

CURRICULUM VITAE

I. Personal Data

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| (a) <u>Name:</u> | Oluseyi Ezekiel <u>Awe</u> |
| (b) <u>Date of Birth:</u> | 7 March, 1970 |
| (c) <u>Sex:</u> | Male |
| (d) <u>Marital Status:</u> | Married |
| (e) <u>Nationality:</u> | Nigerian |
| (f) <u>Town and State of Origin:</u> | Ilesa, Osun State |
| (g) <u>Contact Address:</u> | Department of Physics,
University of Ibadan,
Ibadan, Nigeria |
| (h) <u>Phone Number:</u> | 08055359532/09095500654 |
| (i) <u>Email Address:</u> | oluseyi.awe@mail1.ui.edu.ng/
profoeawe2017@yahoo.com/
draweoe2004@yahoo.com |
| (j) <u>Present Post (with date):</u> | Professor (1 October, 2017) |
| (k) <u>Area of Specialisation:</u> | Condensed Matter Physics |

II. University Education (with dates):

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|---|-----------|
| (a) University of Ibadan, Undergraduate | 1992-1997 |
| (b) University of Ibadan, Postgraduate | 1998-1999 |
| (c) University of Ibadan, Postgraduate | 1999-2004 |

III. Academic Qualifications (with dates and granting bodies):

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|-----------------------------|-----------------------|
| B.Sc. Physics, March, 1997. | University of Ibadan. |
| M.Sc. Physics, June 1999. | University of Ibadan. |
| Ph.D, October, 2004. | University of Ibadan. |

IV. Professional Qualifications and Diplomas (with dates):

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| (a) Certificate in teaching large classes.
(National Universities Commission). | 2003 |
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| (b) Certificate as National Trainer in Distance Learning.
(British Council) | 2011 |
| (c) Certificate of Attendance
(Researcher Academy On Campus) | 2020 |

V. Scholarships, Fellowships and Prizes (with dates) in respect of Undergraduate and Postgraduate work only: Nil

VI. Honours, Distinctions and Membership of Learned Societies:

- Member, Institute of Physics, UK.
- Member, Nigerian Institute of Physics.
- Member, Science Association of Nigeria.
- Associate Editor of Journal of Applied Science, Engineering and Technology.
- Reviewer to a number of international journals. These include 1) International Journal for Light and Electron Optics (Elsevier, UK), 2) Journal of Alloys and Compounds (Elsevier, UK), 3) Journal of Non-crystalline Solids (Elsevier, UK), 4) Journal of Molecular Structure (Elsevier, UK), 5) Vacuum (Elsevier, UK) and 6) International Journal of Modern Physics B

VII. Details of Teaching/Work Experience:

(a) Work Experience

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|------|---|---------------------------------------|
| i. | Assistant Lecturer, Department of Physics,
University of Ibadan: | 28 February, 2000- 30 September, 2002 |
| ii. | Lecturer II, Department of Physics,
University of Ibadan: | 01 October, 2002- 30 September, 2005 |
| iii. | Lecturer I, Department of Physics,
University of Ibadan: | 01 October, 2005- 30 September, 2008 |
| iv. | Senior Lecturer, Department of Physics,
University of Ibadan: | 01 October, 2008- 30 September, 2013 |

- v. Reader, Department of Physics,
University of Ibadan: 01 October, 2013-30 September, 2017
- vi. Full Professor, Department of Physics,
University of Ibadan: 01 October, 2017-Date
- vii. Teaching Experience at University of Ibadan
- (i) Participated in teaching the following courses:
- PHY 101 (Elementary Physics for Students of Agriculture, Forestry
and Veterinary Medicine): 2000/2001
- PHY112 (Basic Principles of Physics II): 2005 - 2015.
- PHY 114 (Basic Principles Physics I): 2000-2004.
- PHY 201 (Classical Physics I): 2008/09.
- PHY 304 (Principles of Quantum Physics I): 2016/17-Date
- PHY 305 (Numerical computation in Physics): 2002-2005, 2016/17-Date.
- PHY 306 (Introduction to Electronics): 2007-2009.
- PHY 307 (Solid State Physics I): 2002-2006, 2013-2015.
- PHY 314 (Semiconductor Devices): 2009-2012.
- PHY 315 (Research Method II): 2018/19.
- PHY 407 (Solid State Physics II): 2009-2015.
- PHY 702 (Thermodynamics): 2009-2015, 2017/18-Date.
- PHY 712 (Basic model concepts and manifest properties
of solid): 2007-2015,2016/17, 2017/18-Date.
- PHY 715 (Semi-Conductor Physics): 2016/17, 2017/18-Date.
- PHY 717 (Alloys, Surface and Interface Physics Theories
of Binary and Ternary liquid alloys): 2013/14-Date

PHY 781 (Numerical and computational methods): 2001/2002, 2005-2009,2016/17.

- (ii) No. of B.Sc Research Projects Supervised to Date: 31
- (iii) No. of M.Sc Research Projects Supervised to Date: 26
- (iv) Ph. D Research Projects supervision already completed: 4
- (v) Ph. D Research Projects supervision in Progress: 1

Details of Teaching/Work Experience (outside University of Ibadan):

1. External Examiner for B.Sc.Industrial Physics Programme-Covenant University,Canaan land,Ota,Ogun state(2018/19 session-Date).
2. Sabbatical leave: I participated in teaching the following courses at Obafemi Awolowo University, Ile-Ife, Osun State, during Sabbatical Leave:

PHY 101 (General Physics I): 2015/2016 (Harmattan Semester).

EPH 304 (Atomic Arrangements in Solids): 2014/15 (Rain Semester).

PHY 305 (Thermodynamics): 2015/2016 (Harmattan Semester).

PHY 308 (Experimental Physics IIIB): 2014/15 (Rain Semester).

PHY 401(Mathematical Physics II):2015/16 (Harmattan Semester).

PHY 407 (Independent Study And Project): 2014/15 (Rain Semester).

PHY 422 (Selected Topics In Condensed Matter Physics): 2014/15 (Rain Semester).

PHY 604 (Electromagnetic theory II): 2014/15 (Rain Semester).

(c) Administrative Responsibilities:

- Departmental Examination officer: 2001 – 31 July, 2013
- Chief examiner for 100L: 01 May, 2006-19 July, 2006
- Member, Department of Physics Postgraduate committee: 2004-Date
- Sub-Dean (Physical Sciences) Faculty of

Science:	01 August 2008-31 July, 2010
- Member, Faculty of Science Appointment and Promotion Committee:	2009/2010
-Course Supervisor for GES 104:	01 August, 2010-31 July, 2015
- Member, UI PHEA SAIDE ETI Project:	2010-2013
- Member, UI team at the 4 th edition of Nigerian Universities Research and Development Fair (NURESDEF) held at UNN, Nsukka:	22-28 November, 2010
- Member, Faculty of Science Undergraduate Curriculum Review Committee:	2011-2014
- Member, Faculty of Science Board of Studies:	2012/2013
- Member, University of Ibadan Servicom Guild:	2013-Date
- Chairman, Department of Physics Student Counselling Committee:	2014/15
- Member, Sub-committee of LOC for the 3 rd International Conference on Scientific research in Nigeria	May 16-19, 2017.
- Member, Department of Physics Student Counselling Committee:	2016/17-Date
- Faculty of Science Representative in Quality Assurance committee:	June 1, 2017-Date
- Assistant Hall Warden of Mellanby Hall of Residence:	June 1, 2017-May 31, 2019
- President, Science Family Cooperative Investment and Credit Society, University of Ibadan:	July 11, 2017-Date
-Deputy Focal Person, Servicom, University of Ibadan:	August 1, 2019-Date
-Head,Department of Physics,University of Ibadan:	August 1,2020-Date

VIII. Research:

(a) Completed:

- (i) Modelling of thermodynamic properties of binary, ternary and multicomponent liquid alloys.
- (ii) Fabrication of solar cells.
- (iii) A theoretical study of the dynamics of the Ionosphere.

(b) In Progress:

- i. Metal nitrides of aluminum, gallium, scandium, and yttrium are class of nitrides semiconductor with interesting mechanical, electronic and optical properties. Their combinations with rare-earth metals in the form of dopants, open possibilities for material heterostructures for wide range of applications. Hence, we are studying the intrinsic defect and dopant interactions in rare-earth doped metal nitrides using both experimental and computational approaches.
We have computationally investigated the structural, electronic, optical, vibrational, mechanical and elastic properties of polymorphs of nitrides of aluminum, gallium, scandium and Yttrium. These form the foundation for the study of defect properties which is crucial to achieving the overall objective of the study. Also, we have synthesized doped nitrides samples but are still working on the determination of the lattice location and the concentration of dopants in the samples. From application point of view, the study has the potentials to discover new class of material suitable for applications in optoelectronics, quantum information processing and information storage as well as materials for renewable energy.
- ii. The increasing use of ternary and multicomponent alloys systems in the electronic industries explains why we are interested in the study of thermodynamic properties of ternary and multicomponent alloys. At present, preliminary calculations have been done on the concentration-concentration fluctuations in the long wavelength limit and short range order of some ternary alloys. The study is being extended to multicomponent systems. It is expected that at the end of this study, the results obtained will provide additional information on the structure of both ternary and multicomponent alloys and consequently shed more light on the relevance of these systems in the electronic industries, especially as possible substitutes for lead-free solders.

Projects, Dissertation and Thesis:

- (i) Awe, O. E. (2004): Modelling thermodynamic properties of binary and ternary liquid alloys (Ph.D Thesis, University of Ibadan).
- (ii) Awe, O. E. (1999): Investigation of Cut-off Radius on The Static and Dynamic Properties of Lennard-Jones Fluid By Method of Molecular Dynamics (M.Sc. Project, University of Ibadan).

IX. Publications:

(a) Books Already Published:

Nil

(b) Chapters in Books Already Published:

1. Farai, I.P. and **Awe, O. E.** (2012). Physics, Space Exploration and Exploitation. In Ekundayo, O. and Awe, O. E. (Eds.) *Science, Industry and Mankind*. Ibadan: General Studies Programme Unit. 52-69 pp. ISBN 978-978-365-84-8-4.
- 2a. **Awe, O. E.** (2013). Electric Field and Electric Field Intensity. In Farai, I.P. and Oni, O.M. (Eds.) *Fundamentals of Electricity and Magnetism*. Ibadan: Ibadan University Press. 41-47 pp. ISBN 978-978-8456-09-4.
- 2b. **Awe, O. E.** (2013). Simple Circuit Laws. In Farai, I.P. and Oni, O.M. (Eds.) *Fundamentals of Electricity and Magnetism*. Ibadan: Ibadan University Press. 87-97 pp. ISBN 978-978-8456-09-4.

(c) Articles that have Already Appeared in Refereed Conference Proceedings:

3. Olopade, M.A., **Awe, O.E.**, Awobode, A.M., Oberafo, A. and Zebase Kana, M.G. (2012). Fabrication of $\text{Cu}_2\text{ZnSnS}_4$ Thin Film Solar Cells by the Spin Coating technique. In Burhanuddin, Y.M. and Ibrahim, A. (Eds.) *Proceedings of 2012 10th IEEE International conference on Semiconductor Electronics (ICSE), Kuala Lumpur, Malaysia*. 678-681 pp. (

(d) Articles that have Already Appeared in Learned journals:

4. Akinlade, O., Hussain, L.A. and **Awe, O. E.** (2003). Thermodynamics of liquid Al-In, Ag-In and In-Sb alloys from a four atom cluster model. *Zeitschrift fur. Metallkunde* Vol. 94. No. 12: 1276-1279.
5. **Awe, O.E.**, Akinlade, O. and Hussain, L.A. (2003). Thermodynamic properties of liquid Te-Ga and Te-Tl alloys. *Journal of Alloys and Compounds* Vol. 316: 227-233.
6. **Awe, O.E.**, Akinlade, O. and Hussain, L.A. (2005). Conditional probabilities and thermodynamic properties of liquid Ag-Au, Cd-Pb, and Ga-Zn alloys. *Journal of Alloys and Compounds* Vol. 387: 256- 259.

7. **Awe, O.E.,** Akinlade, O. and Hussain, L. A. (2005). Thermodynamic investigations of Bi-Cd, In-Pb and Ni-Pd liquid alloys. *Zeitschrift fur. Metallkunde* Vol. 96. No. 1: 89-93.
8. **Awe, O.E.,** Akinlade, O. and Hussain, L. A. (2006). Bulk and surface properties of liquid Al-Mg, Au-Sn, and Mg-Tl compound forming alloys. *Surface Science* Vol. 600: 2122-2128.
9. Akinlade, O. and **Awe, O.E.,** (2006). Bulk and surface properties of liquid Ga-Tl and Zn-Cd. *International Journal of Materials Research (formerly Zeitschrift fur Metallkunde)* Vol. 97. No. 4: 377-381.
10. **Awe, O.E.,** Akinlade, O. and Hussain, L.A. (2006). A Quasi-lattice Theory for compound forming ternary liquid alloys. *International Journal of Modern Physics B* 20. Vol. 23: 3319-3340.
11. Odusote, Y.A., Hussain, L.A. and **Awe, O.E.** (2007). Bulk and dynamic properties in Al-Zn and Bi-In liquid alloys using a theoretical model. *Journal of Non-Crystalline Solids* Vol. 353. Issues 11-12: 1167-1171.
12. **Awe, O.E.,** Odusote, Y.A., Akinlade, O. and Hussain, L.A. (2008). Thermodynamic properties of some gallium-based Binary alloys. *Journal of Physica B* Vol. 403. Issue 17: 2629-2633.
13. **Awe, O.E.,** Odusote, Y.A., Akinlade, O. and Hussain, L.A. (2008). Energetics of Mixing in Bi-Pb and Sb-Sn Liquid Alloys. *Journal of Physica B* Vol. 403. Issue 17: 2732-2739.
14. **Awe, O. E.** (2009). Size difference effects on the bulk and surface properties of Bi-Zn, Cu-Pb, K-Pb and K-Tl liquid alloys. *International Journal of Materials Research (formerly Zeitschrift fur Metallkunde)* Vol. 11: 1593-1601.
15. **Awe, O.E.,** Akinwale, T.I., Imeh, J. and Otu, J. (2010). Calculation of experimental concentration-concentration fluctuations of liquid binary alloys using experimental free energy of mixing and experimental activities. *Physics and Chemistry of Liquids* Vol. 48. Issue 2: 243- 256.
16. **Awe, O.E.** (2010). Size mismatch effects on the atomic transport properties of Copper and Potassium-based liquid alloys. *Journal of Physica B* Vol. 405. Issue 11: 2545-2550.
17. **Awe, O.E.,** Odusote, Y.A., Akinlade, O. and Hussain, L.A. (2011). Temperature dependence of thermodynamic properties of Si-Ti binary liquid alloys. *Thermochimica Acta* Vol. 519: 1- 5.
18. **Awe, O.E.** and Alvan, W. (2010). Theoretical Determination of Dynamic properties of Bi-Sn liquid alloys. *Journal of Science Research* Vol. 9: 86-89.
19. **Awe, O.E. ,** Adegoke, J.A. and Eniafe, B.S. (2011). The impact of the variability of ionospheric phase refractive index on radio signals instability. *International Journal of the Physical Sciences* Vol. 6. Issue 30: 6801-6819.

20. **Awe, O.E.** and Onifade, A. (2012). Effects of surface coordination of atoms on the surface properties of some liquid binary alloys. *Physics and Chemistry of liquids* Vol. 50. Issue 5: 579-595.
21. **Awe, O.E.** and Olawole, O. (2012). Correlation between bulk and surface properties in Cd-X (= Hg, Mg) liquid alloys. *Journal of Non-crystalline solids* Vol. 358: 1491-1496.
22. Olopade, M.A., **Awe, O.E.**, Awobode, A.M. and Alu, N. (2012). Characterization of SnO₂: F Films Deposited by Atmospheric Pressure Chemical Vapour Deposition for Optimum Performance Solar Cells. *The African Review of Physics* (2012) Vol. 7: 177-181.
23. Olopade, M.A., Awobode, A.M., **Awe, O.E.** and Imalerio, T.I. (2013). Structural and Optical Characteristics of Sol Gel Spin-coated Nanocrystalline CdS Thin Film. *International Journal of Research and Reviews in Applied Sciences* Vol.15. Issue 1: 120-124.
24. **Awe, O. E.** and Oshakuade, O.M. (2014). Theoretical prediction of thermodynamic activities of all components in the Bi-Sb-Sn ternary lead-free solder system and Pb-Bi-Sb-Sn quaternary system. *Thermochimica Acta* Vol. 589: 47-55.
25. **Awe, O. E.** and Oshakuade, O.M. (2016). Computation of Infinite Dilute Activity Coefficients of Binary Liquid Alloys using Complex Formation Model. *Journal of Physica B* Vol. 487: 13-17.
26. **Awe, O.E.** (2016). The role of size effect on the bulk properties of copper-tin liquid alloys. *Journal of Science Research* Vol. 15. 109-118.
27. **Awe, O. E.**, and Oshakuade, O.M. (2017). Theoretical prediction of thermodynamic activities of liquid Au-Sn-X (X= Bi,Sb,Zn) solder systems. *Journal of Physica B* Vol. 507: 84-94.
28. **Awe, O.E.** and Azeez, A. A (2017). Temperature dependence of the bulk and surface properties of liquid Zn-Cd alloys. *Applied Physics A* Vol. 123 Issue 5: 1-10.
29. Dada, M.O., Jayeoba, B., Awojoyogbe, B.O., Uno, U.E., and **Awe, O.E.** (2017). Mathematical development and computational analysis of Harmonic Phase-Magnetic Resonance Imaging (HARP-MRI) based on Bloch Nuclear Magnetic Resonance (NMR) diffusion model for myocardial motion. *J.Med Syst.* Vol. 41 Issue 10: 1-20.
30. **Awe, O.E.** (2019). Thermodynamic investigation of thermophysical properties of thallium-based liquid alloys. *Physics and Chemistry of liquids.* Vol.57 Issue 3:296-310

X. Major Conferences Attended with Papers Read (in the last 5 years):

1. The Article Publishing Process: An Elsevier Author Workshop at Africa on Monday 01 June, 2020 (120 minutes online zoom conference)
2. Teams for Tertiary Training Day on Tuesday 26 May,2020(4hours online training)
3. 2019 Fourth Quarter NUC PARASTATAL SERVICOM COMMITTEE (PSC) Meeting.November 26-29,2019,Nigeria Police Academy,Wudil,Kano State.
4. Mini-African School on Electronic Structure Methods and Applications (MASESMA) November 11-15,2019, Kigali,Rwanda (**Poster Presented:** Computation of Transport Properties of Some Liquid Binary Alloys).
5. 3rd Quarter 2019 NUC/PARASTATAL SERVICOM COMMITTEE (PSC) Meeting.October 14-17,2019,Federal University of Technology, Owerri, Imo State.
6. Training Workshop On Computational Studies And Molecular Dynamic Simulation,Postgraduate College,University of Ibadan,29 April,2019-11 May,2019.
7. 3rd International conference on scientific research in Nigeria, Faculty of Science, University of Ibadan, 16-19 May, 2017 (**Paper Read: Awe, O.E;** Thermodynamic, structural and transport properties of Cd-Tl and Sn-Tl liquid alloys).
8. The 8th International conference of the African Materials Research Society, Accra, Ghana, 7-10 December 2015 (**Paper Read: Awe, O.E;** The role of size effects on the bulk, surface and transport properties of Copper-Tin liquid alloys).
9. 38th Nigerian Institute of Physics Annual Conference, Department of Physics, Faculty of Science, Olabisi Onabanjo University, Ago Iwoye, Ogun state, Nigeria, 5-9 October, 2015.
10. 2nd International Conference on Scientific Research and innovation in Nigeria, Faculty of science, University of Ibadan, 16-20 March, 2015.
11. 37th Nigerian Institute of Physics Annual Conference, Oduduwa University, Ipetumodu, Osun state, Nigeria, 27-31 October, 2014.
12. Training on Maple Version 18 Software, Department of Mathematics, University of Ibadan,Ibadan,Nigeria,3-5 June 2014
13. Effective use of Bioinformatics for Research, Department of Computer Science, University of Ibadan, 22 May, 2014

XI. Major Conferences Attended with Papers Read (long time ago):

1. Faculty of Science International Conference on "Science and sustainable development in Nigeria", University of Ibadan ,Ibadan Nigeria, 6 - 10 May, 2013
2. Advance Analysis: With R Software and Matlab, Department of Statistics, University of Ibadan, 2012.
3. Workshop on Responsible conduct in research, Faculty of Science, University of Ibadan, 2012.
4. E-learning workshops (Lagos and Abuja), 2009-2011
5. Nigerian Institute of Physics 34th Annual Conference,CERD-OAU,Ife,Nigeria, 2011
6. Nigerian Institute of Physics 33rd Annual Conference,University of Ibadan,Nigeria, 2010
7. Advanced ICT Techniques,University of Ibadan,Nigeria, 2009
8. ICT in Teaching, Research and Administration,University of Ibadan,Nigeria, 2009
9. School on Electronic Structure Methods,Cape Town South Africa (Snr1979), 2008
10. School on Computational Condensed Matter Physics, National Mathematical Centre, Abuja Nigeria (Snr1921) 2007
11. Understanding Molecular Simulations, Universiteit Van Amsterdam, Amsterdam, Netherlands 2007
12. Regional College on Superlattice and Nanotechnology,University Of Cape Coast, Cape Coast, Ghana 2006
13. African School and Workshop on X-Rays in Materials,Cheikh Anta Diop University, Dakar, Senegal 2005
14. Unesco African Regional Workshop on Active Learning In Optics and Photonics University of Cape Coast, Cape Coast, Ghana 2004
15. Regional College on Super lattice and Nanotechnology,University Of Cape Coast, Cape Coast, Ghana 2004
16. 3rd Regional College on Condensed Matter Physics,University of Cape Coast, Cape Coast, Ghana 2002
17. 1st Regional College on Condensed Matter Physics, University of Cape Coast, Cape Coast, Ghana 2001

RESEARCH FOCUS

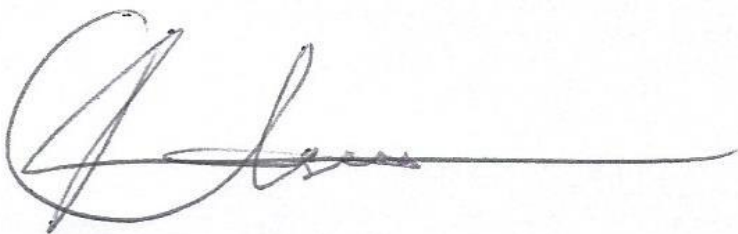
My research interest falls within the realm of Computational condensed matter physics. The diversity of materials studied in this field of Physics makes it a multi-disciplinary and even a trans-disciplinary field. Thus, Condensed matter physics embraces solid state physics, materials science, and it overlaps with chemistry, nanotechnology, and engineering. Materials of specific interest include crystalline solid (such as metals, semiconductors, insulators, semimetals, etc), non crystalline solids (such as amorphous solids, granular matter), soft matter (such as liquid crystals, polymers, foams and gels, etc), and nanomaterials. In the course of my research work, specific attention has been given to (i) modeling the thermodynamic and thermophysical properties of liquid alloys using existing models, (ii) formulation of new model on the basis of existing theories, to study the thermodynamic properties of liquid alloys with the aim of understanding the mixing behaviour and industrial relevance of liquid alloys of interest, (iii) prediction of thermodynamic activities of components of ternary and multicomponent liquid alloys, and (iv) fabrication of solar cells and theoretical study of the dynamics of the Ionosphere.

I have worked on 44 liquid metals and alloys which have been identified to be useful in industries for various technological purposes. More thermodynamic light has been thrown on the existing knowledge on the 44 liquid alloys and thus, their industrial relevancies are better understood.

A new thermodynamic model based on existing quasi-lattice model has been established for compound forming ternary liquid alloys. Also, a new model of computing infinite dilute activity coefficients of binary liquid alloys using existing complex formation model was established. This latter model will predict the values of infinite dilute activity coefficients of alloys that cannot be obtained experimentally but which are crucial to both scientific and engineering applications.

Due to increasing industrial interest in ternary and multicomponent liquid alloys, we have predicted the thermodynamic activities of components of four ternary and one quaternary (multicomponent) liquid alloys which have been found to be lead-free solders.

We have expanded the focus of research interest to include the fabrication of solar cells and a theoretical study of the Ionosphere. Also, a preliminary work has been undertaken on the theoretical study of the dynamics of the Ionosphere with the intention of understanding how this dynamics reflect on radio signals. This knowledge is necessary for solving space communication problems.



Prof. O. E. Awe

06/08/2020