

Professor Herick O. Otieno

Department of Physics and Material Science
Maseno University, Kisumu-Busia Rd
P.O. Box 333 – 40105, Maseno, Kenya

(A). UNIVERSITY EDUCATION

- I. University of Strathclyde (Scotland, UK), Awarded Ph.D degree in Applied Physics. Area of study: Renewable energy Technologies with special focus on solar energy.
- II. Kharkov State University (Ukraine), Awarded M.Sc degree in Solid State Physics, 1977

(B). PUBLICATIONS

1. Othieno, H., W. Grainger and J.W. Twidell (1981). Application of small scale solar crop dryers to maize drying in Kenya. **In Energy for rural and island communities**, Vol II, ED. J.W. Twidell. Pergamon Press, Oxford, pp.377 - 386.
2. Grainger, W.,H. Othieno and J.W. Twidell (1981). Small scale Solar crop dryers for tropical village use - theory and practical application. **In Solar Technology in the Eighties**(ISBN 0 08 026730 0),vol. 2. (Ed. D.O Hall and J. Morton), pergamon Press.
3. Grainger, W, J, W. Twidell and H. Othieno (1983). Modelling Solar air heaters for natural convection crop dryers. **In Rural Power Sources**. Proceedings of conference C32, **International Solar Energy Society (ISES)**, U.K.
4. Othieno, H., (1984). Problems of radiative heat exchange for multilayer collectors. **Kenya Journal of Science and Technology Series A**, 5: 93 - 96
5. Othieno, H., (1984) Science and the dissemination of appropriate technologies. n Ian Lowe (Ed.), **Teaching the interactions of science, technology and society**.(ISBN 0 582 87310 X) Longman Cheshire, pp. 61 - 67.

6. Othieno, H. (1985). Design factors of small scale thermosyphon solar crop dryers. **In O.Awe(Ed.) 'Physics and technology of solar Energy conversion'**. Ibadan Nigeria, pp. 135 - 143.
7. Othieno, H. (1985). Optimization of solar air heating collector used for crop drying. **Renewable Energy Development in Africa**. Vol.2 : 17 - 31.(ISBN 0 85092 292 5). Commonwealth science council.
8. Othieno, H. (1985). Solar Energy Thermal Converters. **In O.Awe(Ed.) 'Physics and Technology of Solar Energy Conversion'**. Ibadan, Nigeria pp. 127 - 133.
9. Othieno, H. (1986). Effects of wind on Solar collectors. **Kenya Journal of Science and Technology Series A**, 7 (I) : 49 - 61.
10. Othieno, H. (1986). Circulation of air in natural convection solar dryers. **In M.W Bassey & O.G. Schmidt (Eds.). 'Solar drying in Africa' (ISBN 0 88936 492 3)**. IDRC -255E, .47 - 59.
11. Johnson R.R. and Othieno, H. (1988). Energy Conservation as an appropriate technology. In Goswami D.Y. (Ed.). **Proceedings of the 23rd Intersociety Energy Conversion Engineering Conference**. ASME, Denver, Colorado pp. 125 - 128.
12. Othieno, H. and R. Johnson (1987). The effects of tilt on wind related heat transfer coefficients for flat plate solar collectors. **Solar Energy Technology**, Vol 4: 73 - 78. American Society for Mechanical Engineers (ASME).
13. Othieno, H. and Wanjau-wakabeche (1988). Aspects of Appropriate Technology in Kenya. In Othieno, H. (Ed). **Application of appropriate Technologies** pp. 14 - 15.
14. Othieno, H. (1988). Problems and Prospects of Technology transfer. In Othieno, H. (Ed). **Applications of Appropriate Technologies**. pp 20 - 23.
15. Othieno, H. (1989). The Development and Application of natural convection of Solar crop dryers in Kenya. **Alternative Energy Sources VIII: Solar Energy Fundamentals and Applications** Vol. 1: 267 -279. Hemisphere publishing corporation.
16. Othieno, H. (1989). Selection of Materials for Solar Thermal Converters. **Discovery and Innovation Vol. 1: 1**, 95 - 98.
17. Othieno, H. and R.J.A Kapiyo (1989). Processes of Technology Transfer: Some critical issues in developing countries. **An International Journal of Energy Exploration**, 7, 2: 93 - 102.
18. Othieno, H. (1989). Energy conservation as the basis for Appropriate Technology Development in Kenya. **An International Journal of Energy Exploration and Exploitation**, 7, 2: 103 - 115.

19. Othieno, H., W. Grainger and J. W. Twidell (1990). Radiative Heat Exchange between partially transmitting Parallel Layers. In A.M. Sayigh (Ed.) **Energy and the Environment** Vol.2: 717 - 725. Pergamon Press, Oxford.
20. Johnson R.R and H. Othieno (1990). Estimated Wind related Heat transfer coefficients for flat plate collectors. In A .M Sayigh (Ed). **Energy and Environment** Vol. 2: 1125 - 1136. Pergamon, Oxford.
21. Othieno, H.,B. Khamati and T.N. Thoruwa (1990). Appropriate Technology or Not. R.J.A. Kapiyo (Ed.), **Curriculum and socio cultural issues in Appropriate Technology Education**. Nairobi, Kenya.
22. Othieno, H. (1991). Alternative Energy Resources: The Kenya Perspective. **Energy and the Environment**. (ISBN 0-910110-82-4). ASHRAE, Atlanta, U.S.A. pp. 413 - 415.
23. Othieno, H.(1991).The Role of Physics in Development. In B.O. Kola (Ed.),**Physics for Better Future in Africa**. KNAP, Nairobi, Kenya.
24. Othieno,H.(1991). Energy Contribution to Climate Change: The Case of Kenya. **In S.M.Ominde and C.Juma (Eds.) 'A Change in the Weather: African Perspective on Climate Change'**. ACTS Press, Nairobi, Kenya.
25. Othieno, H. (1992). Alternative Energy Resources. **Journal of Energy Sources** Vol.14, 4: 405 - 410. Hemisphere Publishing Corporation, Washington.
26. Othieno, H. (1992). Energy Availability in Kenya: The case for Renewable Energies. **Physics and Technologies for Development in Africa**. Kenya National Association of Physicists, Nairobi.
27. Othieno, H. (1992). The Role of Physical Sciences in Technology and Society. In J.O.Malo & H.Othieno (Eds.)"**Physical Sciences in Eastern Africa. Its status and Future"**. IPPS, Arusha.
28. Othieno, H. (1993). Research and Development in Renewable Energy Technology in Sub-Saharan Africa. **Renewable Energy Technologies in Sub-Sahara Africa (ISBN 9966-841-13-X)**. Kenya Energy and Environment Organisation, Nairobi.
29. Othieno, H.(1994). Prediction Of the Effects of Glass Covers and Encapsulations on Solar Collectors. **Kenya Physical Society**. Nairobi, Kenya.
30. Othieno, H.(2000). Photovoltaic Technology: Most Appropriate Electricity Source for Rural Tropical Africa. **In A.Sayigh (Ed.), Renewable Energy**. World Renewable Energy Congress IV, Volume III, pp1962-1965. Pergamon Press, Oxford.
31. Othieno, H.(2002). Photovoltaic Technology and Application. **Discovery and Innovation**, 14: (1/2)

32. Otieno F.O, Kola B.O, Othieno H and Kangethe S.M (2006). A Formula for Measurement of Spectral Reflectance and Emittance Using Integrating Sphere Reflectometer. **The Kenyan Journal of Mechanical Engineering** Vol. 1:2, pp.11-19.
33. Odari, V.B., Mageto, M., Musembi R., Othieno H., Gaitho F. and Muramba V. (2013). Optical and Electrical Properties of Pd Doped SnO₂ Thin Films Deposited by Spray Pyrolysis. **Australian Journal of Basic and Applied Sciences**, 7(2): 89-98, 2013.
34. Odari, V.B., Musembi R., Mageto, M., Othieno H., Gaitho F., Mwamburi, M. and Muramba V. (2013). Optoelectronic Properties of F-co-doped PTO Thin Films Deposited by Spray Pyrolysis. **American Journal of Materials Science**. Vol.3 – 4.
35. Onyinge, G.O; Oduor, A.O and Othieno, H (2014). Investigating Thin Air Drying Characteristics of Vegetable Kales in a Natural Convection Solar Cabinet Dryer Under the Climatic Conditions of Maseno, Kenya. **International Journal of Engineering Research and Technology (IJERT)**: Vol.3, No.8. (ISSN:2278-0181) .
36. Onyinge, G.O; Oduor, A.O and Othieno, H (2015). The Design and Testing of an Indirect Cabinet Solar Dryer for Thin Layer Drying of Rastrineobola Argentea Fish Under Climatic Conditions of Maseno, Kenya. **African Journal of Food Science**, Vol 9 (1). ISSN: 1996-0794.
37. Raphael Venson Makokha Otakwa, Herick Othieno, Awange Joseph Lagat and Andrew Odhiambo Oduor (2016). Technology Options for the Built Environment in Kenya: Dye-Sensitized and Amorphous Silicon Photovoltaics for Application in NZE Buildings. **Current Alternative Energy Technology**. Bentham Science Publishers, ISSN 2405-4631.
38. Raphael Venson Makokha Otakwa, Herick Othieno, Andrew Odhiambo Oduor and Joseph Lagat Awange (2017). Energy Source and Technology Options for Kenya: Towards Direct Conversion of Solar Energy to Mechanical Work. **Advances in Applied Sciences**. Vol. 2, No. 4, 2017, pp. 43-47. doi: 10.11648/j.aas.20170204.11. Science Publishing Group

BOOKS

1. Onganga, O. Othieno H and Muniyirwa K. (Editors). **Lake Victoria 2000 and beyond: Challenges and opportunities**, Osienala (2001)
2. Othieno, H. **Elements of Equilibrium Thermodynamics: Concepts, Problems and Guides to Solutions (ISBN 9966-9748-0-6)**. One Touch Publishers, Kisumu. Kenya. (2001).
3. Othieno, H. **Principles of Applied Physics: Matter, Energy and Environment (ISBN 9966 9748 2 1)**. One Touch Publishers. Kisumu.(2003)

4. Othieno, H. and Awange, J.L. **Energy Resources in East Africa: Challenges and Opportunities (ISBN 3-540-35666-5)**. Springer Verlag, Heidelberg, Germany.(2006)
5. Othieno, H. **Fundamentals of University Physics (ISBN 81-239-1607-8)**. CBS Publishers and Distributors. New Delhi, India (2008).
6. Othieno,H., Onganga,O. and Oyier, M.O. **Resource and Environment Management: A Community-Based Approach**. Osienala, Kisumu. (2013).
7. Othieno, H. And Omulo,M. **The Basics of Environmental Management for Beginners**. Osienala, Kenya. (2013).
8. Othieno,H. **Ecosan Training Manual**. Osienala, Kisumu. (2013).
9. Othieno, H and Awange J.L (2015). **Energy Resources in Africa: Distribution, Challenges and Opportunities**. (ISBN 978-3-319-25185-1). Springer Verlag, Heidelberg, Germany.(2016)

Note: Publications 1, 6,7 and 8 are the result of the involvement in community development activities.

(C). WORKSHOPS AND CONFERENCES ATTENDED OUTSIDE KENYA

1. Solar World Forum, Brighton, U.K. 1981.
2. Energy for Rural and Island Communities, Inverness, U.K. 1981.
3. Ispra Courses on Solar Energy Conversion, Ispra, Italy, November,1981.
4. The J.A. Duffie Course on Solar Collectors, Cardiff, U.K.1982.
5. International Conference on Rural Technology Development (RTD' 1983' Conference), Harare, Zimbabwe.1983.
6. 3rd International Symposium on World trends in Science and Technology Education, Brisbane, Australia, December, 1984.
7. International Conference on Renewable Energy Technologies in Africa, Port Louis, Mauritius, March, 1985.
8. International Seminar on Technology Education at University Level. Simla, India, 1985.
9. Special Workshop on Solar Drying of Agricultural Products. Agricultural Research Organization, the Volcani Centre, Israel, July 1985.

10. Africa Union of Physics, Workshop of Physics and Technology of Solar Energy Conversion, Ibadan, Nigeria, August, 1985.
11. United Nations Special Session on the Critical Economic situation in Africa, 21st to 31st May 1986, New York, U.S.A.
12. Solar Crop Drying Workshop (IDRC Sponsored), Dakar, Senegal 20 - 25 July, 1986.
13. Workshop on Gender Stereotyping in Science, Technology and Mathematics Education, Accra, Ghana, January, 1987.
14. Review meeting of the African Energy Programme, Harare, Zimbabwe, March 1987.
15. Intersociety Energy Conversion Engineering Conference. Denver, Colorado, U.S.A., August 1988.
16. Conference on Wood Energy Development, Khartoum, Sudan, December 1988.
17. Workshop on Material Science and Physics of non-conventional Energy Sources, International Centre for Theoretical Physics (ICTP), Trieste, Italy, September, 1989.
18. International Conference on Prevention of Climate Change, IPCC), Washington, U.S.A. February 1990.
19. International Seminar on Management of Technology. The World Association of Industrial and Technological Research Organizations (WAITRO), Arusha, Tanzania, September, 1990.
20. International CFC Workshop, California, U.S.A. April, 1991.
21. International Workshop on Management of Hazardous Waste, Trinidad and Tobago, June 1991.
22. International Symposium on Energy and Environment, Espoo, Finland, August 1991.
23. International Physical Sciences Programme Workshop, Arusha, Tanzania, May 1992.
24. Salzburg Seminar on Leadership. Salzburg, Austria. 1995.
25. Third Workshop on Thin Films Physics and Technology. International Centre for Theoretical Physics (ICTP), Trieste, Italy. March 1999.
26. School of Synchrotron Radiation. International Centre for Theoretical Physics (ICTP). Trieste, Italy. April/May 1999.
27. Workshop on Nuclear Reactors and Nuclear Data. International Centre for Theoretical Physics (ICTP), Trieste, Italy, March 2000.

28. International Conference on Renewable energies ‘Renewables 2004’. Bonn, Germany 2004
29. Living Lakes conference on Lakes and Energy, Cranbrook, Canada, 2004
30. African Union First Conference of African Scientists and policy makers. Alexandria, Egypt, 2006
31. Workshop for the development of Energy Science Curriculum for Pan African University. Tlemcen, Algeria, 15 – 19 Sept. 2012.
32. Energy Curriculum Validation Workshop. Addis Ababa, Ethiopia. 18 -20 February 2013.
33. Global-Regional Integration Workshop on Sustainable Energy. Mexico City, 8 – 9 April 2013.

In addition to these, I have organised and/or attended several conferences/ workshops in Kenya since 1980 in areas covering Material Science and Renewable Energy Technologies.

(D). SCHOLARSHIPS/AWARDS RECEIVED

1. Association of Commonwealth Universities’ award to pay my salary as a tutorial fellow in the department of Physics at Kenyatta University, Kenya, 1979.
2. Commonwealth Scholarship, University of Strathclyde, U.K, 1979 - 1982.
3. **Commonwealth Science Council** Fellowship under African Energy Programme (Visited Sierra Leone, Liberia and Gambia), 1987.
4. **Fulbright Fellowship**, (1984 – 1985), North Carolina State University, Department of Mechanical and Aerospace Engineering. USA.
5. **Regular Associate** member of the International Centre for Theoretical Physics (ICTP), Trieste, Italy. 1998 – 2003.
6. **Senior Associate** member of the International Centre for Theoretical Physics (ICTP), 2003 – 2009.
7. **BNET Commonwealth Fellowship**. Department of Physics, University of Ibadan, Nigeria, 2014

(E). RESPONSIBILITIES

1. **Acting Director**, Appropriate Technology Centre, Kenyatta University, from September 1983 to June 1985.
2. **Director** of the Appropriate Technology Centre, Kenyatta University from July 1985 to May 1990. Was responsible for developing postgraduate research program for the Centre which later became the school of technology and engineering.
3. **Deputy Director** of Kenya Industrial Research and Development Institute (KIRDI) in charge of research and product development (June 1990 to May 1991)
4. **Chairman** of the Department of Physics and Materials Science at Maseno University (June 1991 to May 1994)
5. **Chairman** of the Department of Physics and Materials Science at Maseno University (2001 - September 2004).
6. **Visiting Professor of Physics** at Papua New Guinea University of Technology (UNITECH) (Jan 2005 to Dec 2005)
7. **Chairman of the Department of Physics**, Masinde Muliro University of Science and Technology (2009 -2011) – (was the founder chairman of the department of Physics)
8. **Professor of Physics**, Department of Physics and Materials Science at Maseno University (2011 to present).
9. **Visiting Professor**, Department of Physics, University of Ibadan, Nigeria (2014).
10. **Visiting Professor**, Curtin University, Perth, Australia (2015)

Note: As the first Chairman of the departments of physics at Maseno University, and also at Masinde University of Science and Technology, I was responsible for establishing the new departments in these newly established universities.

(F). SUPERVISION OF STUDENTS

I have supervised many postgraduate research students at M.Sc and Ph.D levels during my academic career. Within the last five years, I have supervised the following:

PH.D STUDENTS:

1. Onyinge George Odhiambo: A Forced Convection Solar Fish Dryer incorporating a Desiccant Unit (completed)
2. Henry Otunga: Ab Initio Studies of the Mechanical, Electronic, Optical and Thermal Properties of $\text{Ge}_2\text{Sb}_2\text{Te}_5$ (GST).(completed)
3. Raphael V.M. Otakwa: Stability Investigation of a-si, CdTe, $\text{CuIn}_x\text{Ga}_{1-x}\text{Se}_2$ and DSSC Modules Operating in Selected Outdoor Areas in Kenya.(in progress)

M.Sc Students:

1. Benjamin V.Odari: Effects of Fluorine Incorporation on Palladium Doped Tin Oxide for Gas Sensing Applications(graduated)
2. David Osiyo Nganga: Dependence of Temperature Variation on the Shape Factor of a Solar Parabolic Trough Concentrator (completed).
3. Adougo Peter Onyango. Effects of Natural Convection on Solar Energy Conversion Devices (in progress)

(G). THESIS/DISSERTATION EXAMINED:

I have also examined several theses and dissertations. Have, in the last few years examined the following:

M.SC RESEARCH (within the last six years)

1. Optical Properties of $\text{Se}_{100-x}\text{Bi}_x$ Thin Films Deposited on Glass Substrate by Flash Deposition Method. (by Mulama A. Amukayia, Maseno University).
2. Parametric Study of Thermosiphonic Photovoltaic/Thermal Air Systems (by Kipyegon Koech Richard, Moi University).
3. Characterization of Variability of Total Electron Content over Malindi (by George Ochieng Ondede, Maseno University)

PH.D RESEARCH (examined as external examiner within the last five years)

1. Application of Some Models to Estimate Horizontal Global and diffuse Solar Radiation at Selected Sites in Kenya. University of Eldoret, Kenya.
2. The Design, Construction and Performance Monitoring of a Batch Biogas Digester fed with Co-substrates. Patrick Mukumba, University of Fort Hare, South Africa.
3. Power output Estimation of a Conical Diffuser Augmented Wind Turbine. Peacemaker Masukume. University of Fort Hare, SA

(H). MAJOR REPORTS:

1. Othieno, H., and R. R. Johnson (1985). "**The effects of winds on solar collectors**". NCSU Applied Energy Research Laboratory Report AERL - 22. Dept. of mechanical and Aerospace Engineering, N. C. State University.
2. Othieno, H. (1988). "**Natural Convection Solar Crop Dryers in Kenya**". 73 pages, commonwealth Science Council, London.

3. Michieka, R., Othieno, H., Ruigu, G. and Said A. (1987). **"Towards Intensive Food Production in Kakamega and Kiambu Districts"** (293 pages. Ministry of Agriculture and Livestock Development, Home Economics Section. SIDA supported project. Was in charge of energy in Agriculture.
4. Othieno, H., W. Kerre and W. K. Kiiru (1990). **"Industrial Technology Policy and Regulatory Environment for Development"**. A Report for the National Council for Science and Technology. Nairobi, Kenya.

(I). EXTERNAL EXAMINER:

I have been an external examiner in many universities eg. Makerere in Uganda, KIST in Rwanda, Fort Hare in South Africa, University of Nairobi, etc

(J). WORK EXPERIENCE

June 2011 to present:	Professor of Physics, Department of Physics and Materials Science
June2008 – May 2011	Professor and chairman of the department of Physics, Masinde Muliro University of Science and Technology
2003 – 2007	Professor of Physics, Department of Physics, Maseno University
1991 - 2003	Associate. Professor, Department of Physics, Maseno University
1985 -1990	Senior Research Fellow and Director , Appropriate Technology Centre, Kenyatta University.
1983 – 1985	Lecturer, Department of Physics, Kenyatta University
1977 - 1983	Tutorial Fellow, Department of Physics, Kenyatta University College.(away on study leave from Sept 1979 to Jan 1983)

Other Academic Engagements

Sept 1984- Mar 1985	Post-doctoral Research at the department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, North Carolina, USA. Conducted research on effects of wind on solar collectors.
Jan –Dec2005	Visiting Professor, Department of Applied Physics, Papua New Guinea University of Technology, Lae, Papua New Guinea (South Pacific). Taught physics and introduced new physics programs/courses

June 2014 – Sept 2014

Visiting Professor at the University of Ibadan, Ibadan, Nigeria. Taught physics to final year students and completed a book on Energy Resources in Africa as listed above

June- July 2015

Visiting Professor, Curtin University of Technology, Australia. Finalized and submitted the book on Energy Resources in Africa to Springer for publication.

Has also taught, on part-time basis, in many of our local universities.

(K). MEMBERSHIP OF PROFESSIONAL BODIES:

1. Member, Institute of Physics (U.K., 1987)
2. Member, Institute of Energy (U.K, 1987)
5. Member of Task Force on Energy Models and Scenario for Africa (2008 – 2012). International Council for Science (ICSU) Regional Office for Africa

Note: I have been, for several years and at different times, a member of the Deans Committee and the Senate of Kenyatta University, Maseno University and Masinde Muliro University. Between 2003 and 2006 I represented Maseno University Senate at the University Council. I have continuously participated in community based services and implemented several community based projects supported by international donor agencies. In addition I have been energy consultant for many international development agencies. My engagement with donors and involvement in community-based projects enabled me to participate in several Environmental Impact Assessments studies covering a wide range of development issues.

Examples of some of these engagements are listed below.

1. **Researcher**, African Energy Program (1986 – 1988). Conducted research on solar drying for preservation of agricultural products with special focus on cereals.
2. **Renewable energy consultant** (1997 – 1999) for RELMA, a SIDA-funded program for installation of solar energy systems for rural establishments in Nyando District, Kenya..
3. **Lead Expert** on Environmental Impact Assessment (EIA), Registered by NEMA, Reg. No 2520.
4. **Short-term consultant** for African Union on Energy Curriculum Development for Pan African University (2012 -2013). The program is based in Tlemcen, Algeria.