LORENA LEON

Postdoctoral researcher at CREATIS

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RESEARCH INTERESTS

- Statistical Signal and Image Processing
- Inverse problems
- Bayesian Methods
- Multifractal Modeling and Analysis
- Machine Learning
- Multivariate Signal and Image Analysis
- Remote Sensing
- Biomedical Applications

EDUCATION

Ph.D. in Computer Science: Signal and Image processing **2019 - 2022**

IRIT Laboratory, National Polytechnic Institute of Toulouse *Toulouse, France*

Thesis: Bayesian Estimation of the Parameters of the Joint Multifractal Spectrum of Signals and Images

Advisors: J-Y. Tourneret and H. Wendt

Defense on 13/12/2022

M.Sc. in Applied Mathematics: Numerical Analysis **2016 - 2019**

Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*

Thesis: Classification of Mass Malignancy in Digital Mammography through Multifractal Analysis

Advisor: A.M. León Mecías

B.Sc. in Mathematics **2012 - 2016**

Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*

Thesis: A Probabilistic Model for Mobile Robot Self-localization

Advisor: Y. Almeida Cruz

SCIENTIFIC PUBLICATIONS

Google Scholar and ORCID profiles.

International Journals:

1. *L. Leon, H. Wendt, J. -Y. Tourneret and P. Abry, "A Bayesian Framework for Multivariate Multifractal Analysis," IEEE Transactions on Signal Processing, vol. 70, pp. 3663-3675, 2022*

International Conferences with Selection Panels:

3. *H. Wendt, L. Leon, J.-Y. Tourneret and P. Abry, "Multifractal Anomaly Detection in Images via Space-Scale Surrogates," IEEE International Conference on Image Processing (ICIP), Bordeaux, France, Oct. 2022*

2. *L. Leon, H. Wendt, J.-Y. Tourneret and P. Abry, "A Comparison of Bayesian Estimators for the Parameters of the Bivariate Multifractal Spectrum," European Signal Processing Conference (EUSIPCO), Belgrade, Serbia, Aug. 2022.*

1. *L. Leon, H. Wendt, J.-Y. Tourneret and P. Abry, "Bayesian Estimation for the Parameters of the Bivariate Multifractal Spectrum," European Signal Processing Conference (EUSIPCO), Dublin, Ireland, Aug. 2021.*

National Conferences with Selection Panels:

1. *L. Leon, H. Wendt, J.-Y. Tourneret, P. Abry, "Estimation du paramètre de multifractalité : régression linéaire, maximum de vraisemblance ou inférence Bayésienne ?," GRETSI Symposium Signal and Image Processing, Nancy, France, Sept. 2022.*

ACHIEVEMENTS AND AWARDS

CARMIN-IHP-CIMPA Fellowship **Jan. 7th - Apr. 5th, 2019**

of "The mathematics of imaging" research program *Paris, France*

The scientific program is available here

ACADEMIC APPOINTMENTS

Postdoctoral researcher   **Mar. 2023 - present**
CREATIS Laboratory at Université Claude Bernard Lyon 1   *Lyon, France*
Data science for Quantitative Acoustic Microscopy
Advisor: A. Basarab

Instructor   **2016 - 2019**
University of Havana   *Havana, Cuba*
- *Mathematical Analysis. Bachelor in Computer Science (1st year)*
- *Differential Equations. Bachelor in Chemistry (2nd year)*
- *Linear Algebra. Bachelor in Chemistry (2nd year)*

Undergraduate Teaching Assistant   **2014 - 2016**
Faculty of Mathematics and Computer Science, University of Havana   *Havana, Cuba*
- *Differential Equations. Bachelor in Chemistry (2nd year)*
- *Linear Algebra. Bachelor in Chemistry (2nd year)*
- *Calculus. Bachelor in Chemistry (1st year)*

TEACHING QUALIFICATIONS

Instructor Certification   **Jan., 2019**
Faculty of Mathematics and Computer Science, University of Havana   *Havana, Cuba*

Following a two years training for University Instructors (Sept. 2016- Jun. 2018), consisting of module courses once a week and supervised classes, a demonstration class is to be presented in front of a board of examiners. The Certification is conferred by the University President.

TALKS AND SEMINARS

MLSP seminar at ENS Lyon   **May 2nd, 2023**
Talk: "A Bayesian Approach for Multivariate Multifractal Analysis"   *Lyon, France*

ULTIM seminar at CREATIS laboratory   **Apr. 7th, 2023**
Talk: "Multivariate Multifractal Analysis: A Bayesian Approach and Applications"   *Lyon, France*

AI Tasting seminar at TorusAI company   **Jan. 26th, 2023**
Talk: "A Bayesian Framework for Multivariate Multifractal Analysis of Signals and Images"   *Toulouse, France*

SIMUL seminar at CRAN laboratory   **Nov. 17th, 2022**
Talk: "Bayesian Multivariate Multifractal Analysis with Application to Drowsiness Detection"   *Nancy, France*

4th Statistical Learning for Signal and Image Processing (SLSIP) Workshop   **Oct. 11th, 2022**
Talk: "Multifractal Anomaly Detection in Images Via Space-Scale Surrogates"   *Cadaqués, Spain*

GdR Analyse Multifractale et Autosimilarité Workshop   **Sept. 28th, 2021**
Talk: "A Bayesian Framework for Bivariate Multifractal Analysis"   *Porquerolles, France*

Scientific Student Conference   **Apr., 2015**
Talk: "Leslie Matrix: population growth"   *Havana, Cuba*
(Joint work with Beatriz Montero)

RESEARCH SCHOOLS ATTENDED

InnEO Summer school   **Jul. 19th - 24th, 2021**
R&D Institute of Transylvania University   *Brasov, Romania*
Subjects include: *Machine Learning, Deep Learning and Earth Observation Applications. Practical sessions in Python and MATLAB. Open Science and Soft Skills development.*

Research school: Mathematics, Signal Processing and Learning   **Jan. 25th - 29th, 2021**
Centre International de Rencontres Mathématiques (CIRM)   *Marseille, France*
Subjects include: *Machine Learning, Signal Processing, Optimization, Reinforcement Learning, One Signal Processing View on Deep Learning. Practical sessions in Python.*

Winter School: The mathematics of Imaging   **Jan. 7th - 11th, 2019**
Centre International de Rencontres Mathématiques (CIRM)   *Marseille, France*
Subjects include: *Variational Methods and Convex Relaxation for Computer Vision, Practical Machine Learning for Imaging in Neuroscience, Sparsity in Imaging, Bayesian Methods in Imaging.*

II Winter School in Computer Science: CSHab2018 Jan. 29th - Feb. 2nd, **2018**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*
Subjects include: *Languages for Concurrency, Representation and Kernel Learning, Perspectives on Real-time Scheduling in the Wuthering Landscape of Parallel Computing.*

Winter School: Mathematics and Physics meet Feb. 26th - Mar. 3rd, **2017**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*
Subjects include: *Tools for Signal Analysis and Quantum Physics, Semigroups and Spectral Theory.*

POSITIONS OF RESPONSIBILITY

Chair of Mathematics admission exams board **Jul. 2018**
University of Havana *Havana, Cuba*

Class representative **2013-2016**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*

MENTORING

Undergraduate teaching assistants **2018 - 2019**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*
Students: Marcos A. Valdivié Rodríguez, Javier A. Valdes, Rolando M. Bruno Alfonso
Curse: Mathematical Analysis

UNDERGRADUATE THESIS COMMITTEE

Jury member **Jun. 2019**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*
- *Thesis: "Aprendizaje automático para la detección de calcificaciones en imágenes de mamografía digital"*
  Manuel Millares Alvarez (Computer Science)
- *Thesis: "Automatic segmentation of diabetic foot ulcers and its internal tissues using supervised learning"*
  Armando Heras Tang (Computer Science)

Opponent and jury member **Jun. 2018**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*
- *Thesis: "Análisis Factorial y Factorizaciones no Negativas de Matrices en Lingüística de Corpus"*
  Royland Díaz Olivera (Computer Science)

Jury member **Jun. 2018**
Faculty of Mathematics and Computer Science, University of Havana *Havana, Cuba*
- *Thesis: "Desarrollo de un algoritmo eficiente de codificación fractal para la detección de masas en mamografías digitales."*
  Mariella Lorenzo Suarez (Computer Science)
- *Thesis: "Eliminación de zonas especulares en imágenes de colposcopía utilizando Factorizaciones Matriciales No-negativas"*
  Danilo Gómez Gómez (Computer Science)

SCIENTIFIC MEMBERSHIPS

Cuban Society of Mathematics and Computer Science **2017-2019**

COMPUTATIONAL SKILLS

Matlab, Python, LaTeX, Windows, Linux, Git, Word, Excel, Powerpoint

LANGUAGES

 Spanish: Native **English**: Full professional proficiency **French**: Limited working proficiency

Volunteering

Volunteer **Jun. - Nov., 2021**
Refuge ATPA - SPA de Toulouse *Toulouse, France*
Animal Welfare