**CHRISTIANA SUBAAR**

**Office Address: Department of Physics**

**Kwame Nkrumah University of Science and Technology**

 **Kumasi, Ghana**

**Present Status at Employment: Senior Lecturer**

**Nationality: Ghanaian**

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 **Webpages: https://webapps.knust.edu.gh/staff/dirsearch/profile/summary/f5d9b77232f9.html#**

[**https://www.researchgate.net/profile/Christiana-Subaar-2**](https://www.researchgate.net/profile/Christiana-Subaar-2)

**Email Address:** **ysubaar@gmail.com**

**Christiana.subaar@knust.edu.gh**

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| **Academic Interests:** **Research Focus:** | Safety and pathophysiology associated with radiation diagnosis and treatments.Developing and implementing Machine Learning (ML) models to optimize radiation dosages in medical imaging, ensuring a balance between diagnostic accuracy and radiation safety. |

1a. **ACADEMIC DEGREES EARNED WITH DATES**

|  |  |
| --- | --- |
| ***Date***  | ***Degrees earned***  |
| **2015 – 2018**  | PhD Physics (Awarded in September 2018)  |
| **2012 – 2014** | MPhil Medical Physics (Awarded in July 2014)  |
| **2006 – 2010**  | B.Sc (Hons) Applied Physics (Awarded in July 2010)  |

**1b. INSTITUTIONS ATTENDED WITH DATES**

|  |  |
| --- | --- |
| ***Date***  | ***Institution***  |
| **2015 – 2018** **2012 – 2014****2006 – 2010** | University of Cape Coast, Cape Coast, GhanaUniversity of Ghana, Accra, GhanaUniversity for Development Studies, Tamale, Ghana |

**1c. PROFESSIONAL AFFILIATION AND MEMBERSHIP**

|  |  |
| --- | --- |
| ***Date***  | ***Institution***  |
| **2020-to-date****2013-to-date****2012-to-2020****2001-to-2011** | Member, Ghana Science Association Member, Ghana Society for Medical Physicist (GSMP)Colleges of Education Teachers Association (CETAG)Ghana National Association of Teachers (GNAT) |

**2. UNIVERSITY TEACHING AND/OR RESEARCH EXPERIENCE WITH DATES:**

#  2(a) Academic Ranks held and subjects taught

|  |  |
| --- | --- |
| ***3rd August 2020 to*** ***Date***  | **Lecturer, Department of Physics, Kwame Nkrumah University of Science and Technology, Kumasi.** **Courses Taught:** PHY 255 Experimental Physics IIPHY 263 Nuclear PhysicsPHY463 Health Physics IPHY464 Health Physics IIPHY 365 Biomedical LaboratoryBME 347 Biomedical OpticsPHY 455 Project IPHYN 753 Clinical Radiobiology and Radiation  ProtectionPHYN 754 Diagnostic Radiology and Nuclear  MedicinePHYN 551 Radiation Physics and DetectionPHYN 554 Advanced Nuclear Physics and Nutrition |

**Table 1: Summary of *Courses Taught:* 2020 to Date**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course No.**  | **Course Title**  | **Class**  | **Semester / Year**  |
| PHY 255 PHY 263 PHY463 PHY464 PHY 365 BME 347 PHY 455 PHYN 753 PHYN 754 PHYN 551 PHYN 554  | Experimental Physics II Nuclear PhysicsHealth Physics IHealth Physics IIBiomedical LaboratoryBiomedical OpticsProject IClinical Radiobiology and Radiation ProtectionDiagnostic Radiology and Nuclear MedicineRadiation Physics and DetectionAdvanced Nuclear Physics and Nutrition | P 2 P2 P3 P3P3 BME3 P4PhDPhD MPhilMPhil  | **1 and 2 /****2020 to 2022****1 / 2020 to date** **1 / 2020 to date** **2 / 2020 to date****1 and 2 /2020 to date** **2 /2020 to date****1 and 2 /****2020 to date****1 / 2022 to date** **2 / 2022 to date****1 / 2022 to date****1 / 2022 to date** |

## 2(b) Supervision of students Project works/theses/research

Number of undergraduate students’ Project supervised: **14**

Number of postgraduate students’ (MPhil/MSc.) Projects supervised: **3**

Number of postgraduate students’ (PhD) Projects supervised: **1**

## 2(b)i Undergraduate Projects: B. Sc (Physics) – from August 2020 to date

1. Nelson Appiah-Agyei, MacCharthy Alale. *Development of Breast Phantom for the*

 *Purpose of Cancer Screening* (August,2021).

1. Delalorm Abbah Kwasi, Agyei Ralph Agyapong, and Boahen Akosua Sandra. *Development of Breast Phantom for the Purpose of Cancer Screening.* (August, 2022).
2. Samuel Nyarko Osei, Emmanuella Konadu Amaniampong, and Alfred Kwame Agyare. *Development of Breast Phantom for the Purpose of Cancer Screening.* (August, 2023).
3. Fosberg Tweneboah Addai. *Investigating the detection of breast cancer with*

 *deep transfer learning using ResNet18 and ResNet34 (August* 2023)

1. Prince Eduboah, *Assessment of Photon Beam Parameters of the Varian Clinac IX Linear Accelerator (August* 2023)
2. Klu Raphael and Mbenjom Babadu Joseph*. Radiofrequency power density measurement of telecommunication masts from Kentinkrono to Ejisu in the Ashanti Region*. (August, 2024)
3. Annan Vincent, Amofa Owusu Patrick and Mintah Gideon Kwabena*. Pediatric Radiation Dose Optimization in Computed Tomography and Digital Radiography Examinations.* (August, 2024)
4. Asante Gyabeng Anthony, Okyere Edwin Frimpong and Omane Sampson Banti. *Fabrication of heterogeneous breast phantom for computed tomography and magnetic resonance.* (August, 2024*)*
5. Manu Collins Otoo, Marfo Thomas and Gabriel Lawson*. Baseline assessment of naturally occurring radionuclides in Domestic Water of the Abuakwa South Municipality.* (August, 2024)
6. *S*arfo Eric and Konadu Agyeiwaah Afia*. The impact of radionuclides in some water samples in Ashanti Region*. (August, 2024)
7. Owusu Daniel Nyantakyi, Assan Gabriel, and Agyemang Freduah Pearl. *Assessment of Occupational Radiation Exposure among Radiologic Technologies in Diagnostic X-ray Suites Members* *(in progress*)
8. Nidal Nyarko Assinor and Yvonne Seyram Gozey. *Assessment of Electromagnetic Radiation Exposure Risk from Telecommunication Mast in Bomso* *(in progress*)
9. Ayivor Felicity, Tutu Rexford, and Abdul-Latif Abubakari. *Assessment of Electromagnetic Radiation Exposure Risk from Telecommunication Mast on Knust Campus* *(in progress*)
10. Offei Jessica Dansowaah*, investigating mathematical foundations of transfer learning for breast cancer diagnosis using DenseNets (in progress*)

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## 2(b)ii Graduate Projects: MPhil/MSc. (Physics) – From August 2021 - 2024

1. Ezekiel ASHAI AMARH. **Acceptance Testing and Commissioning of a Single Photon Emission Computed Tomography – Computed Tomography System at Komfo Anokye Teaching Hospital – Kumasi** (Will be graduated in March 2025)
2. Joseph AMANFO OFORI. **Evaluation of Natural Radionuclides in Water Samples in Some Selected Towns in the Ashanti Region, Ghana** (Will be graduated in March 2025)
3. Philimon ADJEI. **Performance Assessment of X-Ray Tube Output** (Will be graduated in March 2025) **SP 4**

 ***2(b)iii MSc. Project – Internal Examiner -2023-2024***

1. John WANGEH **Evaluation of Quality Assurance Parameters of a Newly Installed Neuvision 460 X-Ray Machine at Focus Medical Diagnostics Center, Kumasi.**

## 2(b)iv Graduate Projects: PhD Physics – From August 2021 to Date

1. Evans ASAMOAH. **Gamma Ray Spectrometric Analysis of Food Samples from some Selected Areas in Abuakwa South Municipality in the Eastern Region of Ghana** (in progress).

 ***2(b)v PhD Project – Internal Examiner -2022-2023***

1. Olivia ADU-PO KU. **Absolute Dosimetric Quantification of Lutetium-177 Using Spect/Ct System at the St. Olav´S Hospital, Norway**

**2c. Other Professionally related experience**

2018–2020 **Senior Tutor**, St. John Bosco’s College of Education, Navrong, Upper East Region

2019­–2020 **Staff Development and Research Officer**

2017 –2018 **Assistant Director II**

2017-2018 T-TEL Professional Development Programme on Assessing Trainee Teachers

2016–2018 **Tutor**, St. John Bosco’s College of Education, Navrong, Upper East Region

2001–2016 **Teacher**, Ghana Education Services

**3. Details of Research, Projects or Exhibitions undertaken since last appointed / promotion to the University:**

 **3a. Research conducted (Topics with Dates)**

1. Breast Phantom fabrication for image optimization **(2021 to date).**
2. Evaluating the Varian Clinac IX Linear Accelerator's Photon Beam Performance **(2023 to date).**
3. Reviewing Safe CT Scan Limits for African Children **(2024 to date).**
4. Using deep learning (ResNet18 and ResNet34) to improve breast cancer detection **(2023 to date).**
5. Numerical simulation in brain magnetic resonance imaging radiofrequency dosimetry **(2023 to date).**
6. Calculating Brain Temperature Changes During MRI Scans **(2022 to date).**
7. Establishing institutional guidelines for optimal radiation dose and image quality in computed and digital radiography examinations **(2022 to date).**
8. Improving Junior High Students' Understanding of Angle Construction Through Intervention (**2020 – 2022)**
9. Assessing Heavy Metal Pollution in Soil and Trees near Haatso-Atomic Road in Ghana **(2020 – 2022)**

**3b. Publications arising out of the research**

1. **Refereed journal papers with exact references**
2. Azah, C. K., Adjei, D., Deatanyah, P., Osei, S., Appiah, P. M., Amoako, J. K., Sam, F., **Subaar, C.**, & Amable, A. (2025). Determination of Ambient Dose Equivalent Using a Microprocessor-Controlled Universal Reference-Class Dosemeter. *Journal of Science and Technology*, *43*(1), 88-102. https://doi.org/10.4314/just.v43i1.1765
3. **Subaar, C.,** Gyan, E., Nyarko Osei, S., Konadu Amaniampong, E., Agyare, A. K., Eduboah, P., Appiah-Agyei, N., & Alale, M. (2024). Development of Breast Phantom for Clinical Simulation and Educational Purposes. Journal of Science and Technology, Vol 42(4), 25 - 34.DOI:<https://doi.org/10.4314/just.v42i4.1761>
4. **Subaar, C.,** Eduboah, P., Gyan, E., Akosah, K., Azah, C. K., Christos, O., Agyei, M., Nyarko Osei, S., & Amaniampong Konadu, E. (2024). Assessment of Photon Beam Parameters of the Varian Clinac IX Linear Accelerator. Journal of Science and Technology, Vol *42*(4), 57 - 68.DOI: <https://doi.org/10.4314/just.v42i4.1731>
5. **Subaar, C.,** Gyan, E., Dompreh, K. A., Amoako, J. K., Edusei, G., & Owusu, A. (2024). Numerical simulation in magnetic resonance imaging radiofrequency dosimetry. Biomedical Physics & Engineering Express, Vol 10(5), 055042. DOI: 10.1088/2057-1976/ad6a68
6. Gyan E, **Subaar C**, Edusei G, Antwi Nyarko L. Paediatric computed tomography diagnostic reference levels in Africa: A systematic review. J Med Radiat Sci. 2024 Sep 12. DOI: 10.1002/jmrs.824. Epub ahead of print. PMID: 39267431.
7. **Subaar C**, Addai FT, Addison ECK, Christos O, Adom J, Owusu-Mensah M, Appiah-Agyei N, Abbey S. Investigating the detection of breast cancer with deep transfer learning using ResNet18 and ResNet34. Biomed Phys Eng Express. Vol. 2024 Apr 18;10(3). doi: 10.1088/2057-1976/ad3cdf. PMID: 38599202.
8. **Subaar, C**., Amoako , J. K., Owusu, A., Preko, K., & Danuor, S. K. (2023). Estimation of Temperature Change in the Human Brain During Magnetic Resonance Imaging Procedure. Journal of Science and Technology, Vol. 41(1), 113 - 126. <https://doi.org/10.4314/just.v41i1.1471>
9. Gyan, E., Amoako, G., Inkoom, S., **Subaar, C.,** & Maamah, B. R. (2023). Proposed Institutional Diagnostic Reference Levels in Computed and Direct Digital Radiography Examinations in Two Teaching Hospitals. Journal of Radiation Protection and Research, Vol. 48(1), 9-14. DOI: <https://doi.org/10.14407/jrpr.2021.00367>
10. **Christiana Subaar**, George Edusei, Emmanuel Gyan, Nelson Appiah-Agyei, Raymond Atuah. (2022). Teaching of Construction of Common Angles in the Junior High School: An Interventional Study. Science Journal of Applied Mathematics and Statistics, Vol. 10(6), 98-104. <https://doi.org/10.11648/j.sjams.20221006.11>
11. Edusei, G., **Subaar, C.,** Gyan, E., Osei-Owusu, J., Edziah, R., Dofuor, A. K., ... & Ntim, E. (2022). Determination of Heavy Metals Pollution in Soil and Tree Rings along Haatso-Atomic Road in Ghana. Journal of Pollution and Effects on Community Health, Vol. 1(1).DOI:  <https://doi.org/10.58489/2836-3590/002>

 **3d. Table 6: List of journals and publishers in which papers were published**

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| --- | --- | --- |
| **JOURNAL** | **PUBLISHER** | **NUMBER PUBLISHED** |
| Journal of Science and Technology | African Journals Online | 4 |
| Biomedical Physics & Engineering Express | IOP Science | 2 |
| Journal of Medical Radiation Sciences | Wiley Online Library | 1 |
| Journal of Radiation Protection and Research | jrpr.org | 1 |
| Journal of Pollution and Effects on Community Health |  Medires | 1 |
| Journal of Applied Mathematics and Statistics | SciencePG | 1 |

 **EXHIBITIONS**

 **NO EXHIBITIONS**

1. **CONFERENCES/SEMINARS AND WORKSHOPS AT WHICH PAPERS WERE READ**

**NO CONFERENCES/SEMINARS AND WORKSHOPS AT WHICH PAPERS WERE READ**

1. **LIST OF ALL OTHER PUBLICATIONS**
2. [**C. Subaar,**](https://www.iomcworld.com/open-access/time-series-analysis-for-prediction-of-meteorological-data-from-wa-upper-west-region-of-ghana-2342-2594-1000237.pdf) N. Apori, J. J. Fletcher, R. Galyuon, G. Edusei, and V. W. Adayira, ―Time Series Analysis for Prediction of Meteorological Data from Wa, Upper West Region of Ghana‖ *Journal of Climatology & Weather Forecasting* 2018, 6 *(3)*
3. [**C. Subaar,** J](https://www.researchgate.net/publication/334485722_Towards_the_Solution_of_Abysmal_Performance_of_Fraction_in_Navrongo_Presbyterian_Primary_School_Comparing_the_Sets_of_Objects_and_Paper_Folding_Designed_Interventions). A. Asechoma, V. N. Asigri, V. Alebna and F. X. Adams,‖ Towards the Solution of Abysmal Performance of Fraction in Navrongo Presbyterian Primary School: Comparing the Sets of Objects and Paper Folding Designed Interventions‖, *Science Journal of Applied Mathematics and Statistics 2018; 6(4): 119-123*
4. [**C. Subaar,**](https://www.researchgate.net/publication/316485719_Numerical_studies_of_radiofrequency_of_the_electromagnetic_radiation_power_absorption_in_paediatrics_undergoing_brain_magnetic_resonance_imaging) J.K. Amoako, A. Owusu, J.J. Fletcher, J. Suurbaar, ―Numerical studies of radiofrequency of the electromagnetic radiation power absorption in paediatrics undergoing brain magnetic resonance imaging*”, Journal of Radiation Research and Applied Sciences 10 (2017) 188-193*
5. [**C. Subaar,**](https://www.researchgate.net/publication/262675346_FINITE_DIFFERENCE_TIME_DOMAIN_APPROACH_OF_THERMAL_EFFECTS_ON_PAEDIATRIC_PATIENTS_UNDERGOING_MAGNETIC_RESONANCE_IMAGING_IN_GHANA) J. K. Amoako, E.O. Darko, T. Ansah-Narh and T. B. Dery, ―Finite Difference Time Domain Approach of Thermal Effects on Paediatric Patients Undergoing Magnetic Resonance Imaging in Ghana‖, *Research Journal in Engineering and Applied Sciences (RJEAS), 2014; 3(2): 93*

# RECORD OF SERVICE TO THE COMMUNITY

1. **UNIVERSITY**

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| --- | --- |
| March 7th, 2025 February 25th 2025February 25th 2025 July 12th 2024 August 20th 2024October 6th 2023September 14th 2023June 16th 2023February 24 2023July 15 2022April 26th 2022July 7th 20212020-2024October 2th 2020**(b) NATIONAL** January 28th 2025 August 19th 2024 July 10th 2024August 22nd 2023May 5th 2023-DateApril 17th 2023March 28th 2023March 28th 2023January 12th 2023July 25th 2022October 30th 2022June, 2022-Date July 26th 2022July 14th 2022 March 9th 2022May, 2021  | A committee member, responsible for securing sponsorships for the faculty's conferenceAssistant Examinations Officer, Department of PhysicsMember, Syllabus Review Committee for BSc Physics ProgramCoordinator, Field Trip embarked with Year 4 Physics Students (Biomedical Option) to Ghana Atomic Energy Commission Member, Investigation Committee on an alleged leakage of examination questionsMember, A committee comprising faculty members from the College of Science and Engineering and officers from the National Nuclear Research Institute (NNRI) established to develop a framework for a Memorandum of Understanding (MoU) with the Ghana Atomic Energy Commission.Member, Committee for Exploring Collaboration Opportunities between the Physics Department and Ghana Atomic Energy Commission (GAEC)Coordinator, Physics Department Field Trip to Zeal Environmental Technologies, Takoradi (Shama)Member, Physics Department Students' Complaints CommitteeCoordinator, Led Year 4 Biomedical Physics Students on an Educational Field Trip to the Ghana Atomic Energy CommissionCoordinator, Led Year 4 Biomedical Physics Students on an Educational Field Trip to Sweden Ghana Medical CentreMember, Physics Department Outreach Committee: Promoting Physics and Meteorology ProgrammesAcademic Tutor: Department of Physics Board AppointeeMember, MPhil Nuclear Physics Programme Committee, Department of Physics Member, National Curriculum Review Committee: SHS/SHIS/STEM Curriculum, Tusand Hotel, KumasiMember, Curriculum Development Committee: 4-Year B.Ed. Secondary Teacher Education Programme for SHS/SHIS/STEM, Menish Hotel, KumasiMember, Workshop on Developing Senior High School Teacher Education Curricula, KNUST, KumasiResource Person, WiSTEMGH Girls Camp, KNUST Kumasi CampusQuiz Coordinator: Junior Science and Mathematics Competition (JSMQ)Committee Member, GTEC Re-accreditation for MPhil and PhD Programmes in Nuclear and Environmental Protection, School of Nuclear and Allied Sciences, University of Ghana, Atomic CampusCommittee Member, GTEC Re-accreditation for MPhil and PhD Programmes in Applied Nuclear Physics, School of Nuclear and Allied Sciences, University of Ghana, Atomic CampusChairman, GTEC Re-accreditation Committee for MPhil/PhD Medical Physics Programmes, School of Nuclear and Allied Sciences, University of Ghana, Atomic CampusResource Person, Armed Forces Senior High Technical School Science Seminar: Empowering Ghanaian Girls with 21st-Century SkillsCommittee Member, Physics Open Day for Senior High Schools: Outreach and Collaboration ProgrammeResource Person, WiSTEMGH KNUST Stanbic Girls' Camp 2022Assistant Examiner, West Africa Examinations Council (WAEC)Radio Programme Coordinator: "Physics as a Foundation for Science" - Educating the Public on the Importance of Physics in Everyday LifeRadio Programme Coordinator: "Understanding Radiation" - Public Education Initiative on Radiation Effects, Importance, and ProtectionResource Person, Academic Seminar for Final Year Students of Kumasi High School: "Discipline as a Catalyst for Examination Success"Regional Trainer, 2021 Population and Housing Census: Ghana Statistical Service |
|  |  |
| **(c) INTERNATIONAL** November 21st 2024October 21st 2024 August 25th 2024November 6th 2023)July 2st 2023May 26th 2022   |  |  Reviewer, International Journal of Environment and Climate Change: Providing Constructive Feedback to Enhance Research QualityEditorial Board Member, Biomedical Engineering: Open Access Journal - Providing Expertise in Scientific Review and PublicationReviewer, Physics in Medicine and Biology: Providing Critical Feedback to Enhance Research Quality and Impact in Medical PhysicsInternational Journal of Environmental and Climate Change: Providing Constructive Feedback to Enhance Research Quality and Impact (November 6th 2023)Reviewer, Current Journal of Applied Science and Technology: Providing Constructive Feedback to Enhance Research Quality and ImpactGuest Speaker, Girls for Technology and Innovation Africa (G4TI), Entebbe, Uganda: Empowering Young Girls in STEM |