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Department of Mechanical Engineering, University of Nigeria, Nsukka, 410001, Nigeria.

Education

- Ph.D (Mechanical Engineering) University of Nigeria, Nsukka, 2015.
- M.Eng (Energy and Power Technology) University of Nigeria, Nsukka, 2009.
- B.Eng (Mechanical Engineering) University of Nigeria, Nsukka, 2004.

Membership of Professional Societies

- Member, American Society of Mechanical Engineers (ASME), Membership No.: 100691108.
- Member, Materials Science and Technology Society of Nigeria.
- Member, International Association of Computer Science and Information Technology.

Employment History and Academic Experience

- **Senior Lecturer, Department of Mechanical Engineering, University of Nigeria, Nsukka. (October, 2015 – date):** Teach the courses Advanced Strength of Materials (ME 331), Theory of Elasticity I (ME 431), Thermodynamics III (ME 561) and Advanced Fluid Mechanics (ME 640). Supervise final year B.Eng projects, and co-supervise M.Eng projects.
- **Lecturer I, Department of Mechanical Engineering, University of Nigeria, Nsukka. (October, 2012 – September, 2015):** Teach the courses Advanced Strength of Materials (ME 331), Theory of Elasticity I (ME 431), Thermodynamics III (ME 561) and Advanced Fluid Mechanics (ME 640). Supervise final year B.Eng projects, and co-supervise M.Eng projects.
- **Lecturer II, Department of Mechanical Engineering, University of Nigeria, Nsukka. (March, 2009 – September, 2012):** Taught the courses Theory of Elasticity I (ME 431), Thermodynamics III (ME 561) and Advanced Fluid Mechanics (ME 640). Supervised final year B.Eng projects.
- **Graduate Assistant, Department of Mechanical Engineering, University of Nigeria, Nsukka (May 2008 – March 2009):** Taught the course Engineering Drawing (ME 211) and demonstrated experiments in the course Mechanical Engineering Laboratory II (ME 419). Co-supervised final year B.Eng projects.

- **Tofi Memorial Grammar School, Gboko Benue State. (Sept 2005– Sept 2006):** Physics and Mathematics tutor under the compulsory national service under the National Youth Service Corps (NYSC) Scheme.
- **GSC Nigeria Limited (Public Health Engineers), Palmgrove, Lagos. (Feb – Sept 2003):** Internship.

Academic and Administrative Responsibilities

- Member, Faculty of Engineering Postgraduate Screening Examination Committee (June 2015 till date).
- Secretary, Committee on the Development of Draft B.Eng. Academic Programme for the Proposed Department of Chemical Engineering (in the Faculty of Engineering, University of Nigeria, Nsukka) (February – July 2015).
- Departmental Exams Officer (May 2015 – May 2016).
- Supervision of Final Year B.Eng projects and co-supervision of M.Eng projects.
- Courses Taught: ME 211 - Engineering Drawing I (2009/10, 2010/11), ME 331 - Advanced Strength of Materials (2014/2015 Session), ME 431 - Theory of Elasticity (2012/13 – date), ME 561 - Thermodynamics (2010/11 – date), ME 640 - Advanced Fluid Mechanics (2012/2013 Session till date).
- 3rd Year Exams Officer (2008/09 – 2011/12 Session).
- Departmental Time-tables' Coordinator (2009/10, 2011/12 – 2014/2015 Session).
- Member, Technical Sub-committee for the 3rd NCERD/ENEA International Workshop for Sustainable Development in Africa.
- Technical Editor, Nigerian Journal of Technology (NIJOTECH), March 2011 – March 2013.
- Reviewer to *International Journal of Sustainable Energy* (Taylor and Francis), *Nigerian Journal of Technology* (UNN), *Sustainable Energy Technologies and Assessments* (Elsevier), *Neural Computing and Applications* (Springer), *Energy* (Elsevier), *Journal of the Brazilian Society of Mechanical Sciences and Engineering* (Springer), *Scientia Iranica* (Sharif University of Technology, Iran).

Attendance at Workshops, Conferences and Short Courses

- Train-The-Trainers University Lecturers Skill Enhancement Training Programme (ULSETP), Grenoble Ecole de Management, Grenoble, France (27 September to 21 December 2014).
- Workshop on Grid Computing User Applications for Academics and Research Communities, held on 8th July 2014 at the MTN Connect, Nnamdi Azikiwe Library, University of Nigeria, Nsukka.
- Workshop on Advanced Techniques for Scientific Programming and Management of Open Source Software Packages held from 10 to 21 March, 2014 at the Abdus Salam - International Centre for Theoretical Physics, Miramire-Trieste, Italy.
- School on Hands-On Research in Complex Systems held from 1 to 12 July, 2013 at the Abdus Salam - International Centre for Theoretical Physics, Miramire-Trieste, Italy.
- Solar Energy Society of Nigeria National Solar Energy Forum (NASEF) 2012, held at National Centre for Energy and Environment, University of Benin, Benin-City, from 12 – 16 November 2012.
- Joint NCERD/ENEA International workshop on Renewable Energy for Sustainable Development in Africa, held at the Ritz Continental Hotel Abuja on the 27th and 28th July 2010.

- Joint ICTP/IAEA international workshop on Technology and Performance of Desalination Systems held from 11 to 15 May, 2009 at the Abdus Salam - International Centre for Theoretical Physics, Miramire-Trieste, Italy.
- National symposium on Nuclear Energy and Development held on 1st and 2nd September, 2008 at the University of Nigeria, Nsukka, Nigeria.

Research Interests/Experience

My research interests are within the broad fields of Energy and Thermo-Fluids Engineering. Specifically, I have been involved in research on solar thermal devices, thermal energy storage systems and solar photovoltaic power generation systems by way of undergraduate/graduate projects/thesis, projects supervision, collaborative and independent studies.

- PHOTOVOLTAICS AND THERMOELECTRICS: Estimation of spatial and seasonal performance ratios and energy generation potentials of fixed and tracking solar photovoltaics (PV) systems. Development of hybrid solar thermal/thermoelectric and PV/thermoelectric systems, and characterization of same based on experimental and analytical studies.
- CFD: Study on energy, exergy and entropy generation performance measures for Stratified Sensible Thermal Energy Storage systems based on CFD simulations of the systems. Analysis of flow patterns in solar crop dryer chambers using CFD.
- SOLAR THERMAL DEVICES: Design, construction, mathematical modelling and performance evaluation of improved solar cookers, solar stills, shallow solar ponds, etc.
- EXERGY ANALYSIS: Exergetic assessment of thermal systems.
- THERMAL ENERGY STORAGE: Thermal modelling of PCM-based heat storage wall for heating poultry chick brooders.
- SOLAR ENERGY DATA AND GIS: Estimation of solar and wind energy resource and development of Solar HVAC design charts for locations in Nigeria using free access web-based satellite-derived database.
- SOFTWARE USED: OpenFOAM, Engineering Equations Solver (EES), Latex, Modelica, LibreCAD, RETScreen, MS Office, LibreOffice, etc. Preferred OS: Ubuntu (Linux) OS.
- **Coding Languages used**: Python, Scilab, Command line (Bash).

List of Publications

PUBLICATIONS IN REFEREED JOURNALS

1. **H.O. Njoku**, O.V. Ekechukwu and S.O. Onyegebu (2016) Normalized charging exergy performance of stratified sensible thermal stores. *Solar Energy*, 136: 487–498, DOI: [10.1016/j.solener.2016.07.032](https://doi.org/10.1016/j.solener.2016.07.032).
2. **H.O. Njoku**, O.V. Ekechukwu and S.O. Onyegebu (2016) Comparison of energy, exergy and entropy generation-based criteria for evaluating stratified thermal store performances. *Energy and Buildings*, 124: 141–152, DOI: [10.1016/j.enbuild.2016.04.062](https://doi.org/10.1016/j.enbuild.2016.04.062).
3. **H.O. Njoku** (2016) Upper-limit solar photovoltaic power generation: Estimates for 2-axis tracking collectors in Nigeria. *Energy*, 95(1): 504–516, DOI: [10.1016/j.energy.2015.11.078](https://doi.org/10.1016/j.energy.2015.11.078).

4. S.N. Ugwu, B.O. Ugwuishiwu, O.V. Ekechukwu, **H. Njoku**, A.O. Ani (2015) Design, construction, and evaluation of a mixed mode solar kiln with black-painted pebble bed for timber seasoning in a tropical setting. *Renewable and Sustainable Energy Reviews*, 41(1): 1404–1412, DOI: [10.1016/j.rser.2014.09.033](https://doi.org/10.1016/j.rser.2014.09.033).
5. D.I. Egeonu, **H.O. Njoku**, S.O. Enibe (2014) Sky conditions at Nsukka as characterized by clearness index and cloudiness index. *International Journal of Scientific Research and Innovative Technology*, 1(5): 67–82, http://www.ijrsrit.com/uploaded_all_files/3271426382_z5.pdf.
6. **H.O. Njoku**, O.V. Ekechukwu and S.O. Onyegegbu (2014) Analysis of stratified thermal storage systems: An overview. *Heat and Mass Transfer*, 50(7): 1017–1030, DOI: [10.1007/s00231-014-1302-8](https://doi.org/10.1007/s00231-014-1302-8).
7. P.U. Akpan, H. Yeung, S. Jones, **H. Njoku** and C.A. Mgbemene (2014) Mathematical models of air vessels for pressure transient control in water pipelines – a review. *International Journal of Current Research*, 6(2): 5267–5272, <http://www.journalcra.com>
8. **H.O. Njoku** (2014) Solar Photovoltaic Potential in Nigeria. *ASCE Journal of Energy Engineering*, 140(2): 04013020, DOI: [10.1061/\(ASCE\)EY.1943-7897.0000145](https://doi.org/10.1061/(ASCE)EY.1943-7897.0000145).
9. **H.O. Njoku** and O.V. Ekechukwu (2011) Analysis of the thermal performance of the reverse-side absorber-plate shallow solar pond. *Applied Solar Energy*, 47(3): 213–220, DOI: [10.3103/S0003701X11030145](https://doi.org/10.3103/S0003701X11030145).
10. **H.O. Njoku** and O.V. Ekechukwu (2011) Analysis of the exergetic performance of the reverse-side absorber-plate shallow solar pond. *International Journal of Sustainable Energy*, 30(6): 336–352, DOI: [10.1080/1478646X.2010.515742](https://doi.org/10.1080/1478646X.2010.515742).
11. G.U. Akubue, **H.O. Njoku** and G.O. Unachukwu (2011) Exergetic performance evaluation of an improved single slope solar still. *Nigerian Journal of Solar Energy*, 22: 26–30.
12. S. O. Enibe, C. P. Asiegbu and **H.O. Njoku** (2011) Continuous-flow depulping machine for treculia Africana. *Global Journal of Engineering Research*, 10(1&2): 77–103, <http://www.globaljournalseries.com/>.
13. **H.O. Njoku**, O.V. Ekechukwu and A.O. Odukwe (2009) Comparative study of the effect of depth and season on the performance of the reverse-side absorber-plate shallow solar pond in the Nsukka climate. *International Journal of Sustainable Energy*, 28(4): 203–215, DOI: [10.1080/14786450903194510](https://doi.org/10.1080/14786450903194510).

CONTRIBUTED CHAPTERS IN BOOKS

1. O.V. Ekechukwu, **H.O. Njoku** and S.O. Onyegegbu (2013) Energy and Exergy Performance Analysis of Heat Storage Systems. Chapter 8 of *Energy: Modern Energy Storage, Conversion, and Transmission in the 21st Century*, Lars Rose Ed., Nova Publishers, New York, USA.
2. **H.O. Njoku** (2013) Basic Data Handling and Plotting with Scilab. Chapter 11 of *MATLAB/SCILAB for Scientific and Engineering Systems Analysis*, S.O. Enibe Ed., NASAO, Nsukka, Nigeria.

CONTRIBUTIONS TO CONFERENCE PROCEEDINGS

1. I.E. Darlington, **H.O. Njoku**, P.N. Okolo and S.O. Enibe (2014) Comparative Assessment of Temperature Based ANN and Angstrom Type Models for Predicting Global Solar Radiation. In Proceedings of *First International Afro-European Conference for Industrial Advancement AECIA 2014*, Springer International Publishing, Eds: Ajith Abraham, Pavel Krmer and Vaclav Snasel, pp.109–122, DOI: [10.1007/978-3-319-13572-4_9](https://doi.org/10.1007/978-3-319-13572-4_9).
2. Howard O. Njoku (2013) Estimating the Performance of Photovoltaic Systems in Nigeria. Poster presentation at the School on Hands-On Research in Complex Systems held from 1 to 12 July, 2013 at the Abdus Salam - International Centre for Theoretical Physics, Miramire-Trieste, Italy.

3. **H.O. Njoku**, F.C. Ezeokoye and C.K. Olua (2012) Electricity Generation Potentials of PV Systems in Nigeria: Estimations based on Online Open-Access Data. Paper presented at the Solar Energy Society of Nigeria *National Solar Energy Forum (NASEF) 2012*, held at National Centre for Energy and Environment, University of Benin, Benin-City, from 12–16 Nov, 2012.
4. O.V. Ekechukwu, **H.O. Njoku** and G.U. Akubue (2011) Measured Performances of an Augmented [Double Exposure Absorber-Plate] Single-Slope Solar Still. In [proceedings of 30th ISES Biennial Solar World Congress 2011](#), Kassel, Germany from 28 August – 2 September 2011, Ed: K. Vajen, Vol. 2, pp. 867–878.
5. G.U. Akubue, **H.O. Njoku**, S.U. Offiah and G.O. Unachukwu (2010) Performance evaluation of an improved single slope solar still. Paper presented at the *2nd International Workshop on Renewable Energy for Sustainable Development in Africa*, held at the Ritz Continental Hotel Abuja between 27–28 July 2010.