Foutse Momo

Associate Professor of Physics

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Physicist working with engineering colleagues on **affordable medical devices for African hospitals**, from mathematical model to working prototype. Member of BEEMo.Lab (Biomedical Engineering, Energy & Modeling Laboratory), Faculty of Science and Technology. Over 20 years of university teaching and programme leadership, and supervisor of 24 Master's theses, most of them built around a working device. Research published in Elsevier and Springer journals such as *Measurement*, *Biomedical Signal Processing and Control* and *Journal of Neonatal Nursing*.

Key figures **24** Master's theses supervised **7** device prototypes **5** programmes coordinated **20+** years of teaching

Research Low-cost biomedical instrumentation, hospital radiation protection, bioimpedance and biosignals, nonlinear dynamics of lasers and electronic circuits, hospital engineering.

Academic Positions

2021 – now **Associate Professor (Maître de Conférences)**, *Université des Montagnes*, Bangangté

- Coordinator of the distance-learning Master's in Quality Control, Regulatory Affairs and Biomedical Engineering, run with the AUF, and of the Master's in Biomedical Engineering, Instrumentation track (2024–2025)
- Academic Secretary (since 2023) and Administrative Officer (2022–2023), Faculty of Science and Technology
- Member of the Pedagogical Commission and of the Ethics & Quality Assurance Committee

2016 – 2021 **Senior Lecturer (Chargé de Cours)**, *Université des Montagnes*

Coordinator of the Biomedical Instrumentation and Maintenance programme (2018–2020) and of practical laboratory work for the Faculty (2016–2020).

2008 – 2016 **Assistant Lecturer**, *Université des Montagnes*

Interim coordinator of the Master's in Biomedical Engineering and in Computer Engineering & Systems (2014–2016).

2004 – 2008 **Teaching Assistant, Part-time Lecturer**, *University of Yaoundé I; Université des Montagnes*

Education

2016 **Ph.D. in Physics**, *University of Dschang*, Cameroon, *Très Honorable*

Thesis: *Contribution to the study of the dynamical behavior of edge-emitting semiconductor laser: analytical, numerical and analog simulation approach.* Supervisors: Prof. Paul Woafo and the late Dr. Lisette Meffo Poinkan.

2005 **DEA (M.Phil.) in Physics, Atoms & Radiation**, *University of Yaoundé I*

2002 **Licence and Maîtrise in Physics**, *University of Yaoundé I*

Research and Innovation

Neonatal incubators Energy-efficient incubators with phototherapy, remote monitoring and heart-rate control, designed for hospitals with unstable power; initial social-impact study in Cameroonian hospitals [8], [9], [10].

Dental care Low-cost mobile dental unit for underserved areas, from concept to operation [6].

Phonocardiography	Telemedicine phonocardiograph, with the University of Dhaka (Bangladesh), and synthetic heart-sound generation [3], [7].
Bioimpedance	Low-cost spectroscopy system with improved low-frequency accuracy [11].
Agriculture	Energy-efficient 600-egg incubator for poultry farmers, 87% hatching rate [5].
Laboratory	Digital microscope prototype for low-income countries (2023).
Nonlinear dynamics	Electronic circuits mimicking semiconductor lasers [12], [13], [14]; memristive circuits and chaos control in motors [1], [2], [4].

Supervision

Master's **24 theses** (2017–2024), Université des Montagnes and University of Ngaoundéré. Two supervised students co-authored journal papers [6], [10]. Selected topics:

- Hospital engineering: operating theatre, haemodialysis centre, sterilization service (2024)
- Oxygen saturation, heart and respiratory rate from the PPG signal (2022)
- Quality control, dose and image quality in diagnostic radiography (2019)
- Dental unit; neonatal incubator with phototherapy (2017)

Teaching

Physics	Optics, mechanics, thermodynamics, electromagnetism, materials science, atomic and nuclear physics, waves and radiation (Bachelor and Master 1).
Biomedical	Radiation protection and radiotherapy, biophysics, biomechanics, embedded systems.

Professional Activities

Societies	Cameroon Physical Society; Cameroon Bioscience Society; Cameroonian Society for Radiation Protection.
Training	IAEA seminar on radiological quality control, project RAF6048 (2017); OHCEA One Health workshops on course design and scientific writing (2017–2019).
Languages	French (fluent), English (good).
References	Available on request.

Publications

Peer-reviewed articles and book chapter, most recent first. **F. Momo** in bold; underlined: supervised Master's student.

[1] I. K. Ngongiah, R. Tsapla Fotsa, J. Mvogo Ngono, N. Nyang Kibanya, E. Godwe, **F. Momo**. Chaos annihilation based on genetic algorithms in a non-smooth air-gap permanent magnet synchronous motor embedded in the microcontroller. *ADBA Computer Science*, 2(2):30–35, 2025. doi:10.69882/adba.cs.2025071

[2] R. Tsapla Fotsa, P. K. Koubeu Papemsi, G. P. Ayemtsa Kuete, J. R. Mboupda Pone, S. R. Dzonde Naoussi, **F. Momo**, P. Ele. Permanent magnet synchronous motor with load torque: dynamics, circuitry execution and control. *Chaos and Fractals*, 2(1):14–19, 2025. doi:10.69882/adba.chf.2025013

[3] Y. Mohamadou, P. Tiam Kapen, **F. Momo**, A. L. Kamga Kamga, O. Docna, M. Mohammad, M. Ahmad, K. Siddique-e Rabbani. Design and development of a phonocardiograph for telemedicine applications. *Health and Technology*, 12(2):453–463, 2022. doi:10.1007/s12553-022-00646-x

[4] J. R. Mboupda Pone, **F. Momo**, G. H. Kom, I. O. Lowe Kombou, S. Takougang Kingni, A. Tiedeu. Extreme multistability, hidden chaotic attractors and amplitude controls in an absolute memristor Van der Pol–Duffing circuit. In C. Volos, V.-T. Pham (eds.), *Mem-elements for Neuromorphic Circuits with Artificial Intelligence Applications*, ch. 8, pp. 165–180. Academic Press, 2021. doi:10.1016/B978-0-12-821184-7.00016-5

[5] P. Tiam Kapen, Y. Mohamadou, **F. Momo**, H. Manfouo, F. O. Njotchui Mbakop. Design and prototyping of a low-cost, energy efficient eggs incubator in developing countries: a case study of Cameroon. *Scientific African*, 10:e00618, 2020. doi:10.1016/j.sciaf.2020.e00618

[6] **F. Momo**, Y. Mohamadou, P. Tiam Kapen, S. Chapi Tchounang. Low-cost mobile dental unit for oral care service delivery in third-world countries: from concept to operation. *Health and Technology*, 2020. doi:10.1007/s12553-020-00477-8

[7] P. Tiam Kapen, Y. Mohamadou, S. U. Kouam Kouam, **F. Momo**, A. R. Tchamda, G. Tchuen. Phonocardiogram: a robust algorithm for generating synthetic signals and comparison with real life ones. *Biomedical Signal Processing and Control*, 60:101983, 2020. doi:10.1016/j.bspc.2020.101983

[8] P. Tiam Kapen, Y. Mohamadou, **F. Momo**, J. Dongmeza Koudjou, F. de P. Mkankam Kamga. A multi-function neonatal incubator for low-income countries: implementation and ab initio social impact. *Medical Engineering & Physics*, 2020. PMID:31937436

[9] P. Tiam Kapen, Y. Mohamadou, **F. Momo**, J. Dongmeza Koudjou, N. Kanmagne, J. Dongmeza Dongmo. Development of a neonatal incubator with phototherapy, biometric fingerprint reader, remote monitoring, and heart rate control adapted for developing countries hospitals. *Journal of Neonatal Nursing*, 25(6):298–303, 2019. doi:10.1016/j.jnn.2019.07.011

[10] P. Tiam Kapen, Y. Mohamadou, **F. Momo**, J. Dongmeza Koudjou, A. Gnimpikba. An energy efficient neonatal incubator: mathematical modeling and prototyping. *Health and Technology*, 2018. doi:10.1007/s12553-018-0253-3

[11] Y. Mohamadou, **F. Momo**, L. Théophile, C. Njike Kouekeu Landry, T. Fabrice, E. Simeu. Accuracy enhancement in low frequency gain and phase detector (AD8302) based bioimpedance spectroscopy system. *Measurement*, 123:304–308, 2018. doi:10.1016/j.measurement.2018.03.079

[12] **F. Momo**, P. Woafo. Behavior of a new electronic circuit mimicking the edge-emitting semiconductor laser. *Optik*, 127:3430–3434, 2016.

[13] **F. Momo**, P. Woafo. Edge-emitting semiconductor laser subject to nonsinusoidal excitation from three-dimensional autonomous system: numerical and electronic models analysis. *Optical and Quantum Electronics*, 2015. doi:10.1007/s11082-015-0216-0

[14] **F. Momo**, S. T. Kingni, B. Nana, P. Woafo. Edge-emitting semiconductor laser driven by a van der Pol oscillator: analytical and numerical analysis. *Optical and Quantum Electronics*, 47:705–720, 2014.

Selected Conference Presentations

2023 **30th Annual Bioscience Conference**, Bangangté. *Prototyping of a digital microscope adapted for low-income countries.*

2020 **Cameroon Academy of Sciences, Week of Science**, Yaoundé. *Medical instrumentation research and innovation in Cameroon.*

2013, 2015 **3rd and 4th Int. Conferences of the Cameroon Physical Society**. Two papers on the nonlinear dynamics of edge-emitting semiconductor lasers (proceedings).