

NAME: Diop, Idy

POSITION TITLE: Associate Professor, Cheikh Anta Diop University of Dakar

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Demba DIOP School, Mbour, Senegal	Bachelor's	2000	Mathematics and Physical Sciences
University Gaston Berger, Saint-Louis, Senegal	Engineer	2006	Electronic and Telecoms
Ecole Polytechnique Supérieure, Cheikh Anta DIOP University, Dakar, Senegal	Master's	2007	IT, Modeling and Systems Simulation
Ecole Polytechnique Supérieure, Cheikh Anta DIOP University, Dakar, Senegal	Ph.D.	2011	Complex Physics (Corrector Code and Image Processing)
Ecole Polytechnique Supérieure, Cheikh Anta DIOP University, Dakar, Senegal	Ph.D.	2015	IT and Telecommunications (Correctors Codes and Applications Security)

A. Personal Statement

I am an active member of the Laboratory of Medical Imaging and Bioinformatics (LIMB) at the University Cheikh Anta DIOP (CADU) of Dakar, and of a group of Ecole Polytechnique Supérieure (ESP) laboratories aimed at boosting research at a national level. I oversee the ESP Master's Research Program and visiting stays in Computer Science, Simulation, and Complex Modeling Systems, and co / supervise Engineering theses.

I collaborate with the CAEN/France research groups in Computer Science, Image and Instrumentation, in particular the Monetic and Biometrics team at National School of Engineers of Caen /France – ENSICAEN (www.ensicaen.fr). At the national level, I participate in the development of CNRIA (an international conference on computer research and its applications, Ex National Colloquium on Computer Science Research).

I am a co-PI in TAFTRI Research Project 2, Tuberculosis remains a public health problem in Senegal. The transmission of the disease is still intense and the prevalence high. The incidence rate of microscopy positive tuberculosis was estimated at 110/100 000 inhabitants (WHO Report 2006, Global Tuberculosis Control). The HIV / AIDS epidemic and poverty are aggravating factors in the resurgence of this disease.

This TAFTRI Surgical Planning Research Project for the treatment of tuberculosis will allow us to contribute to the resolution of this public health problem. It will be a question for us of making available to this project all our skills not only he is an engineer but also a researcher in medical imaging to support physicians in the management of tuberculosis. It is also an opportunity to participate in the development and promotion of the 3 D Slicier tool in our African countries.

B. Positions and Honors

Positions and Employment

2013-2014	Head of Diploma of Technology in Telecommunications and Networking (DST TR 1), Ecole Polytechnique Supérieure / the Cheikh Anta DIOP University of Dakar, Senegal
2013-2016	Assistant Lecturer, Ecole Polytechnique Supérieure / the Cheikh Anta DIOP University of Dakar, Senegal
2014-2015	Head of University Diploma of Technology in Telecommunication and Networking (DUT TR), Ecole Polytechnique Supérieure / the Cheikh Anta DIOP University of Dakar, Senegal
2015-2016	Head of Diploma of Design Engineer in computer science (DIC TR), Ecole Polytechnique Supérieure / the Cheikh Anta Diop University of Dakar, Senegal
2016-present	Associate Professor, Ecole Polytechnique Supérieure / the Cheikh Anta DIOP University of Dakar, Senegal
2016-present	Head of Diploma of Design Engineer in Telecommunications and Networking (DIC TR), Ecole Polytechnique Supérieure / the Cheikh Anta DIOP University of Dakar, Senegal
2018-2019	Deputy Educational Manager for Master 2 Security training (management of information systems and technical of information systems security)
2018-2019	Head of Cyber Security Center (management of the implementation and coordination of activities), Ecole Polytechnique Supérieure / the Cheikh Anta DIOP University of Dakar, Senegal

Other Experience and Professional Memberships

2013-2020	Member, Senegalese association of Computer Science Researchers
2013,2015, 2017, 2019	Program Committee, CNRIA
2017	Local Organizing Committee, CNRIA
2018-present	Associated Researcher, Computer Science, image and instrumentation of Caen, in particular the Monetic and Biometrics team at ENSICAEN / CAEN, France

C. Contributions to Science

Since obtaining my Master's degree in 2007, my research has focused on two major themes: a) biomedical / bioinformatic diagnostic aid systems (EEG signal processing, image processing) and b) error correcting codes and applications (digital communication, security and image processing).

The challenges of signal processing, medical imaging and the protection of patient information are multiple in the context of biomedical / bioinformatic diagnostic aid systems, requiring the need to develop tools capable of providing quantitative information on the signals and images recorded in patients. Signal and image processing methods provide a substantial complement to visual analysis by providing quantified information. They can also provide information on certain properties that cannot be accessed from visual analysis. This course of research aims to develop a decision support platform for biomedical analysis, diagnosis and interpretation; my work specifically targets signal and image processing tools applied to epilepsy and breast cancer. This platform relies heavily on tools for processing medical signals and images, the realization of which will allow doctors to improve analysis, diagnosis, and confidentiality of data and better advise their patients in terms of treatment. This research should lead to more personalized, more adapted and / or more intelligent care in many areas of health. The aim is to improve knowledge and decision support by strengthening the integration of information and the development of modular and integrated digital processing tools.

In the early 1990s, the JPEG standard for still images appeared. The JPEG exhibits poor image quality obtained at very low bit rates, as well as a lack of flexibility and functionality- testament to its inability to meet all the requirements of contemporary applications. It is also unusable for metadata which is constantly growing today. With the appearance of intelligent algorithms, based on the discrete wavelet transform, a new JPEG 2000 standard has been launched to ensure compression at very low bit rates, to make the transmission quality of images progressive, to compress data under 32 bits. I am interested in the problem of the secure transmission of multimedia data: the proposal of an image watermarking scheme, of steganography based on codes such as Reed SOLMON codes, LDPC codes, polar codes-- through the use of error correcting codes (LDPC, polar codes, etc.).

1. Biomedical signal and image processing/ Bioinformatics

- a. Ousmane KHOUMA **Idy DIOP** Papa A.FALL Mamadou L.NDIAYE Sidi M.FARSSI Abdou M.OUSSAMATOU BirahimeDIOUF., "Novel Classification Method of Spikes Morphology in EEG Signal Using Machine Learning," *Procedia Comput. Sci.*, vol. 148, pp. 70–79, Jan. 2019. DOI: 10.1016/j.procs.2019.01.010. <https://www.sciencedirect.com/science/article/pii/S1877050919300109>. Base(s) d'indexation, Scopus
- b. Ilyass H.; Mohamed F.S.; **Diop I.**; Tarik, J. « Ontology-based mammography annotation for breast cancer diagnosis » *Web Applications and Networking (WSWAN)*, 2015 2nd World Symposium on Year: 2015, Pages: 1 - 6, DOI: 10.1109/WSWAN.2015.7210316. IEEE Conference Publications.

2. Security / image processing/ electronics

- c. François Kasséné Gomis, Thierry Bouwmans, Mamadou Samba Camara, **Idy Diop** | Estimation of the Hidden Message Length in Steganography: A Deep Learning Approach | edited by S. Boumerdassi, É. Renault et P. Mühlethaler | 2020 | Springer International Publishing, | ISBN 978-3-030-45778-5 | p. 333–341.
- d. GOMIS, F. K., M. S. CAMARA **et I. DIOP**. | Feature reduction algorithm for universal steganalysis», in *Innovation in Information Systems and Technologies to Support Learning Research*, edited by M. Serrhini, C. Silva et S. Aljahdali | 2020 | Springer International Publishing, Cham | ISBN 978-3-030-36778-7, p. 451–457.

For more information about my work :

https://scholar.google.com/citations?user=q0GhV_oAAAAJ&hl=fr

<https://orcid.org/0000-0002-9143-196X>

D. Additional Information: Research Support and/or Scholastic Performance

- Co-supervisor of two winning student groups, Innovation in Laboratory Engineered Accelerated Diagnostics (ILEAD) Scholarship. The Institute for Health Research, Epidemiological Surveillance and Training (IRESSEF) has set up a program to offer young scientists the opportunity to develop and implement their iLEAD preprojects. (<http://www.esp.sn/?p=5589>). September 2020