



Mounia Laassiri

PH.D. IN PHYSICS AND NUCLEAR INSTRUMENTATION

Brookhaven National Laboratory, Bldg 510a, P.O. Box 5000, Upton, NY 11973-5000, USA

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Languages: English (proficiency), French (Excellent), Finnish (fair), Arabic (native)

Current Positions

Postdoctoral Researcher, Brookhaven National Laboratory (BNL)

ATLAS Experiment and African School of Physics.

Upton, NY, USA

May 2024 - Present

Senior Research Associate, University of Johannesburg (UJ)

ATLAS upgrade, fiber optic sensors, and contributions to research and teaching in Africa.

Johannesburg, South Africa

Oct. 2024 - Present

Previous Positions

Research Visitor, Helsinki Institute of Physics, University of Physics

POSEIDON - Position-sensitive detectors for nuclear fuel imaging

Helsinki, Finland

Jun. 2023 - May 2024

Postdoctoral Researcher, Helsinki Institute of Physics, University of Physics

POSEIDON - Position-sensitive detectors for nuclear fuel imaging

Helsinki, Finland

Jun. 2022 - May 2023

Member of Nexus Ubuntu Reactors, University of Johannesburg

Ubuntu Reactors- Modelling Nuclear Reactors with Geant4

Johannesburg, South Africa

Dec. 2019 - May 2022

Research interests

- Assembly and testing of the ATLAS strip tracker upgrade (ITk)
- Fiber optic sensors
- Nuclear Instruments and Measurements
- Nuclear Safety, Security and Safeguards
- Nuclear Medicine & Medical Imaging
- Detector R&D; Simulations; Data analysis
- Reactor Studies and Simulations

Education

Ph.D. in Physics and Nuclear Instrumentation

THESIS: NEUTRON SIGNALS NONNEGATIVE TENSOR BLIND SOURCE SEPARATION: APPLICATION TO n/γ DISCRIMINATION

Mohammed V University, Morocco

Nov. 2014 - Apr. 2019

Specialized Master's Degree: Security of Computer Networks and Embedded Systems

THESIS: DEVELOPMENT OF WAVELET BASED TOOLS FOR PROCESSING AND CHARACTERISING THE γ -RAY SPECTROMETRY

Mohammed V University, Morocco

Sep. 2011 - Nov. 2013

Bachelor's Degree in Fundamental Physics

THESIS: IONIZING RADIATION AND RADIOPROTECTION

Mohammed V University, Morocco

Sep. 2008 - Jun. 2011

Work Experience

Brookhaven National Laboratory

POSTDOCTORAL RESEARCH— ATLAS ITK STRIPS PHASE II TRACKER UPGRADE

Upton, NY, USA

May 2024 Present

- Working on various tasks related to the ATLAS Phase II tracker upgrade, focusing on the strips barrel at Brookhaven National Laboratory.
- Developing interlock systems to ensure safe thermal cycling of silicon strip modules, enhancing operational safety and reliability.
- Involved in quality control (QC) for the ITk strips barrel modules, utilizing a coldjig setup for temperature control, data acquisition (DAQ), and hardware monitoring.
- Serving as US contact of the coldjig software.

University of Johannesburg

SENIOR RESEARCH ASSOCIATE— ATLAS ITk

- ATLAS Experiment.
- Upgrade work on fibre optic sensors.
- Contributions to the discipline and teaching across the African continent.

Johannesburg, South Africa

Oct. 2024 - Present

Brookhaven National Laboratory

RESEARCH VISITOR— ATLAS ITk

- Environmental Monitoring System of the ATLAS ITk Clean room.
- ITk strips module testing software, specifically coldjig software development for environmental monitoring

Upton, NY, USA

Dec. 2023 - May 2024

Brookhaven National Laboratory

RESEARCH VISITOR— EVALUATION OF POSITION-SENSITIVE VIRTUAL FRISCH-GRID CZT DETECTORS

- Fabricated and tested pixelated CZT detectors for gamma-ray detection.
- Investigated the use of CZT and germanium detectors for position-sensitive gamma-ray detection, contributing to advancements in 3D imaging technologies.
- Employed two-site event reconstruction to demonstrate the array's Compton imaging capability.

Upton, NY, USA

Jun. 2023 - Dec. 2023

Helsinki Institute of Physics, University of Helsinki

RESEARCH VISITOR— POSEIDON: POSITION-SENSITIVE DETECTORS FOR NUCLEAR FUEL IMAGING

- Provided expertise in nuclear fuel imaging, laying the groundwork for the continuation of the POSEIDON project.
- Acted as a consultant, advising on advanced simulation techniques and experimental validation strategies.
- Contributed to a research publication.

Helsinki, Finland

Jun. 2023 - May 2024

Helsinki Institute of Physics, University of Helsinki

POSTDOCTORAL RESEARCHER— POSEIDON: POSITION-SENSITIVE DETECTORS FOR NUCLEAR FUEL IMAGING

- Studied the performance of a Passive Gamma Emission Tomography (PGET) device utilizing state-of-the-art 3D position-sensitive semiconductor gamma-ray detectors.
- Developed a Monte Carlo simulation framework using the Geant4 toolkit to simulate detector performance, validated through code-to-code verification and experimental data from the Helsinki Institute of Physics (HIP)/University of Helsinki and Uppsala University.
- Explored the potential of Compton imaging to trace the origin of gamma rays along spent nuclear fuel assemblies (SFAs), enhancing the precision of nuclear fuel imaging.

Helsinki, Finland

Jun. 2022 - May 2023

University of Johannesburg

MEMBER OF NEXUS UBUNTU REACTORS, UNIVERSITY OF JOHANNESBURG

- Provided expertise in nuclear reactor simulation.
- Contributed to a research publication.

Johannesburg, South Africa

Dec. 2019 - May 2022

Brookhaven National Laboratory

RESEARCH VISITOR— LIQUID ARGON FIELD CALIBRATION SYSTEM (LARFCS)

- Developed a dedicated system to calibrate the field response functions for the wire-readout- based single-phase Liquid Argon Time Projection Chamber (LARTPC), enhancing TPC signal processing for automated event reconstruction.
- Constructed a LabVIEW-based DAQ program for LARFCS using commercial VME modules from CAEN, avoiding the complexity of the existing MicroBooNE NEVIS FPGA readout system.

Upton, NY, USA

Oct. 2019 - Dec. 2019

Brookhaven National Laboratory

RESEARCH VISITOR— UBUNTU REACTORS: GEANT4 MODELLING FOR NUCLEAR ENERGY

- Developed a stochastic Monte Carlo (MC) simulation of a High Temperature Gas Cooled Reactor (HTGCR) using the Geant4 framework.
- Implemented basic neutronics, geometrical discretization, time slicing, and intra-slice persistence for studying spatial variations of physical parameters.
- Integrated thermal hydraulics via workflow scheduling and validated thermal macroscopic cross-section behavior, fission, burn, decay, and differential energy deposition processes.
- Conducted validation of Xenon effects on neutronics, criticality, and core behavior over multiple time steps.

Upton, NY, USA

Jul. 2019 - Oct. 2019

Mohammed V University

PH.D. RESEARCH— SOFTWARE n/γ DISCRIMINATION USING NONNEGATIVE TENSOR FACTORIZATION (NTF) ALGORITHMS

- Applied Nonnegative Tensor Factorization (NTF) algorithms to extract independent components from signals recorded at the fission chamber preamplifier's output, achieving software-based n/γ discrimination.
- Simulated neutron flux in the TRIGA Mark II reactor using Monte Carlo methods with Geant4 and Garfield++ to model the fission process, energy deposition, and ionization in the fission chamber.
- Integrated Magboltz and Heed within Garfield++ for analysis of electron-ion drift lines and induced signals, providing a detailed simulation of stochastic events and detector response.
- Processed output signals using the NTFLab toolbox in MATLAB®.

Rabat, Morocco

Nov. 2014 - Apr. 2019

Teaching and Mentoring

TEACHING

Tutorial on Events Generation & Detector Simulation using Geant4— a simulation toolkit

The 8th Biennial African School of Physics (ASP2024), Cadi Ayyad University

Marrakesh, Morocco

Jul. 7-21, 2024

Tutorial on Events Generation & Detector Simulation using Geant4— a simulation toolkit

The 7th Biennial African School of Physics (ASP2022), Nelson Mandela University (NMU)

Port Elizabeth, South Africa

Nov. 28- Dec. 9, 2022

Instructor for Nuclear Physics Practical Work (Bachelor's Level)

Faculty of Sciences, Mohammed V University

Rabat, Morocco

2015- 2016

MENTORING

BNL: ATLAS ITk

MENTORED AND WORKED WITH VARIOUS STUDENTS BASED AT BNL

Jan. 2024 - Present

- Abdullah Sayed (PhD student, Brandeis University (US)): Mentoring in ITk strips module testing. Trained in testing procedures, troubleshooting, and documentation methods.
- Shuaiyan Kang (PostDoc, Duke University (US)): Mentoring in ITk strips module testing. Trained in testing procedures, troubleshooting, and documentation methods.

ASP Mentorship:

MENTORED AND WORKED WITH ASP ALUMNI REMOTELY

Jan. 2025 - Present

- Khadija Charef (PhD student, HASSAN II University): Mentorship in Geant4 Simulation and Career Development, providing guidance on simulation techniques, research methodologies, and professional growth in the field.

Contribution to conferences, schools, and workshops

ORAL COMMUNICATIONS

- P. Dendooven et al., *Position-Sensitive detectors for Gamma Ray Imaging*, NKS Seminar, Invited talk, Piperska Muren, Stockholm, 21-22 May 2025
- P. Dendooven et al., *Nuclear fuel imaging using position-sensitive detectors*, ESARDA2025 Symposium "2025 ESARDA Safeguards Symposium - 47th ESARDA Annual Meeting" at Antwerp, Belgium, May 12-16, 2025
- M. laassiri et al., *Performance of 8x8x32 mm³ position-sensitive CdZnTe detector array for nuclear imaging*, The National Society of Black Physicists Conference (NSBP2023), Knoxville, Tennessee, November 10, 2023
- M. laassiri et al., *3D Position-Sensitive Semiconductor Detectors for Nuclear Fuel Imaging*, The 3rd African Conference on Fundamental and Applied Physics (ACP2023), Nelson Mandela University, George Campus, South Africa, September 27, 2023
- M. laassiri et al., *Monte Carlo study of a 3D Position-Sensitive Semiconductor gamma-ray Detectors for Nuclear Fuel Imaging*, Seminar at the Uppsala University, January 20, 2023
- M. laassiri et al., *Ubuntu reactors- Modelling Nuclear Reactors w/ Geant4*, The second African Conference of Fundamental and Applied Physics (ACP2021), March 07, 2022
- M. laassiri et al., *ASP Online Seminars: Neutron/Gamma Identifications in Nuclear Reactors*, Online lecture, April 27, 2021
- M. laassiri et al., *Neutron Signals Nonnegative Tensor Blind Source Separation: Application to neutron/gamma discrimination*, NSBP2019, The National Society of Black Physicists Conference, Providence, Rhode Island November 16, 2019
- M. laassiri, E-M. Hamzaoui and R. Cherkaoui El Moursli, *Application of Nonnegative Tensor Factorization Algorithm for Neutron-Gamma Discrimination*, NPW2017, The XXIV Nuclear Physics Workshop, Kazimierz Dolny, September 21, 2017
- M. laassiri & al., *Emergency planning and response*, Joint ICTP-IAEA School on Nuclear Energy Management (NEM), the Abdus Salam International Center for Theoretical Physics (ICTP) Trieste, Italy, November 13, 2015

POSTER COMMUNICATIONS

- P. Dendooven et al., *Position-sensitive semiconductor detectors for nuclear fuel imaging*, iWoRiD2023 "24th International Workshop On Radiation Imaging Detectors" at Oslo Science Park, June 25-29, 2023
- M. laassiri et al., *Fission Chamber's Identification and Characterization Using Nonnegative Tensor Factorization Algorithms*, EFMMIN5 "The fifth edition of the Franco-Moroccan School of Measurement and Instrumentation Nuclear" at Mohammed V University-2018, October 9, 2018
- M. laassiri et al., *Neutron-Gamma Discrimination Based on Nonnegative Tensor Factorization Methods*, Spring2017, The 12th International Spring Seminar on Nuclear Physics "Current Problems and Prospects for Nuclear Structure" at Ischia, Italy-2017, May 18, 2017
- H. Arahmane et al., *Neutron-gamma discrimination using non-negative matrix factorization blind sources separation algorithms* ND2016, "International Conference on Nuclear Data and Technology Bruges" at Bruges Belgium-2016, September 13, 2016
- M. laassiri et al., *A Monte Carlo simulation of the fission chamber neutron-gamma discrimination using the NTF* ASP2016, "African School of Physics" at the University of Rwanda-2016, August 18, 2016
- M. laassiri et al., *A Preliminary Study on Fission Chamber Simulation for Neutron Gamma Discrimination using Geant4 and NTF*, EFMMIN4 "The fourth edition of the Franco-Moroccan School of Measurement and Instrumentation Nuclear" at Aix Marseille University-2016, July 20, 2016

Seminars and Colloquia

- M. laassiri et al., *3x3 array module of 8x8x32 mm³ position-sensitive virtual Frisch-grid CdZnTe detectors for imaging and spectroscopy of cosmic gamma-rays*, BNL, Instrumentation Division, Mar. 19, 2024
- M. laassiri et al., *Monte Carlo study of a 3D Position-Sensitive Semiconductor gamma-ray Detectors for Nuclear Fuel Imaging*, University of Illinois Urbana-Champaign Champaign, Department of Nuclear, Plasma, and Radiological Engineering, Jul. 27, 2023
- M. laassiri et al., *Monte Carlo study of a 3D Position-Sensitive Semiconductor gamma-ray Detectors for Nuclear Fuel Imaging*, BNL, Instrumentation Division, Mar. 22, 2023
- M. laassiri et al., *Monte Carlo (MC) modelling of a nuclear reactor core using the Geant4 framework*, Nuclear Reactors *Seminar*, Brookhaven National Laboratory (BNL), Nuclear Science and Technology Department, Bldg. 817, De. 18, 2019

Publication

- S. Saariokari et al., *Nuclear fuel imaging using position-sensitive detectors.*, JINST, 2025, <https://iopscience.iop.org/article/10.1088/1748-0221/20/03/C03012>
- A. E. Bolotnikov et al., *3x3 array module of 8x8x32 mm³ position-sensitive virtual Frisch-grid CdZnTe detectors for imaging and spectroscopy of cosmic gamma-rays.*, NIMA, 2024, <https://pdf.sciencedirectassets.com/271580>
- V. Rathor et al., *First experimental demonstration of the use of a novel planar segmented HPGe detector for gamma emission tomography of mockup fuel rods.*, Nuclear Technology, 2023, [Nuclear Technology, doi.org/10.1080/00295450.2023.2236882](https://doi.org/10.1080/00295450.2023.2236882)
- P. Dendooven et al., *Passive methods for spent fuel characterisation at the Finnish geological repository.*, Italian Physical Society, [10.1393/ncc/i2023-23047-4](https://doi.org/10.1393/ncc/i2023-23047-4)
- A.C. Cilliers, S.H. Connell, J. Conradie, M.N.H. Cook, M. laassiri, B.G. Maqabuka, R. Mudau, P. Naidoo and D. Nicholls, *Towards a Monte Carlo simulation of a pebble bed type high temperature gas cooled reactor using Geant4*, Annals of Nuclear Energy (2021), [ANE-108868](https://doi.org/10.1016/j.anucene.2021.108868)
- M. laassiri, E-M. Hamzaoui and R. Cherkaoui El Moursli, *Validation of the neutron and gamma fields in the Moroccan TRIGA Mark II reactor using Nonnegative Tensor Factorization approach: Comparison of performances of the Geant4/Garfield++ and pyFC interfaces*, Acta Phys. Pol. B Proc. Suppl., vol. 11 (2018), p. 73, [APhysPolBSupp.11.73](https://doi.org/10.1051/epjconf/201811073)
- M. laassiri, E-M. Hamzaoui and R. Cherkaoui El Moursli, *Nonnegative Tensor Factorization Approach Applied to Fission Chamber's Output Signals Blind Source Separation*, J. Phys. Conf. Ser., vol. 966 (2018), p. 012063, [IOP Conf. Series: Journal of Physics](https://doi.org/10.1088/1742-6596/966/1/012063)
- M. laassiri, E-M. Hamzaoui and R. Cherkaoui El Moursli, *Application of Nonnegative Tensor Factorization for neutron-gamma discrimination of Monte Carlo simulated fission chamber's output signals*, Results Phys., vol. 7 (2017), p. 1422-1426, [rinp-2017](https://doi.org/10.1016/j.rinp.2017.04.011)

Memberships

2025- Present	Member of , Moroccan Association of Physics
2022- Present	Member of , American Physical Society
2022- Present	Member of , BNL, Early Career Resource Group (ECRG)
2021- Present	Member of , Women in Nuclear Morocco
2021- Present	Member of , Women in Nuclear Global (WIN Global) association
2020- Present	Member of , African Association of Physics Students
2019- Present	Member of , National Society of Black Physicists (NSBP)
2014- 2019	Member of , Science Team of Matter and Radiation (ESMaR), Mohammed V University

Computer skills

- **Computer Skills** \LaTeX (and Overleaf), Office Suite
- **Programming Language** C/C ++, Java/JEE, Mathematica, Maple, Matlab, Python XML
- **Software** LabVIEW, Hybrid burnin and module thermal cycling (coldjig), ITk Strips DAQ (ITSDAQ)
- **OS** Windows (XP, 200X, Vista, 10), Linux (Ubuntu, Debian, Scientific linux)
- **Particle Transport Simulation** Geant4, Garfield++, MCNP5
- **Data Analysis** ROOT, Matlab, IDL
- **Blind Source Separation Algorithms** ICALab, NMFLab, NTFLab

Outreach and Extracurricular

I believe scientific fields should be accessible to young people, regardless of their background. Through my involvement in initiatives like ASP, ASFAF, APN, ArPS, and FIP, I am committed to mentoring the next generation of African and Arab physicists while contributing to physics education and research for Africa's development.

ORGANISATIONS I HAVE COLLABORATED WITH

Jan. 2025 - Present	Member-at-Large , American Physical Society (APS) Forum on International Physics (FIP)
Oct. 2024 - Present	Trustee of the Friends of the ASP (FASP) , African School on Fundamental Physics and Applications (ASP)
Sep. 2024 - Present	Member of the Governing Council (GC) , Arab Physical Society (ArPS)
Mar. 2023 - Present	Senior editor , African Physics Newsletter (APN), American Physical Society
Jan. 2023 - Present	Member of the International Organizing Committee (IOC) and Board of Trustees (BoT) of the Friends , African School on Fundamental Physics and Applications (ASP)
Apr. 2020 - Present	Co-convenor , Young Physicists Forum (YPF) at the African Strategy for Fundamental and Applied Physics (ASFAP)

SCIENTIFIC AND SOCIETAL CONTRIBUTIONS

ORGANISATION OF CONFERENCES, WORKSHOPS ...

Apr. 9-11, 2025	The Inaugural Workshop of Exploring the Frontiers of Nuclear, Particle, and Astrophysics , TIGER	Texas, USA
Sep. 14-20, 2025	The 4th African Conference on Fundamental and Applied Physics , ACP2025	UL, Togo
Mar. 7, 2024	US-ATLAS Workshop , Extend physics outreach efforts to MSIs	Baltimore, USA
Jul. 7-21, 2024	The 8th Biennial African School of Fundamental Physics and Applications , ASP2024	UCA, Morocco
Sep. 25-29, 2023	The 3rd African Conference on Fundamental and Applied Physics , ACP2023	NMU, South Africa
Jun. 8, 15, 22, 19, 2022	ASFAP , YPF Physics Working Group Introductions Series	Virtual event
Jan. 26, 202	ASFAP , Young African Physicists' Workshop—Challenges and opportunities	Virtual event
SCIENCE OUTREACH		
Sep. 29, 2023	Early Career African Physicists , ASK An ASP (Alumni)	NMU, South Africa
Sep. 25, 2023	Early Career Panel Discussion , Beauty of Physics	NMU, South Africa

PUBLICATION

- M. Laassiri et al., *ASFAP Working Group Summary of Societal Engagements*, arXiv:2205.11362, physics.soc-ph, [arXiv:2205.11362](https://arxiv.org/abs/2205.11362)
- B. Mulilo, M. Laassiri and D. Boye, *Young Physicists Forum and the Importance for Education and Capacity Development for Africa*, physics.soc-ph, [arXiv:2206.15171](https://arxiv.org/abs/2206.15171)
- M. Laassiri, *I didn't know a physicist could look like you!*, [hipblog:april 2023](https://hipblog.org/april-2023/)

EXAMPLES OF INVITED TALKS:

- M. Laassiri et al., *Young Physicists Forum*, The African Strategy for Fundamental and Applied Physics (ASFAP)—towards the final report, Gairo, Egypt, Dec. 15-17, 2024, [Young Physicists Forum](https://www.youngphysicistsforum.org/)
- M. Laassiri et al., *The African School of Physics*, EuPRAXIA_PP Annual Meeting 2024, Elba, Italy, Sep. 27, 2024, [ASFAP: Training and young researcher education](https://www.asfap.org/)
- M. Laassiri et al., *An overview of the African School of Physics*, The 3rd African Conference on Fundamental and Applied Physics (ACP2023), Nelson Mandela University, George Campus, South Africa, Sep. 27, 2023, [The African School of Physics, 2023](https://www.asfap.org/)
- M. Laassiri et al., *The African School of Fundamental Physics and Applications (ASP)*, Workshop on Exploring Collaboration with MSIs in Nuclear and Particle Physics, Brookhaven National Laboratory, Upton, New York, Jul. 19, 2023, [The African School of Physics at BNL, 2023](https://www.asfap.org/)
- M. Laassiri, *Young African in Nuclear Physics*, WDTS-RENEW BNL/Fermi Lab Exchange Summer School, Brookhaven National Laboratory, Upton, New York, Jul. 21, 2023,
- M. Laassiri, *Young African in Nuclear Physics*, APS Virtual March Meeting 2023. Open SESAME: Waves of Success and Recognition Connecting Women Scientists Beyond Skepticism-Beyond Borders, Mar. 21, 2023, [Young African in Nuclear Physics, 2023](https://www.asfap.org/)
- M. Laassiri, *The Perspectives of the Young Physicists Forum of the African Strategy for Fundamental and Applied Physics (ASFAP)*, APS March Meeting 2023. Session Q50: International Perspective for Young Physicists from Particle to Materials, Mar. 8, 2023, [The Perspectives of YPF, 2023](https://www.asfap.org/)
- M. Laassiri et al., *The African School of Physics*, The 7th edition of the biennial African School of Fundamental Physics and Applications (ASP2022), Dec. 3, 2022, [The African School of Physics, 2022](https://www.asfap.org/)
- M. Laassiri et al., *ASFAP Working Group Summary of Societal Engagements*, The 2nd African Conference of Fundamental and Applied Physics (ACP2021), Mar. 11, 2022, [ASFAP WG Summary of Societal Engagements, 2022](https://www.asfap.org/)
- M. Laassiri et al., *Pan-African Physics Roadmap Definition— Societal Engagements*, Joint Conference: African Light Source, Pan African Conference on Crystallography, and African Physical Society, Nov. 16, 2021, [ASFAP— Societal Engagements, 2021](https://www.asfap.org/)
- M. Laassiri et al., *African Young Physicists Forum*, The 6th Biennial African School of Physics (ASP2021), Jul. 23, 2021 [African YPF, 2021](https://www.asfap.org/)
- M. Laassiri et al., *The African School of Fundamental Physics and Applications (ASP)*, DPF2019, The American Physical Society Division of Particles & Fields (DPF) Meeting, Boston, Jul. 30, 2019 [ASP at DPF2019, 2019](https://www.asfap.org/)