

Kossi AMOUZOUVI

PhD in Computational Physics

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Research Interests

Quantum Machine Learning, *Machine learning techniques (deep learning and kernel method) for condensed matter physics.*

Theoretical and Computational Condensed Matter Physics, *Formalism of Density Functional Theory (DFT) and its applications to single chain one dimensional lattice systems.*

Machine Learning, *Machine learning techniques for diseases prediction, climate change, smart-agriculture and smart-education.*

Relevant Experiences

Supervision

- 06/2020 **Research Co-Supervisor**, African Institute for Mathematical Sciences (AIMS) Ghana, Title: Generalized Uncertainty Principle.
- 01/2020 **Research Co-Supervisor**, AIMS Rwanda, Title: Ensemble machine learning approach to predict Diabetes.
- 01/2020 **Research Co-Supervisor**, AIMS Rwanda, Title: Ensemble Classifier For Early Prediction of Chronic Hepatitis B.
- 06/2019 **Research Co-Supervisor**, AIMS Rwanda, Title: Comparative analysis of sunshine duration and solar radiation measurements provided by satellites and stations in Dodoma, Kigali and Kisumu.
- 02/2019 **Research Supervisor**, AIMS Rwanda, Title: Comparative analysis of credit card fraud detection techniques on unbalanced data: SVMs, Neural network, random forest, logistic and naive Bayes.

Teaching positions

- 2018-2020 **MSc Level Teaching Assistant**,
2019-2020 African Master's in Machine Intelligence AIMS/AMMI Ghana, Accra-Ghana
08/2018-07/2019 AIMS/AMMI Rwanda, Kigali-Rwanda
04/2018-07/2018 AIMS Rwanda, Kigali-Rwanda.
- 09/2017-03/2018 **Undergraduate level Physics and Mathematics Tutor**, University of Lomé, Lomé-Togo.
- 2015-2017 **Undergraduate level Physics Tutor**, University of the Witwatersrand, Johannesburg-South Africa.
- 2010-2013 **High school Mathematics Teacher**,
¹ Lycée Moderne KOUVAHEY, Lomé-Togo,
² Lycée d'Enseignement Général EDUCADEV, Lomé-Togo,
³ Lycée Technique le LEADER, Lomé-Togo.

Courses recently taught

- 2020 **Vector Algebra, Matrix Algebra, Introduction to number theory, Introduction to set theory**, *KNUST*.
- 2020 **Mathematics for Machine Learning, Optimazation for Machine Learning, Machine learning with Python, Data Science with Python, and Introduction to Python**, *AIMS*.

Education

- 07/2018 **PhD in Density Functional Theory**, *University of the Witwatersrand, School of Physics*, Thesis title: Ensemble Density Functional Theory on a Lattice, Supervisor: Prof. Daniel P. Joubert.
- 06/2014 **Master of Science in Mathematics**, *African Institute for Mathematical Sciences AIMS-Ghana (Ghana)*, Essay title: Hochschild Cohomology and Deformation Theory, Supervisor: Prof. Ulrich Krähmer, University of Glasgow.
- 09/2011 **Master of Science (Maîtrise) in Mathematics**, *University of Lomé (Togo)*, with focus on Differential Geometry (distinction); Optimazition (good pass) and PDEs and Numerical Analysis (good pass).
- 06/2010 **Bachelor Degree (Licence) in Mathematics**, *University of Lomé (Togo)*.

Publications

- 24/10/2018 **Kossi Amouzouvi and Daniel Joubert**, *Exact Kohn-Sham Density Functional Theory on a Lattice*, arXiv preprint arXiv:1810.10442.
- 24/12/2017 **Kossi Amouzouvi and Daniel Joubert**, *Density functional theory on a lattice: Self-consistent Hartree plus exchange approximation*, in the Proceedings of SAIP2016, the 61th Annual Conference of the South African Institute of Physics, edited by Dr. Steve Peterson and Dr. Sahal Yacoob (UCT/2016).
pp. 452 – 456. ISBN: 978 – 0 – 620 – 77094 – 1
- 17/07/2016 **Kossi Amouzouvi and Daniel Joubert**, *Density functional theory on a lattice: Particle number dependence of the exchange-correlation potential*, in the proceedings of the 60th Annual Conference of the South African Institute of Physics (*SAIP2015*), edited by Makaiko Chithambo (RU) and André Venter (NMMU) (2015).
pp. 476 – 480. ISBN: 978 – 0 – 620 – 70714 – 5

Awards

- 2015–2017 **DAAD**, *Deutscher Akademischer Austausch Dienst PhD scholarship*, University of the Witwatersrand, South Africa.
- 2016–2017 **PMA**, *Postgraduate PhD Merit Award*, University of the Witwatersrand, South Africa.
- 2016 **NRF**, *National Research Foundation student's bursary and scholarship*, University of the Witwatersrand, South Africa.
- 2013–2014 **AIMS full bursary scholarship**, *Postgraduate study in Mathematical Sciences*, African Institute for Mathematical Sciences, Ghana.

Conferences and Symposiums

- 12/2020 **IndabaX Togo**, *Organizer*, organized by BERIIA, Universities of Lomé and Kara, UCAO, iPNET and IAI, Lomé–Togo.

- 12/2020 **Virtual Maths Camp for High School Studens: VMC**, *Organizer and national volunteer*, organized by Initiative en Mathématiques au Togo (IMTogo) and Supporting African Maths Initiatives (SAMI), Lomé–Togo.
- 12/2020 **Colloque Régional de Physique et Applications (Regional Colloquium for Physics and Applications) CRéPAs2020**, *Organizer and speaker*, organized by AScIN, Lomé–Togo.
- 04–08/2020 **Virtual Mathematics Classroom for High School Studens: Maths@Facebook**, *Organizer and national volunteer*, organized by Initiative en Mathématiques au Togo (IMTogo) in collaboration with Supporting African Maths Initiatives (SAMI) and Center for Research and Opinion Polls (CROP), Facebook.
- 2019 **Togo Maths Camp**, *Organizer and national volunteer*, organized by African Scientific Integration Network (AScIN) in collaboration with Supporting African Maths Initiatives (SAMI) and Center for Research and Opinion Polls (CROP), Aného–Togo.
- 2019 **Cross pollination**, *Participant*, African Maths Initiative (AMI) Ghana, Biriwa–Ghana.
- 2019 **Big Data for Development**, *Instructor*, African Institute for Mathematical Sciences (AIMS), Kigali–Ghana.
- 2018 **Deep learning Indaba 2018**, *Participant*, Stellenbosch University, Stellenbosch–South Africa.
- 2018 **Colloque Régional de Physique et Applications (Regional Colloquium for Physics and Applications) CRéPAs2018**, *Organizer and speaker*, organized by AScIN, Lomé–Togo.
- 2017 **South African Institute of Physics SAIP2017**, *Oral presentation*, University of Stellenbosch, Cape Town–South Africa.
- 2017 **28th Chris Engelbrecht Quantum Marching Learning Summer School**, *Participant*, Drakensberg–South Africa.
- 2016 **66th Lindau Nobel Laureate Meetings**, *Participant*, Lindau–Germany.
- 2016 **7th annual South African Young Scientists' Conference 2016**, *Invited speaker*, Academy of Science of South Africa (ASSAf), Johannesburg–South Africa.
- 2016 **South African Institute of Physics SAIP2016**, *Poster presentation*, University of Cape Town, Cape Town–South Africa.
- 2015 **South African Institute of Physics SAIP2015**, *Poster presentation*, Nelson Mandela Metropolitan University and Rhodes University, Port Elizabeth–South Africa.
- 2014 **African School of fundamental Physics and its applications ASP2014**, *Participant*, l'Université Cheikh Anta Diop, Dakar–Sénégal.
- 2014 **Eastern Africa Universities Mathematics Programme EAUMP2014**, *Participant*, University of Dar Es Salaam, Arusha–Tanzania.
- 2014 **16th Regional College on Modelling, Simulation and Optimisation**, *Participant*, University of Cape Coast, Cape Coast–Ghana.
- 2012 **Mathematics School in Africa (École Mathématique en Afrique) EMA-2012**, *Participant*, Université Félix Houphouët-Boigny, Abidjan–Côte d'Ivoire.

Languages

Éwé Mother tongue
English Fluent

French Fluent

Computer skills

Expert Python, Octave, Sage, Scilab, Maxima.

Intermediate R studio, C++, HTML, CSS, JavaScript.

Basic Adobe Creative Suite.

Miscellaneous Windows, Office, Ubuntu.

References

¹ Daniel Joubert (PhD supervisor)

School of Physics

University of the Witwaterstand, Johannesburg.

`Daniel.Joubert2@wits.ac.za`

² Ulrich Kraehmer (Master's supervisor)

School of Mathematics and Statistics

Dresden University of Technology.

`ulrich.kraehmer@tu-dresden.de`

³ Yaogan MENSAH

Département de Mathématiques

Université de Lomé .

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⁴ Marc Deisenroth

Statistical Machine Learning, Department of Computing

Imperial College London.

`marc.deisenroth@gmail.com`