

Henry Martin (*PhD, MIMA*)

Curriculum Vitae

Kwame Nkrumah University of Science and Technology
(KNUST), Department of Physics - Faculty Member
& National Institute for Mathematical Sciences (NIMS – GH)
Research Fellow, PMB, Kumasi, Ghana
<https://webapps.knust.edu.gh/staff/dirsearch/profile/summary/0a0f4684a9cb.html>

InterMaths Network: RealMaths Consortium
– Local Coordinator, KNUST & NIMS Path:
<https://www.intermaths.eu/double-degrees/partners/kumasi>
ORCID Id: <http://orcid.org/0000-0003-0173-1238>
Google Scholar:
<https://scholar.google.com/citations?user=Fhi7dUsAAAAJ&hl=en>

PERSONAL DETAILS

Date and Place of Birth: 22nd February 1988; Accra
Nationality: Ghanaian
Marital Status: Married
Number of Children: Two (2)
Email Addresses: headmartin88@gmail.com; hmartin@knust.edu.gh;
hmartin@nims.edu.gh;
Telephone: + 233-55-5653285

RESEARCH INTERESTS

My interests lie in understanding and exploring most of the physical (real life) problems and challenges faced using **Digital Twin techniques** such as

- MultiScale Modelling (Quantum to Continuum)
- MultiPhysics Modelling
- Machine Learning and Statistical Analysis and Modelling

in **Areas** such as

1. Materials: Plasticity, Nucleation and Phase Transformation
2. Local Challenges facing the Ghanaian Societies in Energy system, Water systems, Hydrogeology, Climate and others

INSTITUTIONS ATTENDED AND ACADEMIC DEGREES EARNED

2016 - 2019: Kwame Nkrumah University of Science and Technology:
National Institute for Mathematical Sciences, Ghana
University of L'Aquila, Italy (Visiting PhD Student)
PhD (Scientific Computing and Industrial Modelling) – Nov., 2019
PhD Thesis topic: A Statistical and Quantum Mechanical Model of Combined Alloying Elements for Phase Transformation
Supervisors: Prof. Peter Amoako-Yirenkyi, Prof. Eric K. K. Abavare, Prof. Nana K. Frempong

- 2013 – 2015: University of L'Aquila, Italy:
Hamburg University, Germany (Exchange Student)
Gran Sasso Science Institute, Italy (Visiting Student)
MSc (Mathematical Engineering (Mathematics-Physics Modelling)) – Oct., 2015
MSc Thesis topic: *An Algorithm to Calculate the Ground State (low-spin) Energy and Force of Multi-Centre Transition Metal (MCTM) Complexes*
Supervisor: Prof. Leonardo Guidoni
- 2007 – 2011: Kwame Nkrumah University of Science and Technology, Ghana
B.Sc. (Physics) – June, 2011
B.Sc. Thesis topic: *Improving the Ductility of Local Manufactured Steel rods by Tempering*
Supervisor: Mr. Oswald. A. Nunoo
- 2006 – 2007: City and Guilds Institute of London, United Kingdom
St. Martin's Professional Technology, Accra, Ghana
Adv. Dip. & Dip. (Electrical Engineering Theory) – March, 2007

FELLOWSHIPS AND AWARDS

- 6 – 13/09/2021:** Visiting Scholar, Erasmus Mundus Scholarship Programme, InterMaths Consortium
- 09/21 – 10/21:** Visiting Fellow, Department of Information Engineering, Computer Science and Mathematics (**DISIM**), University of L'Aquila (**UAQ**), Italy.
- 01/16 – 11/19:** Scholarship, National Institute for Mathematical Sciences (**NIMS-GH**).
- 09/19 – 10/19:** Visiting Researcher, Genome of Steel Project, Centre for Advanced Steels Research (**CASR**), University of Oulu, Finland.
- 06/19 – 10/19:** Visiting PhD Fellowship, (**DISIM**).
- 20/3 – 19/4/17:** Fellowship for OIL17, Institute of Pure and Applied Mathematics (**IPAM**).
- 17 – 24/9/16:** Fellowship, Algorithmic Optimization (**ALOP**).
- 03 – 15/7/16:** Fellowship for College on Multiscale Computational Modeling of Materials for Energy Applications, Abdus Salam International Centre for Theoretical Physics (**ICTP**).
- 03/16 – 10/16:** Visiting Research Funds, Computational Biophysics Biochemistry and Chemistry (**CBBC**) Group.
- 19 – 24/7/15:** Participation and Travel Grant, Summer School on Transport, Fluids and Mixing.
- 05/15 – 06/15:** Fellowship, Gran Sasso Science Institute (**GSSI**).
- 09/13 – 09/15:** Abruzzo Regional Grant, Italy.
- 09/13 – 09/15:** Erasmus Mundus MathMods Consortium Scholarship.
- 04/03 – 07/06:** Ghana Government Bursary for Senior High School.

ACADEMIC APPOINTMENT(S)

- 08/20 - date: **Lecturer**, Department of Physics, College of Science, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. **Duties:** *Teach, Mentoring, Undertake Research, Disseminate Knowledge and Foster Relationship between Academia and Industry (National and International).*
- 08/18 - 06/19: **Graduate Assistant**, Department of Physics, College of Science, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. **Duties:** *Teach (Phase transformation and Thermodynamics) and Assist in Supervising Undergraduate Thesis*
- 06/16 - 06/18: **Assistant**, NIMS-GH Graduate Students **Duties:** *Teach (Computational Fluid Dynamics, Finite Elements Analysis, and Dynamical System) and Convener of Weekly Presentation*
- 10/11 - 8/12: **Teaching/Research Assistant**, **Duties:** *Teach (Atomic Physics and Mechanical Evaluation) and Assist in Supervising Undergraduate Thesis*, Kwame Nkrumah University of Science and Technology (KNUST), Department of Physics, Kumasi, Ghana
- 01/07 - 09/10: **Part-Time Lecturer**, **Duties:** *Teach Advanced Mathematics and Fundamental Engineering II for Advanced Diploma and Diploma students*, St Martin's Professional Technology, Accra, Ghana

RESEARCH APPOINTMENTS

- 01/21 – date: **Research Fellow**, National Institute for Mathematical Science (NIMS), Ghana. Coordinate PhD and Master Students Research and Convener of Weekly Presentation.
- 09/19 – 10/19: **Visiting Research Scholar** with Professor Jukka Kömi Group, Centre for Advanced Steels Research (CASR), Materials and Production Technology, University of Oulu, Finland
- 06/19 – 09/19: **Visiting PhD Fellowship** with Professor Bruno Rubino, University of L'Aquila, Department of Information Engineering, Computer Sciences and Mathematics, Italy.
- 03/15 – 10/15: **Visiting Research Scholar** with Professor Leonardo Guidoni, Computational Biophysics Biochemistry and Chemistry (CBBC) Group, University of Rome 'La Sapienza', Italy

ADMINISTRATIVE APPOINTMENTS

- 02/23 – date: **Contact Person**, Interdisciplinary Mathematics (InterMaths) Network, KNUST Path, Kumasi, Ghana.
- 02/23 – date: **Local Coordinator**, International Double MSc Degree in Mathematics for Real World Applications (RealMaths) Consortium, KNUST Path, Kumasi, Ghana. Coordination of Exchange Students Activities at KNUST.
- 01/23 – date: **Coordinator**, MSc Physics Programme on Institute for Distance Learning (IDL) Programme, KNUST.
- 05/22 – 02/23: **Deputy Local Coordinator**, International Double MSc Degree in Mathematics for Real World Applications (RealMaths) Consortium, KNUST Path, Kumasi, Ghana. Coordination of Exchange Students Activities at KNUST.
- 05/22 – date: **Deputy Local Coordinator**, International Double MSc Degree in Mathematics for

Real World Applications (RealMaths) Consortium, NIMS Path, Ghana. Assist with the Coordination of the Exchange Students Activities at NIMS.

04/22 – date: **Mentor**, Central Leadership Program (CLP), Ghana

22/22 – date: **Coordinator, Exhibition Team**, Department of Physics, KNUST.

13/21 – date: **Assistant Examination Officer**, Department of Physics, KNUST.

13/21 – date: **Assistant Postgraduate Coordinator**, Department of Physics, KNUST.

09/21 – 05/22: **Assistant Local Coordinator**, Interdisciplinary Mathematics (InterMaths) Network KNUST Path, Kumasi, Ghana. Coordination of Exchange Students Activities.

06/21 – date: **Contact Person**, Advanced Materials Technology (AMT) Research Group, Department of Physics, KNUST, Kumasi, Ghana.

03/21 – date: **Academic Tutor**, Department of Physics, KNUST.

11/20 – 05/22: **Assistant Local Coordinator**, Interdisciplinary Mathematics (InterMaths) Network NIMS Path, Ghana. Assist with the Coordination of the Exchange Students Activities at NIMS.

OTHER ACADEMIC LEADERSHIP, SERVICE AND ESTEEM

04/23 – date: **Member**, College of Science Curriculum Review and Quality Assurance Committee, KNUST.

02/23 – date: **Member**, Evaluation Committee, Interdisciplinary Mathematics (InterMaths) Network.

02/23 – date: **Member**, Implementation of Online Examination in Communication Skills for All First Years, KNUST.

01/23 – date: **Member**, Planning Committee to Convert Department of Physics into a School, KNUST.

08/22 – 02/23: **Member**, Workshop for Training of Senior High School (SHS) Teachers Committee, College of Science, KNUST.

09/22 – 12/22: **Member**, Coordination of Laboratory Visit by Competing Schools of the National Junior Science and Maths Quiz (JSMQ) Committee, KNUST.

08/22 – date: **Member**, College of Science Representatives on International Programmes Office Committee to Draft a Memorandum of Understanding.

08/22 – 09/22: **Member**, E – Learning Committee, College of Science, KNUST.

05/22 – date: **Member**, Strategic Plan Development Committee, International Programmes Office, KNUST.

02/22 – 04/22: **Member**, Students Financial Services Committee, College of Science, KNUST.

01/22 – date: **Member**, Specialization, Industrial Attachment and Internship Programme Committee, Department of Physics, KNUST.

11/21 – date: **Member (Secretary)**, High Throughput Computer (HTC) System Installation and Management, College of Science, KNUST.

07/21 – date: **Member**, Outreach and Collaboration Programme Committee, Department of Physics, KNUST.

04/21 – date: **Member**, Contract for Developing and Hosting Graduate School Thesis Deposition System, SGS, KNUST – BSU III Project.

03/21 – date: **Member**, Programme Accreditation Committee, Department of Physics, KNUST.

02/21 – date: **Member**, Space Physics Programme Committee, Department of Physics, KNUST.

10/20 – 02/21: **Member (Secretary), Syllabus/New Programme** - MSc Physics Programme Committee, Department of Physics, KNUST.

- 11/20 – 12/20: **Member**, Committee to Review the Structure and Content of Mathematics for Physics Courses and Mathematical Physics for Year Four, Department of Mathematics, College of Science, KNUST.
- 08/20 – 12/20: **Member, Syllabus/New Programme** - Physics with Applied Maths Option for Undergraduate and MPhil Mathematical and Computational Physics Committee, Department of Physics, College of Science, KNUST.
- 08/20 – 09/20: **Member**, Online Teaching Training and Certification Workshop for Staff of College of Science, KNUST.
- 06/19 – 9/19: **Member**, Organization Committee, MathMods and InterMaths Consortium, University of L'Aquila, Italy
- 01/16 – 03/17: **Member**, Evaluation Committee, Erasmus Mundus MathMods Consortium, University of L'Aquila, Italy
- 2009/2010: Certificate of Honour from Physics Students Association of Ghana, KNUST for dedicated service as Tratech Committee Chairman.

REVIEWS AND EXAMINATION

- 01/23 – date: **Examiner**, Department of Information Engineering, Computer Science and Mathematics (DISIM), University of L'Aquila (UAQ), Italy.
- 04/22 – date: **Reviewer**, Metallurgical and Materials Transactions B
- 02/22 – date: **Internal Examiner**, Department of Mathematics, KNUST.
- 07/21 – date: **Internal Examiner**, Department of Physics, KNUST.
- 02/21 – 03/21: **Reviewer**, Proposals submitted to 6th KNUST Research Fund (KReF), Office of Grants and Research, KNUST (OGR/33/KReF/Vol.5).
- 09/20 – date: **Reviewer**, Journal of the Ghana Science Association (JGSA)

GRANTMANSHIP

- 10/22 – 02/24: 1 PhD & 6 MPhils Mathematical and Computational Physics Students at KNUST Participation Grant, as Exchange Students at DISIM, UAQ, Education Ministry of Foreign Affairs, Italy (**€54,240.80**).
- 09/22 – 09/23: A.D.S.U (Azienda per il Diritto agli studi Univveraitari dell'Aquila) application for Four (4) UAQ-NIMS MPhil Students Participation in InterMaths. (**€26,482.6** Grant from the Abruzzi region).
- 10/21 – 03/22: 1 PhD & 4 MPhils Mathematical and Computational Physics Students at KNUST Participation Grant, as Exchange Students at DISIM, UAQ, Education Ministry of Foreign Affairs, Italy (**€23,675.00**).
- 09/21 – 09/22: A.D.S.U (Azienda per il Diritto agli studi Univveraitari dell'Aquila) application for Nine (9) UAQ-NIMS MPhil Students Participation in InterMaths. (**€24,908.31** Grant from the Abruzzi region).

5. 09/20 – 09/21: A.D.S.U (Azienda per il Diritto agli studi Univveraitari dell’Aquila) application for FOUR (4) UAQ-NIMS MPhil Students Participation in InterMaths. (€11,070.36 Grant from the Abruzzi region).
6. 03/21 – 07/21: University of L’Aquila (UAQ) Scholarship to Nyendah Ignatius - One (1) NIMS MPhil Students Participation in InterMaths. (€3250.00).

UNIVERSITY TEACHING EXPERIENCE WITH DATES

1. 08/20 - date: **Lecturer**, Department of Physics, FPCS, CoS, KNUST, Kumasi, Ghana.

Undergraduate

S/N	COURSE CODE	COURSE TITLE	CLASS(ES)	SEMESTER /YEAR
1	PHY 392	Phase Transformation	PHY3 – Materials Science Option	2/2023
2	PHY 358	Fluid Dynamics II	PHY 3 – Applied Maths Option	2/2023
3	PHY 488	MultiScale Modelling	PHY 4 – Applied Maths Option	2/2023
4	PHY 486	Computational Physics II	PHY 4 – Applied Maths Option	2/2023
5	PHY 457	Electrodynamic	PHY 4 – Applied Maths Option	1/2023
6	PHY 485	Computational Physics I	PHY 4 – Applied Maths Option	1/2023
7	PHY 357	Fluid Dynamics I	PHY 3 – Applied Maths Option	1/2023
8	PHY 399	Solid Mechanics	PHY 3 – Applied Maths Option	1/2023
9	PHY 392	Phase Transformation	PHY3 – Materials Science Option	2/2022
10	PHY 358	Fluid Dynamics II	PHY 3 – Applied Maths Option	2/2022
11	PHY 357	Fluid Dynamics I	PHY 3 – Applied Maths Option	1/2022
12	PHY 399	Solid Mechanics	PHY 3 – Applied Maths Option	1/2022
13	PHY 396	EM Theory	MET2	2/2021
14	PHY 396	EM Theory	PHY3 – All Options	2/2021
15	PHY 392	Phase Transformation	PHY3 – Materials Science Option	2/2021
16	PHY 255	Thermodynamics	MET 2	1/2021

Postgraduate

S/N	COURSE CODE	COURSE TITLE	CLASS(ES)	SEMESTER /YEAR
1	PHYC 552	MultiPhysics MultiScale lab	MPhil	2/2023
2	PHYS 525	Crystal Structure and Dynamics	MSc	1/2023
3	PHYS 583	Thermal Physics	MSc	1/2023
4	PHYC 552	MultiPhysics MultiScale lab	MPhil	2/2022
5	PHYG 572	Fluid – Solid Interaction	MPhil	2/2022
6	DTPHY 513	Classical and Electrodynamics (Physics)	MPhil	1/2022
7	PHYS 583	Thermal Physics	MSc	1/2022

8	PHY 572	Research Methods for Physics	All Phy MPhils	2/2021
9	PHY 585	Metallic Materials	MPhil	1/2021
10	PHYE 753	Classical & Electrodynamics	PhD	1/2021

2. 01/20 – date: **Research Fellow**, National Institute for Mathematical Science (NIMS), Ghana.

Postgraduate: InterMaths Students

S/N	COURSE CODE	COURSE TITLE	CLASS(ES)	SEMESTER /YEAR
1	SCIM 562	Numerical Solutions to Differential Equations	MPhil	1/2022
2	SCIM 562	Numerical Solutions to Differential Equations	MPhil	1/2021

SUPERVISION OF STUDENTS PROJECTS

Graduate Projects:

PhD Mathematical and Computational Physics and PhD Scientific Computing and Industrial Modelling

1. Materials Genomics (Multiscale Multiphysics Modelling and Machine Learning):
 - i. **Henry Quarshie:** Viscoplastic behaviour of industrial refractory metals under the influence of interstitial solute using first principle informed machine learning (Ongoing)
2. Hydrology, Geology and Climate
 - i. **Isaac Afari Addo:** Mathematical modelling of leakages in water distribution systems (Ongoing)
3. Energy Modelling
 - i. **Frank Kofi Owusu:** Forecasting electricity load demand using an ensemble kalman filtered state space model (Ongoing)

MPhil Solid State Physics, MPhil Mathematical and Computational Physics, and MPhil Scientific Computing and Industrial Modelling

1. Materials Genomics (Multiscale Multiphysics Modelling and Machine Learning):
 - i. **Wilson Abdul-Korah Kansangabata:** Determination of magnetic susceptibility of iron in water using grand monte carlo simulation (Ongoing)
 - ii. **David Kofi Peprah:** Determining a parsimonious model and probing interactions (extent of interaction effect) involved in alloying elements and temperature for the start ferrite of continuous cooling transformation (CCT) in steels (Ongoing)
2. Hydrology, Geology and Climate
 - i. **Yinbil Sa-ad Ibrahim:** Model reduction of aerodynamic for flight performance (Ongoing)
 - ii. **Abigail Birago Adomako:** Analysis of convective parameterization schemes in the agro-ecological zones of Ghana using RegCM simulations (Completed)
 - iii. **Sheriff Adonoo:** Optimal control of smart irrigation systems in Ghana (Completed)

3. Biophysics, Biomedical and Biological Modelling
 - i. **Millicent Afrifa Opoku:** Analysis of the effects of high-density lipoproteins (HDL) on early formation of a new atherosclerosis plaque model (Completed)

Undergraduate

33 students at the undergraduate level in BSc Physics (Geophysics, Materials Science, Electronics, Computing and Applied Maths Option) and **2 students** of BSc Meteorology and Climate Science

1. Materials Genomics (Multiscale Multiphysics Modelling and Machine Learning):
 - i. **Abraham Gyamfi and Abdul Rahman Mohammed:** Modelling the electromagnetic thermal process in steel hardening (Ongoing)
 - ii. **Eugene Kojo Kudzedzi and Eugene Kwame Boafo Asamoah:** Design of adsorbents by screening of metal organic framework (MOFs) and zeolites using quantum machine learning (QML) (Ongoing)
 - iii. **Vincent Kumi Anyan and Attabio Saeed Ismail:** Design of adsorbents from the screening of metal organic framework (MOFs) using machine learning (Ongoing)
 - iv. **Emmanuella Naana Kwakye and Estherlla Kofie:** Grand canonical monte carlo simulation for structural screening of zeolites as adsorbents (Ongoing)
 - v. **Benard Abudu Akurugu, Seth Asare and David Pagadam:** Atomistic simulation of hydrogen embrittlement mechanism in steel (Ongoing)
 - vi. **Isaac Danso Obeng:** Predicting the start transformation pearlite in a continuous cooling transformation (CCT) of steels using an estimated model of ferrite finished transformation (Completed)
 - vii. **Edward Yeboah and Millicent Botwe:** Simulating the mechanisms of serrated flow of interstitial alloys in bcc using kinetic monte carlo (KMC) (Completed)
 - viii. **Abraham Azalekor and Michael Ato Sackey:** Determining and estimating the extent of interaction effect (probing interaction) for the onset continuous cooling transformation in steel (Completed)
2. Hydrology and Geology Modelling
 - i. **Melvin Kofi Sherif Boateng and Daniel Boah:** Estimating porosity and volumetric soil water content using integrated Geophysical techniques (Completed)
 - ii. **Collins Lartey:** Modelling the volumetric soil water content with climate variability using electrical resistivity method at knust agricultural research station, Anwomaso, Kumasi (Completed)
 - iii. **Isaac Monny and Benjamin Sunkwa:** Modelling the subsurface using quasi-3d data on knust campus (Completed)
 - iv. **Abdul Hafiz Ismail and Abdullah Foussein:** Modelling the volumetric soil water content with climate variability using ground penetrating radar at knust agricultural research station, Anwomaso, Kumasi (Completed)
3. Space Physics and Climate Modelling

- i. **Mohammed Iddrisu Nlowie and William Junior Sabi:** Observation of the HI line along the milky way tabletop radio telescope (Ongoing)
 - ii. **Wonder Sewavi and Stephen Elikplim Adortsu:** Searching for pulsars in the galactic centre at 3mm and 2mm using fast folding algorithm (Ongoing)
 - iii. **Manasseh Etornam D'almeida and Michael Opere Akyea:** Assessing growing degree days using moisture parameters over knust agromet station, Kumasi (Completed)
4. Energy (Renewal) Modelling
- i. **Raymond Takyi Sam and Ransford Agbemape:** Developing an optimal solution for generation of hydrogen energy from Ghana's identified renewable resources – A case study (Ongoing)
 - ii. **Carlos Blemano and Ernest Mensah:** Self-discharge model for supercapacitors incorporating voltage and time as a function (Completed)
 - iii. **Michael Brem Quansah and Lawrence Darko Baah:** Modelling the electrode calendaring processes of lithium-ion battery (Completed)

STUDENTS COORDINATION IN PROGRAMMES

Interdisciplinary Mathematics (InterMaths) Network: RealMaths & InterMaths Consortium

1. Kwame Nkrumah University of Science and Technology (KNUST) Path
 - i. Cohort 2022
 - i. Collins Lartey
 - ii. Isaac Monny
 - iii. Edward Yeboah
 - iv. Michael Brem Quansah
 - ii. Cohort 2021
 - i. Wilson Kansangabata Abdul-Korah
 - ii. Sylvester Agyei Danso
 - iii. Sa-ad Ibrahim Yinbil
2. National Institute for Mathematical Science (NIMS) Path
 - i. Cohort 2021
 - i. Solomon Yeboah
 - ii. Peter Dornyame
 - iii. Ebenezer Danso Effah
 - iv. Enock Darkwa Tweneboah
 - ii. Cohort 2020
 - i. Sheriff Adonoo
 - ii. Emmanuel Agyare
 - iii. Alfred Tan
 - iv. Charles Kankam Boateng
 - v. Ignatius Nyendah

PUBLISHED ARTICLES

1. Owusu, F. K., Amoako-Yirenkyi, P., Frempong, N. K., Omari-Sasu, A. Y., Mensah, I. A., **Martin, H.**, Sakyi, A. *Seemingly unrelated time series model for forecasting the peak and short-term electricity demand: Evidence from the Kalman filtered Monte Carlo method*. Heliyon (2023). DIO: 10.1016/j.heliyon.2023.e18821
2. Boakye, D., **Martin, H.**, Labik, L.K., Britwum, A., Nunoo, O.A., Elloh, V.W., Kwakye-Awuah, B., Yaya, A. and Abavare, E.K. *Electronic and Magnetic Properties of Transition Metal-Doped MoS₂ Monolayer: First-Principles Calculations*. Physica Status Solidi (b) 260 (7), 2200337 (2023). DIO: 10.1002/pssb.202200337
3. Prempeh, K. O. K., Parker-Lampsey, G., **Martin, H.**, and Amoako-Yirenkyi, P., *Boltzmann transformation of radial two-phase black oil model for tight oil reservoirs*. J Petrol Explor Prod Technol (2022). DIO: 10.1007/s13202-022-01528-8
4. **Martin H.**, Abavare, E. K. K., and Amoako-Yirenkyi, P., *Thermodynamic stable site for interstitial solute (N or O) in bcc refractory metals (Mo and Nb) using density functional theory*. MRS Advances 7, 474–481 (2022). DIO: 10.1557/s43580-022-00280-9
5. **Martin H.**, Amoako-Yirenkyi P., Pohjonen A., Frempong N. K., Kömi J., Somani C. M. (2020), *Statistical Modelling for Prediction of CCT Diagrams of Steels Involving Interaction of Alloying Elements*. Metall Mater Trans B 52, 223–235 (2021)., DIO: 10.1007/s11663-020-01991-w
6. Chu S., Bovi D., Cappelluti F., Orellana A. G., **Martin H.**, and Guidoni L., *The Effects of Static Correlation between Spin Centers in Multi-Center Transition Metal Complexes*. Journal of Chemical Theory Computation (JCTC), (2017) DIO: 10.1021/acs.jctc.7b00316
7. **Martin H.**, Nunoo O. A., and Dadson A. B. C. (2012), *Improving the Ductility of Locally Manufactured Steel Rods by Tempering*, Ghana Science Association Conference Proceedings (GSA/Pub/Vol.5/2012/127).

PUBLICATION IN PROGRESS

1. Prempeh, K. O. K., Parker-Lampsey, G., **Martin, H.**, and Amoako-Yirenkyi, P., *Spatial Non-Local Conservation of Momentum Equation for Fluid Flow in Porous Media*.
2. **Martin H.**, Amoako-Yirenkyi P., Pohjonen A., and Porter D., *Probing Interactions (Extent of Interaction Effect) of a Parsimonious Model for Austenite Decomposition of CCT Diagrams of Steels Involving Nth-way of Interacting Alloying Elements*.

SELECTED CONFERENCE / WORKSHOPS / SEMINARS

- | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 05/22 – 08/22: | Mentors training sessions, Online: Central Leadership Program (CLP) , Ghana. |
| 23 – 27/05/22: | Professional and Communications Training for Scientists (Snr 3710), Online: ICTP – Italy. |
| 23 – 25/02/21: | 20th International Workshop on Computational Physics and Materials Science: Total Energy and Force Methods (Snr 3554), Online: ICTP – Italy. |

- 13/1 – 03/02/21:** The Hitchhiker's Guide to Condensed Matter and Statistical Physics: Machine Learning for Condensed Matter (Smr 3589), Online: **ICTP** – Italy.
- 11 – 14/01/21:** Transport and Mixing in Complex and Turbulent Flows (CTF2021), **Institute of Pure and Applied Mathematics (IPAM)**, University of California, (UCLA) Los Angeles - United States (US).
- 18 – 20/11/20:** African Physical Society (AfPS) International Conference (Smr 3476), Online: **ICTP** – Italy.
- 5 – 6/10/20:** Conference on Quantum Annealing/Adiabatic Quantum Computation (Smr 3474), Online: **ICTP** – Italy.
- 12 – 13/8/20:** Virtual conference on the occasion of the **70th birthday of Ari Laptev**, **University of Stuttgart**, Zoom.
- 10 – 14/8/20:** Online School on Ultra Quantum Matter, **Perimeter Institute (PI) for Theoretical Physics**.
- 29/6 – 3/7/20:** First Battery Manufacturing Days, **ARTISTIC Project Webinar Series**, **UPJV/LRCS**.
- 24/6 – 10/7/20:** **Joint GSSI-SISSA virtual course on Mathematical QM and QFT**, Zoom.
- 4/6 – 5/6/19:** Workshop on Mathematics and Materials Science for Steel Production and Manufacturing (**MIMESIS**), **Thon Hotel Høyers**, head office of **EFD Induction**, Skien, Norway.
- 25/4 – 27/4/19:** Ghana Data Science Summit 2019 (**INDABAX GHANA**): The Promise of Data Science for Economic Transformation, **Kofi Annan Center of Excellence in ICT** Accra, Ghana.
- 28/1 – 2/2/19:** Joint 2nd International Conference of the Pan African Conference on Crystallography (**PCCr2**) and The African Light Source (**AfLS2**): Crystallography a tool for sustainable development in Africa, **University of Ghana, (Legon)**, Accra, Ghana.
- 20/3 – 12/4/17:** Computational Issues in Oil Field Applications, **Institute of Pure and Applied Mathematics (IPAM)**, **University of California, (UCLA)** Los Angeles - United States (US).
- 19 – 23/9/16:** Autumn School Algorithmic Optimization (ALOP), **Universität Trier** – Germany.
- 3 – 15/7/16:** College on Multiscale Computational Modeling of Materials for Energy Applications (smr 2874), **ICTP** – Italy.
- 14 – 18/3/16:** 5 Day Workshop on Building Research Capacity for Academia-Industry Partnership, **KNUST Engineering Guesthouse**, Kumasi – Ghana.
- 29/7/15:** Coherent localized structures emerging from parabolic regularizations of an ill-posed problem in materials, **GSSI - INFN**, Italy.
- 19 – 24/7/15:** Summer School on Transport, Fluids and Mixing, **Levico Terme** (Trento) – Italy.
- 15 – 17/7/15:** Nonstandard transport NsT, **Gran Sasso Science Institute - INFN**, Italy.
- 15 – 19/6/15:** Eighth Summer School, Analysis and Applied Mathematics, **Dipartimento di Matematica "Guido Castelnuovo" La Sapienza, Università di Roma**.
- 12/6/15:** Kato inequalities for scalar hyperbolic and degenerate parabolic problems, **GSSI - INFN**, Italy.
- 9/6/15:** **SPEED**: a high performance numerical code for multi-scale seismic wave propagation, **GSSI - INFN**, Italy.

- 1 – 5/6/15: Collective dynamics in gradient flows and entropy driven structures, **GSSI - INFN**, Italy.
- 4/5 – 6/5/15: Computer Simulations for Condensed Phase Systems: From Correlated Electrons to Novel Materials (**GBB60**), **CNR headquarters, Rome**, Italy.
- 15/7 – 4/8/12: African School of Fundamental Physics and its Applications ASP2012, **Kwame Nkrumah University of Science and Technology (KNUST)**, Kumasi, Ghana.

TALKS AND POSTER PRESENTATIONS OF RESEARCH CONDUCTED

- 8 – 16/3/20: *Modelling Austenite Decomposition of Steel with an Nth-way of Combining Alloying Elements using Machine Learning Techniques*. Mathematisches Forschungsinstitut Oberwolfach (**MFO ID 2011**) Title: Mechanics of Materials: Towards Predictive Methods for Kinetics in Plasticity, Fracture, and Damage. Germany.
- 18 – 21/6/19: *Thermodynamically Stable Site in bcc-Refractory-Interstitial Solid Solution using Ab initio*. 10th Young Researcher Meeting (**YRM**), **University of Rome, "Tor Vergata"**, Italy.
- 4 – 5/6/19: *Modelling the Onset of Ferrite Formation in Steel: Effect of Combining Different Alloying Elements (2-Way Interaction)*. Workshop on Mathematics and Materials Science for Steel Production and Manufacturing (**MIMESIS**), **Thon Hotel Høyers, head office of EFD Induction**, Skien, Norway.
- 28/1 – 2/2/19: *Thermodynamically Stable Site in bcc-Refractory-Interstitial Solid Solution using Ab initio*. Joint 2nd International Conference of the Pan African Conference on Crystallography (**PCCr2**) and The African Light Source (**AFLS2**): Crystallography a tool for sustainable development in Africa, **University of Ghana, (Legon)**, Accra, Ghana.
- 12 – 14/10/15: *An Algorithm to Calculate the Ground State (Low-Spin) Energy and Force of Multi-Center Transition Metal (MCTM) Complexes*. 6th Young Researcher Meeting (**YRM**), **Gran Sasso Science Institute**, L'Aquila, Italy.
- 6/15: *Numerical Simulation of Nonhomogeneous Bingham Fluids by Semismooth Methods*. Modelling Camp Session, **Hamburg University**, Germany.

OUTREACH ACTIVITIES

- 29/07/23: **Contact Person:** Physics Open Day for Senior High Schools 2023 (PODS23), Department of Physics, College of Science, KNUST, Kumasi, Ghana.
- 19 – 20/07/23: **Contact Person:** Advanced Materials Technology Research Group, Public Engagement 2023 (AMT - PE23), Advanced Materials Technology for Sustainable Waste Management: Innovation and Opportunities in Ghana, Department of Physics, College of Science, KNUST, Kumasi, Ghana.
- 5 - 14/06/23: **Facilitator:** Training of Faculty on the Usage of the Online Thesis Deposition and Management System, SGS, KNUST.
- 15 - 19/05/23: **Lead Organizer:** Quantum Computing Workshop, Department of Physics, College of Science, KNUST, Kumasi, Ghana.
- 15 – 19/05/23: **Organizer:** Progress Report Clinic 2023 (PRC23), Department of Physics Postgraduate Students, KNUST, Kumasi, Ghana.
- 1 & 8/02/23: **Facilitator:** Specialization Orientation for Physics Program, Department of Physics, College of Science, KNUST, Kumasi, Ghana.
- 30/06/22: **Coordinator:** Department of Physics Exhibition Team at the **Science & Technology Fair 2022**, by N. A. Kyerema Foundation, Anyinam, Atiwa East District, Eastern Region, Ghana.

- 10 – 13/05/22:** **Coordinator:** Department of Physics Exhibition Team at the **70th Anniversary Science & Technology Exhibition**, KNUST, Kumasi, Ghana.
- 19 – 12/04/22:** **Assistant Postgraduate Coordinator & Organizer:** Postgraduate Poster Presentation 2022, Department of Physics, KNUST, Kumasi, Ghana.
- 24 – 25/03/22:** **Contact Person & Organizer:** Advanced Materials Technology Research Group, **Public Engagement (AMT PE22)**, Zoom Meeting, KNUST, Kumasi, Ghana.
- 08/16 – 05/18:** **Facilitator:** C++ Programming for 2nd year Physics students, Physics Department, KNUST, Kumasi, Ghana.
- 2011:** Certificate of Honor from Science Students Association and National Society of Black Engineers (KNUST) for participating in **Science and Technology Fair**, Kumasi, Ghana.
- 2010:** Certificate of Honor from Student Representative Council (SRC - KNUST) for participating in Trade & Technology Fair, **Tratech 2010**. Theme: “Commerce (Creativity + Innovation) = National Development”

SYNERGISTIC ACTIVITIES

- Member of Institute of Mathematics & its Application (MIMA) – April 2021 to date
- Research Fellow of NIMS – GH Research Team – 2020 to date
- Associate Member of Institute of Mathematics & its Application (AMIMA) – August 2014 to March 2021

REFERENCES

1. Prof. Peter Amoako-Yirenkyi, Director SCIM, NIMS-GH and ICT Consultant, Department of Mathematics, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Email: amoakoyirenkyi@gmail.com
2. Prof., Robert K. Nkum, Former Provost College of Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Email: rknkum@gmail.com
3. Prof. Sylvester K. Danuor, Past Head of Department, Department of Physics. Coordinator of DACCIIWA, QweCi and GCRF African SWIFT project, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Email: danuor@yahoo.com
4. Prof. Leonard Guidoni, Department of Physics and Chemistry, University of L'Aquila, Italy. Email: leonardo.guidoni@univaq.it
5. Prof. Leonard K. Amekudzi, Provost College of Sciences, Coordinator Meteorology and Climate Science, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Email: leonard.amekudzi@gmail.com
6. Prof. Rubino Bruno, Vice International Rector, Coordinator RealMaths, Past Coordinator MathMods Programme and Former Head of Department of Information Engineering, Computer Science and Mathematics (DISIM), University of L'Aquila, Italy. Email: bruno.rubino@gmail.com