6 **Graduate Assistant** (1986 - 1988)

## **EXPERIENCE IN ADMINISTRATION AND MANAGEMENT, UNIVERSITY OF NAIROBI**

### **11. ADMINISTRATIVE POSITIONS**

- 11.1 **Principal**, College of Biological and Physical Sciences (CBPS) (March 2011 – February 28, 2021)
- 11.2 **Associate Dean**, Kenya Science Campus (KSC) (Nov. 2007 – March 2011)
- 11.3 **Chairman Dept.** of Physics (October 2003 – November 2007)
- 11.4 **Group Leader**, Condensed Matter Physics Group, Physics Department, (2000 – Present)
- 11.5 **Acting Chairman** (Dec. 1997 to Dec. 1998), Oct. 2001-Feb. 2002
- 11.6 **Departmental Examination officer** (1992 – 2003)
- 11.7 **Chairman**, Faculty of Science Examination Committee (1999 – 2003)

### **11.1 SHORT-TERM ACTING CAPACITIES**

- 11.8 **Ag. Deputy Principal** (KSC) (Diverse dates in 2008 – 2010)
- 11.9 **Ag. Principal** (CBPS) (Diverse dates in 2009 - 2011)

### **12. OTHER (PAST) UNIVERSITY RESPONSIBILITIES**

- 12.1 **Member**, University Management Board (UMB)
- 12.2 **Member**, University Senate
- 12.3 **Member and Chairman**, College Management Committee (CMB)
- 12.4 **Member and Chairman**, College Academic Board (CAB)
- 12.5 **Chairman of Appointment Committees** up to Assistant Lecturer Level
- 12.6 **Member and Chairman**, College Procurement Committee (CBPS)
- 12.7 **Chairman**, College Disciplinary Committee
- 12.8 **Chairman**, College Corruption Prevention Committee
- 12.9 **Chairman**, College ISO Management Review Committee
- 12.10 **Chairman**, University Central Corruption Prevention Sub-Committee to Address Vandalism in the University (2020)

- 12.11 **Chairman**, University Executive Board on the Committee on Development of Succession Planning and Mentorship Programme (2019)
- 12.12 **Chairman**, University Executive Board Committee On The Development of Clean and Orderly Learning and Work Environment Framework (2019)
- 12.13 **Chairman**, University Executive Board Committee on Rewards and Sanctions (2018)
- 12.14 **Chairman**, Infrastructure Maintenance Policy Review Committee, 2018
- 12.15 **Member**, UEB Committee on the Development of Culture Change Programme, 2018
- 12.16 **Member**, UEB Committee to Review the Rules and Regulations Governing the Conduct and Discipline of Students, 2018
- 12.17 **Chairman**, Committee on University of Nairobi Students Association Constitution (UNSA), 2017
- 12.18 **Special Assignment by Vice Chancellor to supervise** the completion of the Kisumu Towers (2016)
- 12.19 **Chairman**, Committee to Review SONU Constitution, 2016
- 12.20 **Vice-Chairman**, Coordinating Committee – UoN’s Digital Literacy Programme (DLP, 2016)
- 12.21 **Chairman**, The UoN’s Coordinating Committee for DLP Expression of Interest (EOI), 2015
- 12.22 **Member**, University of Nairobi Public-Private Partnership (PPP) Node
- 12.23 **Member**, University of Nairobi, Internal Collective Bargaining Agreement (CBA) Negotiation Committee
- 12.24 **Member** of several University Executive Board Committees
- 12.25 **Member**, School of Physical Sciences (SPS) and CBPS Academic Boards
- 12.26 **Member**, the CBPS College Management Board (CMB)
- 12.27 **Chairman**, The Kenya Science Disposal Committee (2008 to 2011)
- 12.28 **Member**, Tender Committee UNES (Ltd) (2008 – 2010)
- 12.29 **Chairman**, Board of Survey (College of Health Sciences) March – July 2007
- 12.30 **Has chaired** several Technical Evaluation Committees for Tender Awards
- 12.31 **Member**, College of Biological and Physical Science’s (CBPS) Sub-Committee on Staff Training and Development (STDF) (2005 – 2011)

### **13 MANAGEMENT SEMINARS, WORKSHOPS AND TRAININGS ATTENDED**

- 13.1 University Leadership Retreat: Personal Effectiveness for University Managers. July 29th-31st 2005, Voyager Beach Resort, Mombasa.
- 13.2 An in-house Training Programme on Financial Management and Human Resource Management for Chairman of Departments of the University of Nairobi, KCCT – Mbagathi 2<sup>nd</sup> – 4<sup>th</sup> Feb., 2006
- 13.3 The workshop on Training of Chief Internal Examiners of the University of Nairobi. July 13th–14th 2006, KCCT, Mbagathi, Nairobi.
- 13.4 Senior Management Staff Training on Results Based Management (RBM) and Rapid Results Initiative (RRI), May, 2007, Utalii Hotel
- 13.5 Special Senate Training on Performance Contracting and Review of Customer Survey – 11<sup>th</sup> July 2007, Taifa Hall
- 13.6 Seminar on Public Procurement, Central Catering Unit, 20<sup>th</sup> March 2008
- 13.7 Induction Training for Alternate Members of the Tender Committee and Members of Kenya Science Campus Disposal Committee – 16<sup>th</sup> July, 2008 at Central Catering Unit
- 13.8 Records Management & Corruption Prevention – 14<sup>th</sup> Sept. 2010 – CBPS
- 13.9 HIV/AIDS Awareness and Drug & Substance Abuse – 22<sup>nd</sup> Nov., 2010 at CBPS
- 13.10 Strategic Leadership and Change Management Programme for Directors of State Corporations held at the Kenya Institute of Administration (K.I.A) 12 – 13<sup>th</sup> November 2010

- 13.11 Workshop on technical Evaluation for Goods and Services held at The Central Catering Unit (CCU), 27<sup>th</sup> January 2011
- 13.12 Workshop for CEOs of State Corporations, Kenya School of Government, On Monday January 15<sup>th</sup> 2018

## **14 PROFESSIONAL AND ADMINISTRATIVE ACHIEVEMENTS**

### **14.1 Principal, CBPS**

#### **A: As Administrative Head of the College**

1. Initiated (2018), supervised and launched (2019) the **Automated Teaching Timetabling and Space-management System** for CBPS ( a first and so far only one in the University of Nairobi)
2. Caused and supervised the **in-house development of the on-line Maintenance Form M1 monitoring system** being implemented in the College (2018)
3. Presided over the **growth and prudently managed the resources and assets** of the College for better results as evidenced by the Performance Contract Results (e.g., **3<sup>rd</sup> (2010/11), 3<sup>rd</sup> (2011/12), 2<sup>nd</sup> (2014/15), 1<sup>st</sup> (2015/16), 2<sup>nd</sup> (2017/18), 1<sup>st</sup> (2019/2020) PC cycles respectively**); 3<sup>rd</sup> and 1<sup>st</sup> – College ranked in University Sports Day in 2018 and 2019 respectively.
4. Continued to grow the financial resource base for the College (e.g., research grants, mounting of short professional courses and income generating units).
5. Addressed security challenges by securing the College through chainlink and razor wire fencing, and floodlighting, besides having regular security meetings with neighboring institutions.
6. Developed the 2018 – 2023 College Strategic Plan.
7. Developed and implemented the 2013 – 2018 College Strategic Plan.
8. Revised the 2008 – 2013 College Strategic Plan.
9. Developed and cascaded the College service charter.
10. Has ensured that CBPS processes comply with the UoN Quality Management Systems and are ISO 9001- 2015 compliant.
11. Ensured a disciplined, cohesive workforce.
12. Enhanced the profile of the College through very good performance in the performance contract (always ranked amongst the top three best performing colleges of the University).
13. Enhanced and supported students' co-curricular activities (by allocating each club a vote) for students' all-rounded growth with impressive results, e.g., the **thrice lifting of the Mazingra Challenge Cup** by the Chiromo Environmental Awareness Club (CEAC).
14. Provided the requisite support that led to the very successful launch of Chiromo Alumni Chapter.
15. Overseen the completion of the 1<sup>st</sup> and ground floors of the Central Examination Center to house the BPO/ITES facilities, three (3) postgraduate lecture rooms, ICCA offices, and staff offices.
16. Refurbished the facilities at the College and Moana Field Research Station for excellent ambience and work environment.
17. Initiated the 1<sup>st</sup> College Newsletter that comes out every quarter.
18. Ensured a beautiful, clean and serene work environment.

#### **B: As Academic Head of the College**

1. Caused and supervised the **in-house development of an automated timetabling software**

for efficient and maximal teaching rooms allocations (being implemented in 2018/19 academic year)

2. Provided a beautiful, serene and conducive environment for learning & research activities.
3. Enhanced postgraduate enrolment and completion rates, with the number of PhD graduands more than doubling from 12 in 2012 to 29 in 2016/17 Academic year.
4. Provided administrative and critical support that resulted in the creation of the Institute for Climate Change and Adaptation (ICCA) in 2011- a Vision 2030 flagship project, and **C4DLab** as a research and incubation centre.
5. Provided support to and supervised the establishment of ITES/BPO (- a Vision 2030 flagship project) learning facilities in CBPS.
6. Has ensured the academic programmes run smoothly, and results released in time, with minimal cases of missing marks.
7. Has overseen the review of various curricula in all Schools in the College, and initiation of new programmes (e.g., Sustainable Urban Development (M Sc), Petroleum Geoscience (B Sc and M Sc); B Sc in Mathematics and Computing; etc).
8. Financially supported (from the “**Principal’s Research Grant**”) specialized research units for enhanced productivity/outputs and/or growth (**Aquaculture** – School of Biological Sciences; **Electronics** – Department of Physics; **C4DLab** – School of Computing and Informatics; **Atmospheric Resources Modeling Centre** – Dept. of Meteorology; **GIS** – Department of Geology) to become Centers of Excellence and Income Generating Units.
9. **Supported staff in initiating diverse collaborations** with peer institutions, private and public sectors.
10. Provided leadership that ensured several staff members are trained in **grant-writing, and in PhD supervision.**
11. Provided leadership to ensure staff and students with **patentable research outputs are sensitize on intellectual property rights.**

#### 14.2 **Leader of the Condensed Matter Group, Department of Physics:**

1. **Enhanced the research and Income generating capacity** through attracting funds (~ **KSh 200 Million** in the last 20 years (KSh 190,000,00 from IPPS – Sweden; and KSh10,000,000 from Nuffic - Netherlands)) to purchase research equipment. The equipment, most of which are the only ones of their kinds in the region have been accessible to research students from local and regional universities. The publications, conferences attended, postgraduate students graduating from this Group have contributed positively the College and University ranking nationally and internationally. The Group, has under my guidance started (since 2012) a two-week course on Installation of Photovoltaic (PV) systems that has trained about 600 technicians, vendors and religious leaders and has earned the University about **KSh.20 million, and** installed a 3kW grid-connected Solar Panels in the Department of Physics since 2019.
2. Led the Condensed Matter research Group (Department of Physics, University of Nairobi) to be competitively selected by the REGIONAL SCHOLARSHIP AND INNOVATION FUND (RSIF) UNDER THE PARTNERSHIP FOR SKILLS IN APPLIED SCIENCES, ENGINEERING AND TECHNOLOGY (PASET) as a Center of Excellence in Energy to host the RSIF-PASET 11 PhD sponsored students from Africa effective from 2020. Riding on this success of positive RSIF-PASET evaluation the Group has won further funding of US\$90,000 for institutional capacity building.
3. In 2007, wrote a background for the Director of the International Science Programme (ISP) to



use in justifying the need for continued funding by SIDA SAREC - Sweden of research programmes in Kenya which it (SIDA/SAREC) had wanted to exclude from their funding programmes as she was considered rich enough (outside the 50 poorest nations) to warrant such support. This initiative was a success and this resulted in continued support to research groups in Kenya (e.g., 2 projects in the Department of Physics; 2 in Dept. of Chemistry, 1 Dept. of Geology – all at the University of Nairobi, and 1 at the Department of Physics, Eldoret University)).

#### 14.3 **Associate Dean - Science** at the Kenya Science Campus

1. Was responsible for overseeing the smooth running of the pioneer B. Ed. Science Programme at Kenya Science Campus.
2. Was involved in the development and implementation of the strategic plan for the Kenya Science Campus (e.g., expansion and stocking of the Campus Library; building of laboratories and lecture theatre, furnishing of lecture rooms, expansion and equipping of computer laboratories, disposal of excess and unserviceable/obsolete stock, painting, mentoring of staff and students, etc).
3. Initiated, coordinated and had published B. Ed (Science) B. Ed (ICT) Information Booklet to guide students make informed subject choices.
4. Was involved in the planning for the 4-year cycle degree programme and following through to implementation in close consultation and was very instrumental in having the Senate approve the synchronization of the 3<sup>rd</sup> year B. Ed (Science) and B. Ed (Arts) academic calendars that ensures that these groups of students will graduate at the same time.
5. Was instrumental in the introduction of Vote system and use of Authority to incur Expenditure (A.I.E) by user departments at KSC.
6. Was involved in ensuring smooth phasing out of the 3-year Ministry of Education Diploma Programme.
7. Was a member of the Vice Chancellor's appointed committee to plan and advice on the immediate and future needs of Kenya Science Campus.
8. Coordinated/run the Bridging Course in the Science subjects (Biology, Chemistry, Mathematics and Physics) at KSC on behalf of CBPS. This programme now generated a gross income of ~ KSh 6 million annually up to 2017.

#### 14.4 **Chairman of the Department of Physics:**

1. Oversaw the reinvigoration of the undergraduate physics teaching laboratories through prudent purchase of apparatus;
2. Implemented effective student mentoring (e.g., holiday projects from internally generated funds);
3. Enhanced student mentoring programmes managed by the senior most academic members of the Department;
4. Initiated stepwise repainting of the departmental laboratories, classrooms and offices using internally generated funds;
5. Enhanced staff motivation by ensuring enjoyable and comfortable work/ambient environment through purchase of office furniture and painting of the Department's walls;
6. Developed the first Departmental 5-year strategic plan (2005 – 2010);
7. Reviewed the Master of Science and Bachelor of Science in Microprocessor Technology and Instrumentation syllabi.
8. The above initiatives resulted in significant increase in number of students majoring in Physics (from an average of less than 20 to > 40).

#### **14.5 The Academic:**

- 14.5.1 Has to-date supervised and mentored many B.Sc., M.Sc. (**16 completed**) and PhD (**9 completed**) students.
- 14.5.2 Leads the Condensed Matter Group (Department of Physics, University of Nairobi) that was competitively selected in a process facilitated by ICIPE in 2019 to participate in the RSIF initiative as an RSIF African Host University within the Energy including Renewables for the Doctor of Philosophy in Physics program based on our current capacity to offer a PhD program in the selected thematic area.
- 14.5.3 Has authored/co-authored **61 papers published in refereed journals**, and made presentations in over 31 international, regional and local conferences.
- 14.5.4 Served as mentor (**as patron** of a duly registered students' association) for the university students from a local community (2004 – 2009).
- 14.5.5 External Examiner of Physics in Local and Regional Universities (Maseno (1998), Kenyatta University (2003, 2008 -), Egerton 2003 - 2010, Makerere University 2008 - 2010), Dar es Salaam University College of Education (DUCE) 2012 – 2014, and Thesis (MSc and PhD) for Port Hare, Makerere University, Maseno, Kenyatta and Egerton Universities.

#### **14.6 MSSEESA CHIEF COORDINATOR**

- 14.6.1 Enhanced the financial position of the Network by about 28% (from ~US\$130,000 to ~US\$166,000)
- 14.6.2 Initiated the development of the 2020 – 2024 Network's Strategic Plan
- 14.6.3 Individualized the financial allocation the Network Nodes, which subsequently increased accountability and measurable network activities, in particular those that enhance female-gender enrolment in Physics, student exchange visits, and equipment maintenance
- 14.6.4 Initiated the series of alternating bi-annual Young Scientists' MSSEESA Conference on Materials for Solar Energy Conversion, and MSSEESA Postgraduate Students Seminar

### **CONTRIBUTIONS**

#### **15. REGIONAL AND INTERNATIONAL CONTRIBUTIONS**

- 15.1 **Honorary Treasurer**, Network of Africa Academy of Sciences (NASAC), 2013 – 2019
- 15.2 **Chief Coordinator**, MATERIALS SCIENCE AND SOLAR ENERGY NETWORK FOR EASTERN AND SOUTHERN AFRICA (**MSSEESA**) Network (2018 – 2020)
- 15.3 **A member** of the pioneer group that in 2002 initiated the MATERIALS SCIENCE AND SOLAR ENERGY NETWORK FOR EASTERN AND SOUTHERN AFRICA Network (referred to as “MSSEESA”) – a Network aimed at forging collaboration in Solar cell and solar cell materials research in East and Central Africa region.
- 15.4 **Co-Editor**, Proceedings of the International Workshop on Nanotechnology: Present Status and Future Prospects in Developing Countries. 18 – 20 May 2009, Kashan, Iran (Publishers NAM S&T Centre)
- 15.5 **Editor-in-Chief**, Kenya National Academy of Sciences
- 15.6 **Subject (Physics) & Regional Sub-Editor**, *Africa Journal of Science and Technology* (2003 – 2015)
- 15.7 **Has served as External Examiner**, Egerton University, Kenyatta University, Makerere University; University of Fort Hare, Dar es Salaam University College of Education (DUCE)
- 15.8 **Reviewer** for several International Journals, e.g., *Journal of Materials Science*; *Journal of Materials Research*; *Journal of Photobiology and Photoenergy*

## **16. NATIONAL CONTRIBUTIONS**

- 16.1 **Member of Council**, National Council for Science and Technology (NCST) (2010 - 2013)
- 16.2 **Member of Council Member**, Kenya Polytechnic University College (2009 – 2013)
- 16.3 **Editor**, Proceedings of the “Workshop on Science and Technology Park Development for Sustainable Industrial Growth” by the Kenya National Academy of Sciences (KNAS) Conference, June, 2004.
- 16.4 **Editor**, Proceedings of the KNAS “National Symposium on Science, Technology, Innovation and Society: The African Perspectives and Experiences”, June 2006.
- 16.5 **Editor**, Proceedings of the KNAS Workshop on Science/Mathematics Teacher Professional Development and Testing, 13<sup>th</sup> – 14<sup>th</sup> December 2006
- 16.6 **Editor**, Final Report on “The Role of Parliamentary Office of Science and Technology (POST) and Pairing Scheme,” a Workshop organized by KNAS, June 2007
- 16.7 **Member** of the local organizing committee (LOC) of KPS/ANSTI Regional Conference, Nairobi, Kenya, 19th-23rd Sept. 1994.
- 16.8 **Member** of Local Organizing Committee and Chairman of the Conference Scientific Committee of the 1<sup>st</sup> ARCNDT, Nairobi, June 22-24, 1994
- 16.9 **Chairman**, Organizing Committee of Kenya Physical Society (KPS) Regional Conference (2000)
- 16.10 **Chairman**, Organizing Committee of Kenya Physical Society (KPS) Local Workshop (2001)
- 16.11 Member of the Committee that drew the Kenya National Academy of Sciences (KNAS) Strategic Plan (2006 – 2011)
- 16.12 **Chairman**, Organizing Committee of the Conference on “Opto-electronic devices: Potential for sustainable development”, University of Nairobi, 8 – 9<sup>th</sup> July 2010
- 16.13 **External examiner**, University of Port Hare – South Africa, Maseno University, Egerton University, Kenyatta University, Jomo Kenyatta University, Makerere University - Uganda, Dar es Salaam University College of Education (DUCE) - Tanzania,
- 16.14 **Chairman**, Ad Hoc Committee on Nanotechnology of NCST that produced the Report titled “NANOTECHNOLOGY DEVELOPMENT IN KENYA”, A Report to the National Council for Science and Technology (NCST), Ministry of Higher Education Science and Technology (September, 2009)
- 16.15 **Peer Reviewer**, National Research and Development Journal (A journal of the Ministry of Higher Education, Science and Technology), 2009

## **FUNDRAISING**

### **17. RESEARCH GRANTS**

- 17.1 International Programme in Physical Sciences: (2000 – 2023): SEK 16,750,000,000 (**Approx. KSh 201,000,000/**)
- 17.2 MSSEESA: **KSh 18 million** (2018 - 2020)
- 17.3 Nuffic Foundation (Netherlands): Euros 100,000 (**KSh. 10,500,000**) for Tailor Made Training of PV Systems (TMT) – November 2013 (10 technologists and academic staff members trained in Netherlands for 2 weeks)
- 17.4 University of Nairobi (2006) (**KSh 2,500,000**) towards purchase of spectrophotometer
- 17.5 Deans’ Committee Grant (in collaboration with the late Prof. B.O. Kola) 1994: **KSh112,200/** (To develop and test a system to study the elastic properties of solids)
- 17.6 National Council for Science and Technology, 1998: **KSh 100,000/** for Ultrasonic characterization of Kenyan refractories.

- 17.7 Member of a four-nation consortium bidding for the Phase II Royal Society (RS-UK)/DFiD call for proposal (2014/15)

### **OTHER FUNDS**

- 17.7 **Solar Academy Training** (twice a year since 2012) - > **KSh 20,000,000**

### **18. AWARDS AND RECOGNITIONS**

- 18.1 Certificate of Excellent Performance (2010/2011; 2011/2012, 2015/2016)
- 18.2 Certificate of Recognition (*Category: Diligent Academic and Administrative Leadership*), College of Biological and Physical Science, on Outstanding Work performance during the year 2006.
- 18.3 First prize in the category of 'Industrial Relevance' for a presentation based on the Ph.D. research work at the Materials Department's Postgraduate Research day (1991), Imperial College of Science and Technology and Medicine.
- 18.4 Third prize in the category of 'Best Scientific Content', (see 17.2).
- 18.5 Trophy in recognition of a presentation at the Young Speakers Meeting organized by the Institute of Ceramics South-East Branch, U.K. (1990).

### **RESEARCH PROFILE**

#### **19. RESEARCH ACTIVITIES AND INTERESTS**

- 19.1 Microstructure-Property Relationships with emphasis on:
- (i) Renewable Energy sources (wet solar cells, i.e., nanostructured TiO<sub>2</sub> and photovoltaics, and the environmental impact.
  - (ii) Electrophoretic deposition (EPD) of TiO<sub>2</sub> thin films for photocatalysis, and other uses.
  - (iii) Elastic wave propagation in materials, especially for nondestructive evaluation and characterization of materials.
  - (v) Internal friction and relaxation processes in materials.
  - (vi) Thermophysical properties of solids, in particular, ceramics and granular thermal insulators.
  - (iv) Nanotechnologies for sustainable development (e.g., water purification and solar cells).
- 19.2 Broad Education issues, e.g., Best Practices in Science Education in Kenya.
- 19.3 Nanotechnology knowledge brokerage and stakeholder participation in Kenya

#### **20. COLLABORATIVE RESEARCH LINKAGES**

- (1) Development of dye-sensitised nanostructured TiO<sub>2</sub> photoelectrochemical (PEC) solar cell. (In collaboration with Materials Department, Uppsala University, Sweden and Physics Department, Imperial College London, and Hahn-Meitner Institute - Germany).
- (2) Nanotechnologies for sustainable development (e.g., water purification and solar cells)
- (3) Nanotechnologies for development in India, Kenya and The Netherlands—towards a framework for democratic governance of risks in developing countries. An integrated project with ATPS (with Dr. Kevin Urama formerly of Africa Technology Policy Studies Network (ATPS)).

#### **21 STUDENT SUPERVISION**

##### **MSc (Physics) (16 completed)**

- 1) Mr. F. W. Nyongesa (1994), 2) Mr. R. Kinyanjui (1995), 3) Mr. J.W. Muliaro (1996), 4) Mr. S. Waita (1999), 5) Mr. T. Nyangonda (2000), 6) Mr. J. Simiyu (2001) 7) Mr. A. Ogacho (2002),

8. Mr. S. Njogu (2005), 9) Mr. B. Wafula (2006) 10) Mr. W. N. Gatimu (2007) 11) Mr. Paul Ajuoga (2012), 12) Mr. C.O. Ayieko, 13) J. Ndungu (2014), 14) J. Obilla (2016), 15) B. Okoth (2019), 16) Sheila Bisach (2021)

### **PhD (Physics) Completed (9)**

1) Dr. F.W. Nyongesa (2000), 2) Dr. J.N. Kimani (2002), 3) Dr. S. Waita (2008), 4) Dr. R.J. Musembi (2009), 5) Dr. A.A. Ogacho (2010) 6) Dr. J. Simiyu (2010), 7) Dr. T. Nyan'gonda (2014), 8) Dr. J.N. Nguu (2017), Dr. C.O. Ayieko (2017).

### **On-going Supervision**

MSc (1), PhD (3)

## **22. PUBLICATIONS**

### **22.1 REFEREED JOURNALS**

#### **2021**

- (1) Jorim Okoth Obila, Hongwei Lei, Elijah Omollo Ayieta, Alex Awuor Ogacho, **Bernard O. Aduda**, Feng Wang (2021), Improving Efficiency and Stability of Tin-Based Perovskite Solar Cells by Anilinium Hypophosphite Additive, January 2021, *New Journal of Chemistry*, January 2021, DOI: [10.1039/D1NJ00602A](https://doi.org/10.1039/D1NJ00602A)

#### **2020**

- (2) Brian O. Owino, Francis W. Nyongesa, Alex A. Ogacho, **Bernard O. Aduda** and Benjamin V. Odari (2020). Effects of TiO<sub>2</sub> Blocking Layer on Photovoltaic Characteristics of TiO<sub>2</sub>/Nb<sub>2</sub>O<sub>5</sub> Dye Sensitized Solar Cells, *MRS Advances* © 2020 Materials Research Society, Vol.5(20), 1049 – 1058. DOI: 10.1557/adv.2020.16
- (3) Charles Opiyo Ayieko, Robinson Juma Musembi, **Bernard Odhiambo Aduda**, Alex Ogacho, Pushpendra Jain (2020). Photo-thermal Conversion Efficiency of Textured and Untextured Aluminum Substrate Coated with Titanium Dioxide (TiO<sub>2</sub>)-bound CuFeMnO<sub>4</sub> Absorber. *American Journal of Modern Energy*, 6(1): 9-15. <http://www.sciencepublishinggroup.com/j/ajme>. doi: 10.11648/j.ajme.20200601.12. ISSN: 2575-3908 (Print); ISSN: 2575-3797 (Online)
- (4) Mary T. Simiyu, Francis W. Nyongesa, **Bernard O. Aduda**, Zephania Birech, and Godwin Mwebaze (2020). Application of An Organic Plant-Derived Binder in the Fabrication of Diatomaceous Earth Waste- Based Membranes for Water Purification Systems. *MRS Advances* © 2020 Materials Research Society, Vol. 5(26), 1339 -1348. DOI: 10.1557/adv.2020.123

#### **2019**

- (5) Nduhiu Ndungu, **Bernard O. Aduda**, Francis W. Nyongesa, Alex Ogacho, Comparison of the effectiveness of various designs of ceramic filter membranes in domestic water purification, *International Journal of Innovative Research and Advanced Studies (IJIRAS)* Volume 6 Issue 1, January 2019

## 2018

- (6) Francis W Nyongesa, **Bernard O. Aduda** and Wilson G Nyaga, Electrophoretic Deposition of TiO<sub>2</sub> Thin Films for Photocatalytic Degradation of Organic Pollutants in Water, *Tanz. J. Sci. Vol. 44(4)*, 65 – 76, 2018
- (7) John Nguu, Francis Nyongesa, Robinson Musembi, **Bernard Aduda**. Electrophoretic Deposition and Characterization of TiO<sub>2</sub>/Nb<sub>2</sub>O<sub>5</sub> Composite Thin Films for Dye Sensitized Solar Cells, *Journal of Materials Physics and Chemistry*, 2018, Vol. 6, No. 1, 1-8. DOI:10.12691/jmpc-6-1-1

## 2017

- (8) Mulati DM, Nyang'onda TN, **Aduda BO**. "Raman Crystallinity and Hall Effect Studies of Microcrystalline Silicon Seed Layers." *Journal of Agricultural Science and Technology*. 2017; 16(1):106-118.
- (9) Ignatius Nakhoywa Barasa, ,Justus Simiyu, Sebastian Waita, Denis Wekesa and **Bernard Aduda**, (2017), Automobile Battery Monitoring System using Arduino Uno R3 Microcontroller Board, *The International Journal of Science & Technoledge*, **5(6)** 6, 24-36.
- (10) Francis Nyongesa, **Bernard Aduda**. Electrophoretic Deposition of Titanium Dioxide Thin Films for Photocatalytic Water Purification Systems. *Advances in Materials*. Vol. 6, No. 4, 2017, pp. 31-37. doi: 10.11648/j.am.20170604.11
- (11) Justine Sageka Nyarige, Sebastian Waita, Justus Simiyu, Silas Mureramanzi, **Bernard Aduda**, Structural and Optical Properties of Phosphorous and Antimony doped ZnO thin films Deposited by Spray Pyrolysis: A Comparative Study, *International Advanced Research Journal in Science, Engineering and Technology*, Vol. 4, Issue 11, November 2017, 149 – 154. DOI 10.17148/IARJSET.2017.411121

## 2016

- (12) Sebastian Waita and **Bernard Aduda** (2016). Emphasis on Photovoltaic (PV) Solar System Installation Training: A case study of a PV Solar System Installed in Makueni County, Kenya, *International Advanced Research Journal in Science, Engineering and Technology*, **3(8)**, 2016, 231 – 234, DOI 10.17148/IARJSET.2016.3843
- (13) Sebastian Waita and **Bernard Aduda** (2016). Photovoltaic (PV) Solar System Sizing for Off Grid Solar Home Systems, *International Journal of Applied and Natural Sciences (IJANS)* **5(5)** 2016, 73 – 78, ISSN(P): 2319-4014; ISSN(E): 2319-4022
- (14) Ogacho A., **Aduda B. O.** (2016) Structural, Optical and Photoelectrochemical Properties of Cuprous Oxide Synthesized by Low Temperature Thermal Oxidation. *Mat.Sci.Res.India*;**13(1)**
- (15) C. O. Ayieko, R. J. Musembi1, A. A. Ogacho, **B. O. Aduda**, B. M. Muthoka, P. K. Jain (2016) Optical Characterization of TiO<sub>2</sub>-bound (CuFeMnO<sub>4</sub>) Absorber Paint for Solar Thermal Applications, *American Journal of Energy Research*, 2016, Vol. 4, No. 1, 11-15

## 2015

- (16) C.A. Opiyo, R.J. Musembi, A.A. Ogacho, **B.O. Aduda**, B.M. Muthoka, P. K. Jain (2015), Controlled texturing of Aluminum Sheet for Solar Energy Applications, *Advances in Materials Physics and Chemistry*, 2015, **5** 458 – 466

- (17) A.A. Ogacho, P.B. Ajuoga and **B.O. Aduda (2015)**, Suppression of Anatase to Rutile Phase Transformation of Niobium doped TiO<sub>2</sub> Synthesized by High Temperature Diffusion Technique, *International Journal for Innovation Education and Research* www.ijer.net Vol:-3 No-6, 2015 Online-ISSN 2411-2933, Print-ISSN 2411-3123

#### 2014

- (18) Patrick Mwinzi Mwathe, Robinson Musembi, Mathew Munji, Benjamin Odari, Lawrence Munguti, Alex Alfred Ntilakigwa, John Nguu, **Bernard Aduda**, Boniface Muthoka (2014), Influence of surface passivation on optical properties of spray pyrolysis deposited Pd-F:SnO<sub>2</sub>, *International Journal of Materials Science and Applications*; **3**(5) 137-142
- (19) P. M. Mwathe, R. Musembi, M. Munji, B. Odari, L. Munguti, A. A. Ntilakigwa, J. Mwabora, W. Njoroge, **B. Aduda**, and B. Muthoka (2014), Surface passivation effect on CO<sub>2</sub> sensitivity of spray pyrolysis deposited Pd-F:SnO<sub>2</sub> thin film gas sensor, *Advances in Materials*, **3**(5), 38 - 44, DOI: 10.1164/j.am.20140305.12
- (20) J. Simiyu, S. Waita, R. Musembi, A. Ogacho, **B. Aduda (2014)**. Promotion of PV Uptake and Sector Growth in Kenya through Value Added Training in PV Sizing, Installation and Maintenance, *Energy Procedia*, **57**: 817 – 825, DOI: 10.1016/j.egypro.2014.10.290
- (21) John Nguu, Susan Ndivo, **Bernard Aduda**, Francis Nyongesa, Robinson Musembi (2014), Livestock Farmers' Perception on Generation of Cattle Waste-based Biogas Methane: the Case of Embu West District, Kenya, *Journal of Energy Technologies and Policy*, [www.iiste.org](http://www.iiste.org) ISSN 2224-3232 (Paper) ISSN 2225-0573 (Online), Vol.4, No.8, 2014
- (22) T. N. Nyan'gonda, D. M. Mulati, and **B.O. Aduda, (2014)** Raman Crystallinity and Hall Effect Studies of Microcrystalline Silicon Seed Layers, *JAGST* **16**(1), 105 – 117.
- (23) J. N. Nguu, R. J. Musembi, F. W. Nyongesa and **B. O. Aduda**, Electrophoretic Deposition of TiO<sub>2</sub>/Nb<sub>2</sub>O<sub>5</sub> Composite Electrode Thin Films for Photovoltaic Application. *Jnl of Energy and Power Engineering* **8 (2014)** 757 – 764.
- (24) John N. Nguu, Robinson J. Musembi, Francis W. Nyongesa and **Bernard O. Aduda**, Effect of Process-related Parameters on Band Gap of Electrophoretically Deposited TiO<sub>2</sub>/Nb<sub>2</sub>O<sub>5</sub> Composite Thin Films, *Africa Journal of Physical Sciences*, **1**(1) June **2014**, 43 – 48

#### 2013

- (25) Robinson Musembi, **Bernard Aduda**, Julius Mwabora, Marin Rusu, Konstantinos Fostropoulos, Martha Lux-Steiner, Effect of Recombination on Series Resistance in eta Solar Cell Modified with In(OH)<sub>x</sub>Sy Buffer Layer, *International Journal of Energy Engineering* 2013, **3**(3): 183-189
- (26) C. O. Ayieko, R. J. Musembi, S. M. Waita, **B. O. Aduda**, P. K. Jain, Performance of TiO<sub>2</sub>/In(OH)<sub>i</sub>Sj/Pb(OH)<sub>x</sub>Sy Composite ETA Solar Cell Fabricated from Nitrogen Doped TiO<sub>2</sub> Thin Film Window Layer, *International Journal of Materials Engineering* 2013, **3**(2): 11-16 DOI: 10.5923/j.ijme.20130302.01

#### 2012

- (27) C. O. Ayieko, R. J. Musembi, S. M. Waita, **B. O. Aduda**, P. K. Jain, Structural and Optical Characterization of Nitrogen-doped TiO<sub>2</sub> Thin Films Deposited by Spray Pyrolysis on Fluorine Doped Tin Oxide (FTO) Coated Glass Slides, *International Journal of Energy Engineering* **2012**, **2**(3): 67-72

## 2011

- (28) F. Nyongesa, N. Rahbar, S. Obwoya, J. Zimba, **B.O. Aduda** and W. Soboyejo, (2011), “An Investigation of Thermal Shock in Porous Clay Ceramics” *ISRN Mechanical Engineering 2011*, Article ID 816853; doi: 10.5402/2011/816853

## 2010

- (29) N. Rahbar, **B.O. Aduda**, J. Zimba, S.K. Obwoya, F.W. Nyongesa, I. Yakub and W.O. Soboyejo (2010), Thermal Shock Resistance of a Kyanite-Based (Aluminosilicate) Ceramic, *Experimental Mechanics*, DOI 10.1007/s11340-010-9345-3 (published online: 27 April 2010)

## 2009

- (30) S.M. Waita, **B.O. Aduda**, J.M. Mwabora, G.A. Niklasson, C.G. Granqvist and G. Boschloo (2009), Electrochemical characterization of TiO<sub>2</sub> blocking layers prepared by reactive magnetron sputtering, *Journal of Electroanalytical Chemistry*, **637** 79 – 83
- (31) **Bernard Aduda**, Justus Simiyu, Julius Mwakondo Mwabora, Conduction Band Edge of (Ti,Sn)O<sub>2</sub> Solid Mixtures Tuning for Photoelectrochemical Applications, *MRS- Materials Research Society*, **Paper #:** 1171-S05-04, **DOI:** 10.1557/PROC-1171-S05-04, (2009)

## 2008

- (32) R. J. Musembi, M. Rusu, J.M. Mwabora, **B.O. Aduda**, K. Fostiropoulos, M.C. Lux-Steiner (2008) Intensity and Temperature Dependent Characterization of eta Solar Cell, *Physics Status Solidi (a)* **205** (7) 1713 – 1718
- (33) R.J. Musembi, **B.O. Aduda**, J. M. Mwabora, R. Bayon: Solar Cell with Extremely Thin Absorber (eta) Based on Novel eta Concept, *Africa Journal of Science and Technology*, **9**(2), (2008) 55 – 59.
- (34) S. Njogu, F.W. Nyongesa, **B.O. Aduda** (2008), Effect of plant-derived organic binders on fracture toughness and fatigue of kaolin-based refractories, *J. Mater. Sci.*, **43**, 4107 – 4111

## 2007

- (35) H. B. Wafula, J. Simiyu, S. Waita, **B.O. Aduda** and J. M. Mwabora, (2007) Effect Of Nitration On Pressed TiO<sub>2</sub> Photoelectrodes For Dye-Sensitized Solar Cells, *African Journal of Science and Technology (AJST) Science and Engineering Series* Vol. 8, No. 2, pp. 63 – 71
- (36) J. Simiyu, A.A. Ogacho, J.M. Mwabora, **B.O. Aduda**, S-E. Lindquist, A. Hagfeldt, G. Boschloo (July 2007), Titania Nanotubes Prepared by Synthesis Method for Dye Sensitized Electrochemical Solar Cells (Paper presented at the International Conference in Electroceramics (31<sup>st</sup> July – 3 August 2007, Arusha – Tanzania).
- (37) S.M. Waita, **B.O. Aduda**, J.M. Mwabora, C.G. Granqvist, S-E Lindquist, G.A. Niklasson, A. Hagfeldt, G. Boschloo, (2007) Electron Transport and Recombination I Dye Sensitized Solar Cells Fabricated from Obliquely Sputter Deposited and Thermally Annealed TiO<sub>2</sub> Films *Journal of Electroanalytical Chemistry* **605**,151–156.

## 2006

- (38) A.A. Ogacho, **B.O. Aduda** and F.W. Nyongesa (Dec. 2006), Thermal Shock Behaviour of a Kaolinite Refractory Prepared Using a Natural Organic Binder, *Journal of Materials Science*, **41**(24) 8276 – 8283.



(39) S. M. Waita, J. M. Mwabora, **B.O. Aduda**, G. A. Niklasson, S – E. Lindquist and C. G. Granqvist (2006), Performance of Dye Sensitized Solar Cells Fabricated From Obliquely DC Sputtered TiO<sub>2</sub> Films, *Africa Jnl. of Science and Technology, Series*, **7**(2), 125–139.

(40) **B.O. Aduda** (2006), Materials Science, *Promotion of Science and Technology (POST)*, Vol. XII No. 1, p19 –22.

#### **2004**

(41) F.W. Nyongesa and **B.O. Aduda** (2004), Fracture Strength of Porous Ceramics: Stress concentration versus minimum solid area models, *Africa Journal of Science and Technology, Series A*, **5**(2), 19-27.

(42) **B.O. Aduda**, P. Ravirajan, K.L. Choyi & J. Nelson (2004), ‘Effect of Morphology on Electron Drift Mobility in Porous TiO<sub>2</sub>, *International Journal of Photoenergy* **Vol. 06**, 141- 147.

(43) J.N. Kimani, and **B.O. Aduda** (June 2004), ‘Temperature Dependence of the Thermal Conductivity of Grog Modified Kenyan Kaolinite Refractory’, *Africa Jnl. of Science and Technology, Series A*, **5**(1), 6-14.

(44) F.W. Nyongesa and **B.O. Aduda** (2004), ‘The Effect of Quartz and Mullite Phases on the Strength of Triaxial Porcelain’, *East African Journal of Science* **5**(1): 11-24.

(45) J. Simiyu, **B.O. Aduda**, and J. Mwabora (2004), Anthocyanin Sensitized Nanoporous TiO<sub>2</sub> PEC Solar Cells Prepared by a Sol Gel Process, *Progr Colloid Polym Sci.* **125**, 34-37.

#### **2003**

(46) **B.O. Aduda** and A.R. Boccaccini (June 2003), Velocity of Elastic Waves in Porous Ceramic Materials: Influence of Pore Structure, *British Ceramic Transactions*, **102**(3) 103-108.

(47) A.A. Ogacho, **B.O. Aduda** and F.W. Nyongesa (June 2003), Thermal Conductivity of a Kaolinite Refractory: Effect of an Organic Binder, *Journal of Materials Science* **38**(11) 2003, 2293-2297.

(48) J. Simiyu, **B.O. Aduda**, and J. Mwabora (January 2003), Stability of anthocyanin sensitized TiO<sub>2</sub> photoelectrochemical (PEC) solar cells prepared by sol gel process *African Journal of Science and Technology (AJST) Science & Engineering Series* **3**(2) 2003, 56-61.

#### **2000**

(49) A.K. Raturi, S. Waita, **B. Aduda**, T. Nyangonda (2000), Photoactive Iron Pyrite Films for Photoelectrochemical (PEC) cells, *Renewable Energy* **20**(2000) 37 – 43.

(50) **Aduda B.O.** and F.W. Nyongesa, (2000) ‘The role of aspect ratio on the elastic moduli of a triaxial ceramic system’, *Brit. Ceramic Transactions*, **99**(5) 206 – 211.

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#### **1999**

(52) Nyongesa, F.W. & **Aduda B.O.** (June 1999) Ultrasonic Attenuation in Clay Refractories, *Brit. Ceramic Transaction*, **98**(6) 266 – 270.

- (53) **Aduda B.O.**, F.W. Nyongesa and G. Obado, (1999) 'Improving the green and fired fracture strength of a kaolinite ceramic using some vegetable syrup', *J. Mater. Sci. Lett.* **18** 1653–1655.

#### 1998

- (54) **Aduda, B.O.**, E.M. Ayiera and D.R. Newman, (1998), 'Thermal Conductivity of Porous Insulators: Vermiculite and Wood-ash', *KJST, Series A*, **11** (1).

#### 1996

- (55) **Aduda, B.O.**, (1996), 'Effective thermal conductivity of loose particulate systems', *Journal of Materials Science* **31**, pp 6441-6448.
- (56) **Aduda, B.O.** and R.D. Rawlings, (1996), 'Spectral Analysis of Acousto-Ultrasonic Waves for Defect Sizing' *NDT & International Vol. 94* No.4, PP. 237-240, August issue.
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- (58) **Aduda, B.O.**, D.R. Newman and E.M. Ayiera, (1996), 'Thermal Conductivity of Particulate Insulators: Effect of Particle Size Distribution, Moisture Content and Binders', *KJST Series A* **13** (1-2), 116-129.

#### 1995

- (59) Nyongesa, F.W. and **Aduda, B.O.**, (1995), 'An Ultrasonic Nondestructive Evaluation of Clay Refractories', *AJST Series B vol.7* (2) July, P 53-57.

#### 1994

- (60) **Aduda, B.O.** and R.D. Rawlings, (1994), 'An Acousto-Ultrasonic Study of the Effect of Porosity of a Sintered Glass System' *J. Mater. Sci.* **29**, 2297 - 2303.
- (61) **Aduda, B.O.** (1994), 'A Case for Ultrasonic Evaluation of Materials in Kenya', *Discovery and Innovation* **6**(1), 40.

### 22.2 CONFERENCE AND SEMINARS PROCEEDINGS

- (1) **Aduda, B.O.** and R.D. Rawlings, (1991), 'An Acousto-Ultrasonics Testing of Inorganic Composites', in *MATER. SCI. MONOGR. Vol. 68*, pp 445 - 450, Elsevier Science Publisher, Amsterdam.
- (2) **Aduda, B.O.** and R.D. Rawlings, (1992), 'An Acousto-Ultrasonics Assessment of Glass-Alumina Composites', presented at the 13th WCNDT World Conference on Nondestructive Testing, Sao Paulo, Brazil, 18th-23 Oct. 1992. *Proceedings to be published by Elsevier Science Publishers.*
- (3) **Aduda, B.O.** (1992), 'Spectral Analysis for Defect Sizing in Model Ceramics', *Proceedings of the 1st Regional Kenya National Association of Physicists (KNAP) Conference, held in Nairobi, Sept. 21 - 25th, P93 - 98.*
- (4) Nyongesa, F.W. and **Aduda, B.O.**, (1994), 'Ultrasonic Characterization of Kenyan Clay Refractories', *Proceedings of the 1st Africa Regional Conference on Nondestructive Testing (ARCNDT), Nairobi, Kenya, 22-24th, June, p32.*

- (5) **Aduda, B.O.**, (1994), 'What is Nondestructive Testing?' An awareness seminar paper presented to senior management personnel of the East Africa Industries Ltd., Nairobi, 24th, March.
- (6) **Aduda, B.O.** (1996) 'Materials Characterization: The Kenya Scenario' Presented at the 3rd Kenya Physical Society (KPS) Regional Conference, held in Nairobi, 23rd - 27th Sept.
- (7) J.N. Kimani and **B .O. Aduda** (1999) 'Thermal fatigue behaviour of a Kenyan kaolinite clay', Proc. Regional Conference on materials Science, Makerere University, Kampala, Uganda, Spt. 15<sup>th</sup> – 19<sup>th</sup>, 1999, p 121 – 133.
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- (16) **B.O. Aduda**, P. Ravirajan, K.L. Choyi & J. Nelson (2003), 'Effect of Morphology on Electron Drift Mobility in Porous TiO<sub>2</sub>, 7<sup>th</sup> International conference on Solar Energy and Applied Photochemistry (SOLAR '03) 23-28<sup>TH</sup> February 2003, Luxor Egypt. (Paper submitted to *International Journal of Photoenergy*).
- (17) **B.O. Aduda, A.A. Ogacho, J.N. Kimani, F.W. Nyongesa**, (2004) 'Thermal Conductivity of Kaolinite Refractory: Effect of Varying Preparation Parameters' East Africa Materials Research Society (EAMRS), University of Dar es Salaam, August 2004.
- (18) **B.O. Aduda** (2005), Materials Science: A Spin-Off In Research And Development, *The KNAS National Workshop on Science and Technology Capacity in The Framework of Millennium Development Goals: A Commemoration of Scientific Revival Day of Africa 7th-9th December 2005, Nairobi Kenya.*

- (19) J. Simiyu, J.M. Mwabora, **B.O. Aduda**, S-E. Lindquist, A. Hagfeldt, and G. Boschloo (2006), Titania Nanotubes Prepared by Synthesis Method for Dye Sensitized Electrochemical Solar Cells, International Conference on Micro and Nano Technologies (ICMNT 06), Tizi-Ouzou, 19 -23 Nov. 2006, Abstracts Book, pp224 – 225.
- (20) **B.O. Aduda**, S.M. Waita, A.A. Ogacho, J.M. Mwabora, R.J. Musembi and J. Simiyu, (2007), Columnar and Passivated Nanoporous TiO<sub>2</sub> Excitonic Solar cell, US/Africa Workshop on Frontiers in Materials Science and Education, 20<sup>th</sup> – 26<sup>th</sup> January 2007, Abuja Nigeria. ([www.materialsworld.net/mwn/abuja/abuja\\_presentations/aduda-Nigeria-Presentation.pdf](http://www.materialsworld.net/mwn/abuja/abuja_presentations/aduda-Nigeria-Presentation.pdf) -)
- (21) R.J. Musembi, **B.O. Aduda**, J.M. Mwabora, R. Bayon (Jan, 2007), Solar Cell With PbS Extremely Thin Absorber (eta) Based on Novel eta Concept, 6<sup>th</sup> EBASI International Conference on Physics and Technology for Sustainable Development in Africa, Cape Town, South Africa, 24<sup>th</sup> – 26<sup>th</sup> Jan 2007 (submitted to *Africa Review Journal*).
- (22) R.J. Musembi, **B.O. Aduda**, J.M. Mwabora, M.Rusu, K. Fostiropoulos, M.Ch. Lux-Steiner (June/July 2007) Temperature dependent characterization of TiO<sub>2</sub>/In(OH)<sub>x</sub>S<sub>y</sub>/PbS/PEDOT:PSS eta Solar Cell, Poster presented at 17<sup>th</sup> International Vacuum Congress(IVC-17),13<sup>th</sup> International Conference on Surface Science(ICSS-13) and International Conference on Nanoscience and Technology (ICN+T) Congress, Stockholm, Sweden, 2<sup>nd</sup> – 6<sup>th</sup> July 2007.
- (23) S.M. Waita, A.A. Ogacho, and **B. O. Aduda** (July 2007), Charge Transport in Bare and MgO-Coated TiO<sub>2</sub> Thin Films and in Dye-Sensitized Solar Cells: Effect of Film Thickness (Invited paper presented at the International Conference in Electroceramics (31<sup>st</sup> July – 3 August 2007, Arusha – Tanzania).
- (24) **Bernard O. Aduda** (2009), Status of Nanoscience and Nanotechnology in Kenya International Workshop on Nanotechnology: Present Status and Future Prospects in Developing Countries. 18 – 20 May 2009, Kashan, Iran
- (25) **Bernard O. Aduda** (2010), Energy Demand, Usage and Consequences: The Kenyan Case, Conclave of Afro Asia Young Scientists: February 11 – 13, 2010 on the theme “Energy, Climate and Development”, Jawaharlal Nehru Centre for Advanced Scientific Research; Jakukur, Bangalore-560 64, India
- (26) C. Opiyo Ayieko, **B.O. Aduda**, S. Waita, R.J. Musembi (2010), Effect of Nitration of TiO<sub>2</sub> Thin Film on the Efficiency of TiO<sub>2</sub>/In(OH)<sub>x</sub>S<sub>y</sub>/Pb(OH)<sub>x</sub>S<sub>y</sub> ETA Solar Cell. 48<sup>th</sup> Annual Conference of Microcopy Society of Southern Africa, University of Limpopo, 26<sup>th</sup> – 29<sup>th</sup> October, 2010
- (27) **Bernard O. Aduda** (2011) “Review of the Current State of Nanotechnologies Research and Policy Making in Kenya”, Nanotechnologies for Kenya’s Development: Questions of Knowledge Brokerage and Risk Governance Workshop, 12 – 13 December, 2011. Silversprings Hotel, Nairobi.
- (28) Sebastian Waita, Justus Simiyu, Robinson J. Musembi, Alex. Agacho, Thomas Nyang’onda, James Wafula, Silas Mureramanzi, Francis Nyongesa, Julius Mwabora and **Bernard Aduda**. Material Science and Energy Research at the Department of Physics, University of Nairobi, Kenya, AFRICAN NETWORK FOR SOLAR ENERGY - [www.ansole.org](http://www.ansole.org) An Network ANSOLE Mini - Symposium in Kenya, 9.May 2013, University of Nairobi, Kenya
- (29) Sebastian Waita and **Bernard Aduda**, Structural and Optical Characterization of Polymer based TiO<sub>2</sub> films for Photovoltaic Applications, 9<sup>th</sup> International Conference of African Materials Research Society, December 11 – 14, 2018, Gaborone, Botswana

- (30) M. Simiyu F. Nyongesa, **B. Aduda**, Z. Birech, N. Ilin, D. Andala, V. Odari, Strength-Porosity Relationship in Diatomaceous-Based Membranes and the Role of the Aspect Ratio in Filtration, 2nd Edition of the CREPAS conference, 14th to 16th December 2020, Université de Lomé, Lome, Togo
- (31) M. Simiyu, F. Nyongesa, B. Aduda, Z. Birech, L. Njenga, N. Ilin, T. Krauss, and G. Pitruzzello, Application of Molasses in Improving Water Purification of Diatomaceous Earth-waste Ceramic Membranes, 3rd Annual Science for Sustainable Development Conference – on 12th to 16th October, 2020, University of Nairobi, Kenya

### 22.3 CONFERENCES AND WORKSHOPS ATTENDED

- 1 The Working Party on the Mechanical Properties of Materials, ICTP, Trieste, Italy (23<sup>rd</sup> Aug.-3<sup>rd</sup> Sept, 1993).
- 2 The Workshop on Physics and Material Science of Nonconventional Energy Sources, at ICTP, Trieste, Italy- 28th Aug. - 17th Sept., 1993).
- 3 The Regional Workshop on Qualification and Certification of NDT Personnel, Nairobi, Kenya, (22nd - 26th. Nov., 1993).
- 4 The Workshop on Archaeometry and Preservation of Work of Art, ICTP, Trieste, Italy, (17th - 28th, Oct., 1994).
- 5 The Workshop on Industrial Composites: Design and Application, ICTP, Trieste, Italy, (31st Oct. - 5th Nov. 1994).
- 6 The Training of trainers Workshop at IMTR, Nairobi, Kenya (26<sup>th</sup> Feb- 6<sup>th</sup> March 2001).
- 7 The 7<sup>th</sup> International conference on Solar Energy and Applied Photochemistry (SOLAR '03) 23-28<sup>TH</sup> February 2003, Luxor Egypt.
- 8 National workshop on Science and Technology Parks Development for sustainable industrial growth: In commemoration of the Scientific Revival Day of Africa. June 30th 2004, Holiday Inn, Nairobi.
- 9 The East Africa Materials Research Society (EAMRS), University of Dar es Salaam, August 2004.
- 10 The African Virtual University (AVU) Teacher Education Curriculum Design Workshop, Nairobi, Kenya 24<sup>th</sup>-29<sup>th</sup> October 2005.
- 11 The International Conference in Electroceramics (31<sup>st</sup> July – 3 August 2007, Arusha – Tanzania).
- 12 Math–Physics Information Workshop: Finding Online Information on Research and Teaching in Mathematics and Physics, 5<sup>th</sup> – 11<sup>th</sup> August 2007, University of Dar es Salaam.
- 13 The 4<sup>th</sup> AMRS International Conference, 9<sup>th</sup> – 15<sup>th</sup> Dec. 2007, Dar es Salaam.
- 14 Innovative approaches to higher education and research in Africa'', Lome, Togo, 26<sup>th</sup> to 28<sup>th</sup> November, 2014
- 15 Uganda National Academy of Sciences, Network of African Science Academies (NASAC) and the U.S. National Academies (USNAS) international conference on 'Ensuring Country Ownership of Africa's Development Agenda Beyond 2015', Kampala, Uganda 10<sup>th</sup> – 12<sup>th</sup> November 2014 at Serena Resort Hotel.
- 16 Joint MSSEESA and DAAD International Conference on Materials Science Research for Sustainable Energy in Africa, Held at University of Nairobi, School of Physical Sciences on 26-27 September 2018, Nairobi, Kenya
- 17 3rd Annual Science for Sustainable Development Conference – on 12th to 16th October, 2020, University of Nairobi, Kenya

#### **22.4. BOOKS/MANUSCRIPTS**

- (1) Structure and Properties of Matter (2004) (2<sup>nd</sup> Year UoN Course book B. Ed/ B. Sc (ODL Programme))
- (2) Physics of Materials (2007) (4<sup>th</sup> Year UoN Course book B. Ed/ B. Sc (ODL Programme))
- (3) NANOTECHNOLOGY; Present Status and Future Prospects in Developing Countries (Eds. Harish Padh, **Bernard O. Aduda**, Ajith P. de Alwis), Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T CENTRE), Daya Publishing House, (2011) ISBN 81-7035-707-1; ISBN 978-81-7035-707-0

#### **23. COMMUNITY SERVICE**

1. Sponsor of disadvantaged students to high schools and colleges
2. Member of Development Committee, AIC Milimani-Nairobi

#### **24. CONSULTANCIES AND OTHER ACTIVITIES**

- (1) 1987: A consultant Kenya Energy Non Governmental Organization (KENGO), on thermal properties of insulating materials used in the Kenya Ceramic Jiko.
- (2) Resource Person (University Physics Curriculum evaluation), Commission for Higher Education (CHE) – now Commission for University Education (CUE) (2003 – to date).
- (3) Reviewer, *Journal of Materials Science*; *Journal of Photobiology and Photoenergy*, and other local journals.
- (4) Sub-Editor (Physics) and East Africa Region - *African Journal of Science and Technology* (AJST).
- (5) Editor, Kenya National Academy of Sciences (KNAS) 2004, 2005 and 2006 Workshop Proceedings
- (6) Member of the committee that developed the KNAS Strategic plan (2006).
- (7) Reviewer, African Virtual University (AVU) Physics modules (2008 – 2010)
- (8) Proposals Reviewer in **Energy and Industry** thematic area, National Council for Science and Technology (January, 2010).