Name **:** Ahmed

Family name **:** BEN HAMIDA

Birth Date **:** 11th July 1963, Sfax, (Tunisia)

Nationality **:** Tunisian & Canadien

Address **:** Ecole Nationale d'Ingénieurs de Sfax
Dept. G.E, (ENIS), B.P. 1173, 3038, Sfax Tunisia

Email **:** ahmed.benhamida@enis.tn
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Tel **: Office** +216-74274088 ext.238, ***Fax:*** +216-74275595

Profession **: *Full* Professor, since 2008,** http://www.lab-atms.com/members/full_professor.php
ENIS (Ecole Nationale Ingénieurs Sfax '*National School of Engineering*'),
ENIS, University of Sfax, Tunisia *http://www.enis.rnu.tn*
***Founder* & Director of ATMS Research Laboratory,**
Advanced Technologies Medcine & Signals,
ATMS-ENIS, University of Sfax, Tunisia *http://www.lab-atms.com*
***Founder* & *President* of Theses (Doctorate) Commission TSI**
Technology Signal & Image , TSI at ENIS, University of Sfax, Tunisia
http://www.enis.rnu.tn/fra/pages/254/Formation-Pédagogique?ml1=274

***Specialty* & *Skills* :** Signal, Speech, Image Processing, DSP & Algorithms…
Medical applications & CAD Algorithms, ***Expert in Medical Technologies***

H-index :* 19** ***IEEE Senior Member since 2012

DIPLÔMES	**SPECIALITE**	**QUALIFICATION**	**DATE**
Baccalaureate ***Secondary Education***	Math & Science	Good	June 1982
D.E.U.G General University Diploma	Math & Physique	Good	June 1984
Engineer (Principal) (Six university years) Long course	Electrical Engineering & Instrumentation	Good	June 1988
A.E.A (ENIT) First Master Degree University of Tunis	A.S.T.N Telecommunications	Very good	September 1992
D.E.A (ENIT) Second Master Degree University of Tunis	A.S.T.N Telecommunications	Very Honorable With Jury felicitation	March 1993
DOCTORATE (As PhD) ENIS University of Sfax	Electronics (Speech Processing and Medical Technologies)	Very honorable With Jury felicitation	December 1998
HABILITATION Post Doctorate Degree ENIS University of Sfax	Electronics (Speech Processing and Medical Technologies)	Very honorable With Jury felicitation	May 2003

Doctorate : Thesis equivalent to PhD, defended in 1998

Study and Implementation of Speech Processing Algorithms Dedicated to Electrical Stimulation by Cochlear Prosthesis

Post Doctoral Qualification: University Habilitation, in 2003

Progress in courses & research involving projects & supervised Thesis

Application after Doctorate involving: Projects, defended supervised Theses, Courses…

Advanced Signal Processing and Medical Electronics Applied to Disability aided tools

ENIS University of Sfax, Tunisia & University of Sherbrooke CANADA

High Lights, CURSUS by Year …

- **1989** : **Principal Engineer** at Tunisia-Cables (January)
  Quality control, Establishment of the ISO 9000 standard, Research and development …
- **1991** : **University Assistant : (following Master, progress in coures & doctorate research…)**
  Electrical Engineering Department at ENIS, University of Sfax, Tunisia
  Teaching & research: Signal Processing, Statistical Probability, Electronics …
- **1999 : Associate Professor : (following Doctorate Degree…)**
  Electrical Engineering Department at ENIS, University of Sfax, Tunisia
  Teaching & research: Signal Processing, Statistical Probability, Electronics …
- **2003 : Professor : following Post Doctoral Qualification (University Habilitation)**
  Electrical Engineering Department at ENIS, University of Sfax, Tunisia
  Teaching & research: Signal Processing, Statistical Probability, Speech, Image …
- **2008** : **Full Professor : following defended supervised thesis and financed projects…**
  Electrical Engineering Department at ENIS, University of Sfax, Tunisia
  Teaching & research: Signal Processing, Statistical Probability, Speech, Image …
  Founder & Head of ATMS Laboratory (Director) at ENIS.
  Advanced Technologies for Medicine & Signals, with a staff of 80 members …
- **2010** : **Hiring Commission of Associate Professors, Ministry of Higher Education, Tunisia.**
- **2012** : **Expert in Medical Technologies, Project Coordinators …**
- **2014 : Founder and Honorary President of Scientific Association ATSI Tunisia**
  http://www.lab-atms.com/atsi.php
- **2014 : Founder and General Chair of International Conference ATSIP'2014**
  http://www.lab-atms.com/atsip_2014.php
- **2014 : Sectoral Commission Coordinator (Applied Science), Ministry of Higher Education**
- **2015 : Founder and General Chair of Spring International School SS-ATSIP'2015**
  http://www.lab-atms.com/atsip_2015.php
- **2016 : Founder and General Chair of International Conference ATSIP'2016**
  http://www.lab-atms.com/atsip_2016.phphttp://www.lab-atms.com/atsip_2020.php
- **2016 : Official Partner of the Clinical Investigation Center (CIC), CHU of Sfax, Tunisia**
- **2017 : Founder and General Chair of International Conference ATSIP'2017**
  http://www.lab-atms.com/atsip_2017.phphttp://www.lab-atms.com/atsip_2020.php
- **2018 : Founder and General Chair of International Conference ATSIP'2018**
  http://www.lab-atms.com/atsip_2018.phphttp://www.lab-atms.com/atsip_2020.php
- **2018 : Founder and General Chair of Spring International School SS-ATSIP'2018**
  http://www.lab-atms.com/atsip_2018_school.php
- **2018** : **President of TSI Theses Commission (Technology Signal & Image) at ENIS.**
- **2020 : Founder and General Chair of International Conference ATSIP'2020**
  http://www.lab-atms.com/atsip_2020.php
- **2022 : Founder and General Chair of International Conference ATSIP'2022**
  http://www.lab-atms.com/atsip_2022.php

BIOGRAPHY

Ahmed BEN HAMIDA, born in 1963 in Sfax (Tunisia), holds university degrees as Principal Engineer, AEA and DEA post graduate degrees in Telecommunications, Doctorate (as PhD) in Signal Processing, and Post-doctoral Qualification in medical technologies, where he is currently expert. Actually, Full Professor, at ENIS (National School of Engineering), University of Sfax, Tunisia.
He is the founder & the head of the research laboratory ATMS (Advanced Technologies for Medicine & Signals), ENIS, University of Sfax, Tunisia. This laboratory presents an original creation bringing together various skills in technology and medicine. The staff managed is around 80 members (Research Professors, Professors and Associate Professors, Professors in Medicine, Post doc candidates, PhD students, Masters ...), and the activities concern various research projects, close partnership with medical & clinical department, supervision of Doctorates (more than 40 doctorate programs was successfully defended), promotion of completed research works, towards the industrial application fields…

He coordinates and actively participates in the Doctoral programs of ENIS, University of Sfax. He is Founder and Chairman of a TSI (Technology Signal & Image) thesis committee of ENIS, and Expert in Medical Technology thanks to his permanent activities with medical & clinical departments.
Founder and Honorary President of a Scientific Association ATSI (Association Technologie Signal Image), which has organized various high-level scientific events, sometimes on an international scale.

In 2014, he founded the **ATSIP** international conference on signal & image processing, and he was the General Chair during all editions. Such an important event aims to provide a high-level international forum for researchers, engineers and scientists from around the world to present and discuss recent advances technologies and applications in the fields of Signal and Image Processing. The conference will feature world-class speakers, plenary sessions, business and industrial exhibits…

He was also the Founder and President of an International Spring School SS-ATSIP'2015, which brought together high-level Professors, Tunisia, France, Canada, USA, to provide applied courses for high-level training for doctoral students working in Signal fields, Image, Video, Telecom, Remote sensing...
He was an invited Speaker in various high-level seminars and conferences especially those concerned with signal processing and medical technologies…

He occupied the position of the Coordinator of a sectoral committee at the Ministry of Higher Education (Tunisia), for five years, for the qualification & habilitation of Masters Degrees, Thesis Degrees and Habitations qualifications, in applied sciences. He was also a member of the hiring commission for Associate professors in Signal and Image Processing, during four years.

His research work, initially shared between ENIS, University of Sfax Tunisia and the University of Sherbrooke Canada, was mainly oriented to Signal Processing, Speech, Image, Medical Electronics (Stimulator, Hearing prosthesis, Audiometry). He heads a variety of research works at various levels (Master, Doctorate, Post-Doctoral Qualification), and he is currently focused on medical image processing (various modalities)… CAD 'Computer Aided Diagnosis' for various pathologies' exploration was carefully finalized, developed and tested under his supervision.

Research work was globally in cooperation with eminent Laboratories as GRAMS University of Sherbrooke (Canada), LAMIH Valenciennes (France), GRIF Telecom lille1 (France), Laboratory of Neuroscience (Lyon, France), CReSTIC Laboratory (Reims, France), CEA (Commissariat Energie Atomique) (France), Telecom Paris (France), CENIR Pitié Salpêtrière hospital in Paris (France), Moncton University (Canada), PERFORM Laboratory Concordia University Montreal (Canada)…

High-level scientific publications in specialized scientific journals, more than one hundred (Elsevier editions, IEEE Trans., Springer editions, IJSP, JAS, JOLPE, GESTS, Etc…).

High-level scientific manuscripts (courses), more than six, were under press with eminent edition…

Various financed projects were also headed, and interesting results were achieved & tested…
High-level scientific interventions were assured as an Invited Professor at the University of Sherbrooke (Canada, 1999-2003), LASL Calais France Laboratory and at GRIF Télécom Lille1 France.
Reviewer for Post-Doctoral Qualification and Theses, Reviewer for various graduate programs, Founder & Reviewer of various university institutions, Reviewer for various high-level projects, Reviewer of various articles for high-level journals...

Main OBJECTIVES

Take full advantage of advanced Mathematics, Signal Processing Techniques, computer science and computer engineering & electronics to:

- *develop advanced and enhanced algorithms,*
- *assure diagnostic aid procedures, CAD 'Computer Aided Diagnosis*
- *provide efficient work strategies, work protocols,*
- *provide effective tools according to needs,*
- *and solve problems for technology including those in the biomedical field, the field of telecommunications…*

Our research and teaching are mainly targeted

- Signal processing,
- Speech processing,
- Image processing,
- Probability and Statistics,
- Medical image processing, Algorithms for various applications,
- Satellite image processing, Algorithms for various applications,
- Signal Processing for Biometrics, Algorithms for various applications, …
- Medical electronics (prosthesis, diagnostic equipment); towards industry applications…

Various ACTIVITIES (From Industry to University).

- Computer Assisted Management, Quality Management 1989/1990/1991
- Member of the Institute for Standardization and Industrial Properties 'INNORPI' 1989-1993.
- Various agreements and cooperation with hospitals, clinical teams.
- Agreements and cooperation, French universities, North American universities.
- Supervision of PFE, Master and Thesis projects, Post-doctoral, with various co-direction ...
- Director of Research, International Projects: DGRST, CNRS - CMCU, Tunisian-Moroccan …
- Expert in Medical Technologies for a project with the European Commission ...
- ATMS Lab Research Director, ENIS University of Sfax Tunisia.

Our research, which is geared more towards the medical field, has a new component, which is the valuation. Indeed, following our close contact with the medical field, and with funded projects, various products can be valued, and tested with experts, such as :

- Computer-Assisted Digital Audiometer, for hearing diagnosis
- Computer-assisted digital audiometer, for voice diagnosis
- CAD 'Computer Aided Diagnosis' for brain MRI segmentation

Various ACTIVITIES (ATSIP Conference, ATSI Association).

- Founder of Conference School ATSIP editions
- Founder of Association ATSI (Association Technologie Signal Image)
- General Chair of ATSIP2014 Conference
- General Chair of Spring School ATSIP2015, and speaker
- General Chair of ATSIP2016 Conference, and speaker
- General Chair of ATSIP2017 Conference,
- General Chair of ATSIP2018 Conference, and speaker
- General Chair of ATSIP2020 Conference,
- General Chair of ATSIP2022 Conference,

Some Pre & Post Doc Research Activities

UNIVERSITE	ACTIVITES	DATE
Télécom Sud - Paris France **Invited Professor**, Ivry	Doctorate in joint-supervision agreement Audio Visual Recognition, Advanced Biometric	June 2018
CENIR, Hôpital Pitié Salpétrière **Invited Professor,** Paris France	Doctorate in joint-supervision agreement Functional MRI	January 2016
University of Orsay, Paris France **Invited Professor**, CEA Saclay	Image processing and MRI diffusion Master & Co-supervised Thesis in perspectives in Diff MRI	June 2012
University of Orsay, Paris France **Invited Professor**, Lab. Imagerie	Image Processing Conference Doctorate in joint-supervision agreement: Movement detection,	June 2011
University of Reims France **Invited Professor**, Lab. CReSTIC	Functional medical image processing Conference Doctorate in joint-supervision agreement: Tracer kinetics, cancer	June 2010
University of UCLB Lyon France **Invited Professor**, Lab. Neuroscience	Speech Treatment & Cochlear Prosthesis Conference Doctorate in joint-supervision agreement: Speech Signal denoising	June-July 2009
Université UCLB Lyon France **Invited Professor**, Lab. Neuroscience	Speech Treatment & Cochlear Prosthesis Conference Doctorate in joint-supervision agreement: Speech Signal denoising	June-July 2008
University of Valenciennes France **Invited Professor**, Lab. LAMIH	Image Processing Conference Doctorate in joint-supervision agreement: medical imaging fusion	June 2007
University of Pas de Calais France **Invited Professor**, Lab. Anal Système	Speech and Image Processing Conference Doctorate in joint-supervision agreement: Fusion in satellite imagery	June 2006
Télécom Lille 1 France **Invited Professor,** Laboratoire GRIF	Speech and Image Processing Conference Doctorate in joint-supervision agreement on E commerce matrices	June 2005
University of Sherbrooke Canada 'GRAMS', 'Medical Devices Research Group' Canada	**Post-doctoral training** 1- Cadence, PSPICE : Design electronic 2- Speech processing: Matlab/Simulink	January – April 2000
University of Sherbrooke Canada 'GRAMS', 'Medical Devices Research Group' Canada	**Post-doctoral training** 1- Cadence, PSPICE : Design electronic 2- Speech processing : Matlab/Simulink	January – April 1999
University of Sherbrooke Canada 'GRAMS', 'Medical Devices Research Group' Canada	**Doctoal training** 1- Speech therapy for cochlear prostheses 2- Implementation FFT/FIR on DSP	January – August 1998
University of Sherbrooke Canada 'GRAMS', 'Medical Devices Research Group' Canada	**Doctoral training** 1- P. cochlear speech signal processing 2- Matlab / Simulink 3- FFT / FIR DSP implementation	January – August 1997
University of Bordeaux ENSERB 'Signal Processing Unit'	**Doctoral training** Training on MENTOR software for algorithm DSP implementation	Septembre 1996
SUPELEC Paris 'Signal Processing Research Group'	**Doctoral training** 1- Training on MENTOR software for algorithm implementation on DSP	December – January 1995
University of Bordeaux France 'Laboratoire Audiologie Expérimentale'	**Doctoral training** 1- Training on hearing measurement software	December – January 1995
University of Paris V Laboratoire 'Audio-Phono-Prothèses' Paris-France	**Doctoral training** Cochlear prosthesis and surgery Research: Speech processing, Hearing	September, 1994
Institut de normalisation INNORPI –TUNISIE	**Industry training** Company quality control ISO 9000	April 1990, 1991

Courses, Manuscripts under edition phase (1)

Signals & Systems:

* Mathematical introduction: Complex, Functions ...
* Notion of Signal
* Concept of System: Signal vs System
* Convolution: Basic tool for signals
* Fourier Series: From Series to Transform
* Some Transforms

Mathematics for Signals

* Mathematical introduction: Complex, Together, Body
* Usual functions ...
* Laplace transform
* Fourier transform
* Z transform
* Convolution: Basic tool for signals

Probability & Statistics: Extended course towards Doctoral Training

* Mathematical introduction: Complex, Together, Body
* Usual functions: Application and forms...
* Preliminary to Probabilities
* Real Random Variables
* Distribution function, density function
* Laws of Probability: Applications
* Projects and applications ...

Signal Processing (Analog): Extended Course towards Doctoral Training

* Mathematical introduction: Complex, Functions ...
* Notion of Signal, Notion of System: Signal vs System
* Convolution: Basic tool for signals
* Deterministic Signals, Applications, Simulations, Projects ...
* Random Signals, Applications, Simulations, Projects .

Analog filtering

* Mathematical introduction: Complex, Functions ...
* Notion of Signal, Notion of System: Signal vs System
* The convolution:
    - Discrete case, Continuous case, Dirac impulse, Convolution integral
    - Input-output relationship, some examples
* Laplace II transform
    - Transfer function, System poles and zeros, stability
    - Frequency response from the locus of the poles and zero: geometric method
    - Some examples
* Analog filters design
    - Tolerance diagram, Types of filters, constraints
    - Introduction to the design of conventional Butterworth filters
    - Butterworth filter design (continued)
    - Design of Chebyshev type I and II filters
    - Design of Ellitic filters
    - Application, choice of a type of filter

Courses, Manuscripts under edition phase (2)

Digital Signal Processing: Extended course towards Doctoral Training

* Mathematical introduction: Complex, Functions...
* Mathematical introduction: Discretization, Numerical functions ...
* Concept of digital signal,
* Concept of digital system: Signal vs System
* Weeding theorem (Shannon)
* Digital filtering
* Concept of Algorithms
* DSP and Implementation
* Projects and applications

Speech Signal Processing: Extended Course Towards Doctoral Training

* Mathematical introduction: Complex, Functions ...
* Notion of Speech signal: An intelligible signal, of communication...
* Speech Signal Processing: Basic Tools,
* Estimation of Fundamental and Formants
* Speech Signal Recognition: Basic Tools,
* Speech Signal Synthesis: Basic Tools,

Digital Control 'Digital Discrete System':

* General notions on numerical control
* Sampled signals, sampling theory
* Z transform, Direct, Inverse
* Control systems with discrete time and stability
* Structure of digital correctors, Digital PID corrector
* Numerical approximations of a continuous corrector
* Digital corrector by the location of the roots in the z plane and frequency design

Communication: Modulation & basic tools

* Mathematical introduction: Complex, Functions ...
* Overview of the transmission ...
* AM modulation, modulation index
* AM modulation with synchronous, asynchronous demodulator
* DSB-AM and SSB-AM modulation, Examples of circuits
* PM and FM modulation, principle, Modulation index
* AM vs FM comparison (advantages and disadvantages)

Other Courses, Manuscripts in perspective …

Electronics 1:

Propagation Antenna:

Optical fiber

Microwaves:

Audiometry and hearing prostheses

Medical Technologies

Medical imaging

Conferences, Seminars, Presentations

Signals & Systems

A presentation allowing introducing the basic notions on the signals, by detailing some with applications, and then orienting towards the systems and their mathematical formulation…

Advanced Signal Processing

A presentation to properly introduce the processing of signals in mathematical form, moving towards concretizations ... The system aspect should also figure in this signal processing …

Advanced Digital Signal Processing

A presentation allowing to properly introducing the digital processing of signals in mathematical form, by starting the digitization, going towards concretizations ... The digital system aspect should also figure in this signal processing…

Speech Processing

A presentation that begins by introducing the notion of a speech signal, in digital form, and which is oriented towards the extraction of characteristics. Applications such as recognition (isolated words, continuous speech, speaker, etc.) should be mentioned…

Digital filtering

A presentation allowing a good introduction to digital signal processing. We will detail the notion of filtering in mathematical form, and we will study specific filters with simulations, and then with application examples.

Audiometry: towards digitalization

A presentation that begins by introducing medical concepts, such as physiology of hearing, anatomy of the ear, hearing impairments; Then, we will detail the audiometry in tonal form, and in vocal form.

Hearing Prosthesis

A presentation that begins by introducing medical concepts, physiology of hearing, ear anatomy, hearing impairments. Then, we will detail the audiometry in tonal form, and in vocal form, to focus on the device, which is the Prosthesis.

Cochlear prostheses

A presentation that begins by introducing medical concepts, physiology of hearing, ear anatomy, hearing impairments. Then, we will detail the deep and total deafness to focus on the device, which is the Cochlear Prosthesis.

Medical imaging

A presentation that starts with medical concepts, to justify imaging, in its different technologies and modalities …

Neuro Radiology: Advanced Exploration Techniques

A presentation that starts with medical notions in neurology, to justify imaging, in its different technologies and modalities... Pathologies will be under global study to explore the modalities.

CAD Computer Aided Diagnosis: A Trend …

A presentation that explains the graphical interface operating according to advanced algorithms for the exploration of certain pathologies …

Supervision of Post-Doctoral Qualification

Post Doctoral Qualification: Defended :

1. **Mondher FRIKA**
   Title: Speech Recognition & Denoise: Hearing Aid App
   Defense date: May 2013
   Journal Articles : 6 Articles with impact factor
2. **Mohamed BEN SLIMA**
   Title: Advanced medical image processing techniques based on the inverse problems of statistical approaches: Application for detection of tumor tissues and for localization of cerebral electrical activity
   Defense date: June 2014 Journal Articles: 4 Articles with impact factor
3. **Abdelaziz KALLEL**
   Title: Advanced image processing techniques based on the theory of evidence and the theory of optical flow: Application for motion detection and for satellite images
   Defense date: June 2014
   Journal Articles: 4 Articles with impact factor
4. **Mohamed GHORBEL**
   Title: Electronics and Signal Analysis for Medical: Application for Cochlear Prosthesis
   Defense date: June 2015
   Journal Articles : 4 Articles with impact factor
5. **Lamia SELLAMI BEN HAMIDA**
   Title : Advanced Medical Imaging Technology: From Image Processing Methodology vs. Pathologies to Physical Concepts
   Defense date: 2016
   Journal Articles : 4 Articles with impact factor
6. **Fathi KALLEL**
   Title : Advanced methods for signal preprocessing: Improvement of speech intelligibility (Cochlear prosthesis) and contrast enhancement in medical imaging
   Defense date: 2018
   Journal Articles: 4 Articles with impact factor
7. **Ines NJEH CHAKER**
   Title : Advanced Image Processing Techniques For The Exploration Of Glioblastomas In Brain MRI
   Defense date: 2021
   Journal Articles: 4 Articles with impact factor

Post Doctoral Qualification: to be defended:

8. **Wassim ZOUCH**
   Title : Advanced methods for the preprocessing of the EEG signal: Human Machine Interface, and Exploration of Neurodegenerative pathologies
   Planned defense date: 2021 Journal Articles : 3 Articles with impact factor
9. **Achraf MAKHLOUFI**
   Title: Advanced Techniques MRI Medical Image Segmentation: Towards CAD Applications
   Planned defense date: 2021 Journal Articles : 3 Articles avec with impact factor

Defended Theses:

1. Mohamed GHORBEL : Thesis in Cooperation with ORL clinical department of CHU of Sfax

Thesis Title : Study and Design of a Programmable Multi-electrode Cochlear Stimulator (Medical)

Defense date: 2007 Journal Articles : 2 Articles (JOLPE) indexed with impact factor

2. Mondher FRIKA

Thesis Title : Markovian Approach for Robust Recognition of Isolated Words: Variable Acoustic Environment

Defense date : 2008 Journal Articles : 2 Articles (ASIAN) indexed with impact factor

3. Ahmed REKIK : Co-supervised thesis with the University of Calais France

Thesis Title : Statistical Segmentation of Satellite Images: Markovian Context and Fusion by Dempster Shafer Theory

Defense date : 2008 Journal Articles : 2 Articles (ELSEVIER) indexed with impact factor

4. Dorra GARGOURI

Thesis Title : Contribution to the Estimation and Tracking of Speech Formant Trajectories

Defense date : 2010 Journal Articles : 2 Articles (JOLPE) indexed with impact factor

5. Neila REKIK : Thesis in Cooperation with ORL clinical department of CHU of Sfax

Thesis Title : Design and optimization of a Programmable circuit dedicated to a cochlear stimulator with 16 electrodes

Defense date : 2010 Journal Articles : 2 Articles (JOLPE) indexed with impact factor

6. Sinda SHABOU : Thesis in Cooperation with ORL clinical department of CHU of Sfax

Thesis Title : Design and optimization of a Programmable circuit dedicated to an RF stage for a cochlear implant with 16 electrodes

Defense date : 2013 Journal Articles : 2 Articles (JOLPE) indexed with impact factor

7. Wassim ZOUCH : Thesis Co-Diection with Université Valenciennes France & clinical departments

Thesis Title : Location of Brain Electrical Activity: Reverse problem in electroencephalography

Defense date : 2010 Journal Articles : 1 Article SPIE indexed with impact factor

8. Fathi KALLEL : Co-supervised thesis with UCLB Lyon France University & clinical departments

Thesis Title : Noise Reduction Algorithms: Improving Speech Intelligibility: Case of Cochlear Prosthesis

Defense date : 2011 Journal Articles: 2 Articles(ELSEVIER,ASIAN) indexed with impact factor

9. Sabeur MASMOUDI

Thesis Title : Intelligent Approach to Continuous Speech Recognition by Artificial Neural Networks

Defense date : 2011 Journal Articles : 2 Articles (SPRINGER) indexed with impact factor

10. Zeineb BENMESSAOUD

Thesis Title : Acoustic Modeling & Parameter Selection for Continuous Speech Phonetic Recognition

Defense date : 2011 Journal Articles : 1 Article (SPRINGER) indexed with impact factor

11. Amira DERBEL : Thesis in Cooperation with ORL clinical department of CHU of Sfax

Thesis Title : Contribution to the study and implementation on DSP of a new strategy based on the wavelet transform dedicated to cochlear stimulation (Medical)

Defense date : 2012 Journal Articles : 2 Articles (ASIAN) indexed with impact factor

12. Olfa BEN SASSI : Thesis in Cooperation with Radiology clinical department of CHU of Sfax

Thesis Title : CAD Computer Aided Diagnosis 'in Breast Ultrasound: Application in Diagnostic Assessment in Real Examination Conditions (Image Sequence)

Defense date : 2013 Journal Articles : 1 Article (ELSEVIER.) indexed with impact factor

13. Rafik KHEMAKHEM : Thesis in Cooperation with Neuro & Radio clinical department of CHU Sfax

Thesis Title : Contribution to the spatial-temporal analysis of cortical signals by algorithms solving inverse problems

Defense date : 2013 Journal Articles : 2 Articles (IEEE) indexed with impact factor

14. Ines KETATA : Co-supervised thesis with CReSTIC Reims FRANCE & clinical departments

Thesis Title : Extraction and Modeling of the kinetics of the tracer in PET imaging for the characterization of tumor tissues

Defense date : 2013 Journal Articles : 1 Article (ELSEVIER) indexed with impact factor

15. Tijani DALLEJI

Thesis Title : Contribution to statistical segmentation and image fusion based on the Bootstrap approach

Defense date : 2014 Journal Articles : 4 Articles (ELSEVIER, IJRS) indexed with impact factor

16. Ines NJAH : Codirection CENIR Pitié Salpatrière Paris France, INRS Montréal CANADA

Thesis Title : Optimized Segmentation of MRI Brain Images Based on Measurements of Information and Non-parametric Distributions for Characterization of Tumors

Defense date : 2014 Journal Articles:2 Articles (IEEE Tr, ELESVIER) indexed with impact factor

17. Wafa REKIK : Co-supervised thesis with Paris-Sud ORSAY Paris FRANCE

Thesis Title : Fonctions de Croyance pour l'Analyse d'Images Appliquée au suivi d'Objets et de Surface

Defense date : March 2015 Journal Articles : 2 Articles indexed with impact factor

18. Jihène BOUGHARIOU : Medical imaging MRI, EEG, Cooperation with Neuro clinical department

Thesis Title : Three-dimensional modeling of brain structures for the treatment of the direct problem vs the inverse problem in EEG

Defense date : 2015 Journal Articles: 2 Articles (IEEE Tr, SPIE) indexed with impact factor

19. Dhouha DAOUD : Medical Electronics: Thesis in cooperation with ORL clinical department CHU Sfax

Thesis Title : Contribution to the Optimization of the Digital Data and Energy Transmission Stage for Implantable Medical Electronic Systems

Defense date : 2016 Journal Articles : 1 Article (SPRINGER) indexed with impact factor

20. Hind HALLABIA : Satellite imagery, filtering: Codirection with U Paris - Sud, France

Thesis Title : Towards Automatic Detection of Objects in a Scene Using a Pansharpening Approach Based on a Bank of Filters Adjusted to the Response of the Sensor

Defense date : 2016 Journal Articles : 1 Article (SPRINGER) indexed with impact factor

21. Mofdi DHOUIB : Multimodal Biometrics

Thesis Title : Contribution to the Study and Design of a Hybrid Recognition Algorithm Dedicated to Biometrics

Defense date : 2016 Journal Articles : 2 Articles indexed with impact factor

22. Lina Jarboui : Satellite imagery: Co-supervised thesis with Toulouse FRANCE

Thesis Title : Advanced Source Separation Methods: Application in Spectral Imaging

Defense date : 2017 Journal Articles : 1 Article (SPRINGER) indexed with impact factor

23. Rania Trigui : Medical imaging: Co-supervised thesis with Dijon FRANCE

Thesis Title : Location and classification of cancerous tissue by fusion of prostate MRI and SRM data

Defense date : 2017 Journal Articles: 2 Articles (ELSEVIER) indexed with impact factor

24. Olfa Ghribi : Imagerie médicale : Medical Imaging in Cooperation with Neuro & Radio departments,

Thesis Title : Multiple sclerosis detection and monitoring methods using MRI sequences

Defense date : 2017 Journal Articles : 2 Articles (IEEE Tr, ELSEVIER) indexed with impact factor

25. Sarra Hajri : Biometrics

Thesis Title : Exploitation of Enhancement Algorithms to Improve the Performance of Articulation Print Image Identification Algorithms

Defense date : 2018 Journal Articles : 1 Article (SPIE) indexed with impact factor

26. Hanen RHAYMA: Biometrics

Thesis Title : Reversible tattooing for authentication and integrity control: Real-time systems application

Defense date : 2019 Journal Articles: 2 Articles (IEEE , SPRINGER) indexed with impact factor

27. Aymen BOUGACHA : Medical Imaging in Cooperation with Neuro & Radio departments, CHU Sfax

Thesis Title : Towards Evolved Algorithms for the Segmentation of MRI Medical Images: Advanced Characterization of Glioblastomas

Defense date : 2019 Journal Articles : 2 Articles indexed with impact factor

28. Marwa CHAABANE : Thesis in cooperation with Texas A&M University , QATAR

Thesis Title : Advanced Signal Processing Techniques for States Estimation, Modeling and Damage Detection With Applications To Health Monitoring Structures
Defense date: 2019 Journal Articles: 3 Articles (SPRINGER, WILEY ,SAGE) indexed with impact factor

29. Bilel AMEUR : Biometrics

Thesis Title : Vers des Algorithmes Évolués pour la Reconnaissance de Visage en Milieux non Contrôlés
Defense date : 2020 Journal Articles : 2 Articles indexed with impact factor

30. Raoudha BAKLOUTI : Thesis in cooperation with Texas A&M University , QATAR

Thesis Title: Linear and N linear Data-Based Fault Detection Techniques, Applications to Chemical Systems
Defense date : 2020 Journal Articles: 2 Articles (ELSEVIER et IEEE) indexed with impact factor

31. Imen BAKLOUTI : Thesis in cooperation with Texas A&M University , QATAR

Thesis Title: Advanced Signal Processing Algorithms for Fault Detection, Applications To Wastewater Process
Defense date : 2020 Journal Articles : 2 Articles (ELSEVIER) indexed with impact factor

32. Mouna SAHNOUN: Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title: Advanced Techniques for Contrast Enhancement of MRI Images and Quantification of the Spinal Cord for Advanced Exploration of MS
Defense date : 2021 Journal Articles : 2 Articles indexed with impact factor

33. Aymen MTIBAA : Biometrics : Co-supervised thesis with TéléCom Sud Paris, France

Thesis Title : Exploitation of audio-visual data synchrony for efficient biometric systems, resistant to fraud and revocable
Defense date : programmed for 2021 Journal Articles : 1 Article indexed with impact factor

Theses programmed to defense in 2022 :

Mouna MAYOUF : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Design of new approaches based on deep learning for the classification and automatic segmentation of histological images of kidney cancer

Defense date : programmed for 2022 Journal Articles : 2 Articles indexed with impact factor

Theses in progress:

1. Saida Kachira : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Noise Reduction of Cardiac Ultrasound Images: Towards Computer Assisted Diagnosis

2. Yosri BEN SALAH : Microcopy : Co-supervised thesis with China

Thesis Title : Binocular Digital Holographic Microscopy

3. Besma MNASSRI : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Towards a CAD 'Computer Aided Diagnosis' in brain MRI for the exploration of SEP …

4. Nabil ABDELMOULEH : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Towards a CAD 'Computer Aided Diagnosis' in CT Scan for the exploration of cerebral stroke

5. Besma MABROUK : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Towards a CAD 'Computer Aided Diagnosis' in functional brain MRI: Exploration of neurodegenerative diseases, Alzheimer's …

6. Wamed Raad : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Detection, segmentation and classifying of brain glioma tumor, meningioma tumor, pituitary tumor and healthy images cases by employing MRI images, based on artificial techniques

7. Marwa Alhatab : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Developing a Classifier and Segmentation Models for Types of Lung Cancer By Employing CT-scan Images, Based on Deep Learning Networks with Support Vector Machine Techniques

8. Anas Fuad : Medical Imaging: in Cooperation with Neuro & Radio clinical departments

Thesis Title : Design of Robust System for Heart Diseases Diagnosis Based on ECG Signal

Funded Cooperation Projects :

1. **CMCU 2009 with Neuroscience UCLB Lyon France : PHC UTIQUE**
   Duration : 3 years + 1 year extension Funding : About 5 000 Euros per year
   Project title : Rehabilitation of hearing impairments: Cochlear prosthesis
   Scientific contributions: Thesis, high level publications
2. **CMCU 2010 with CReSTIC University Reims France & Centre GFL Lutte contre le Cancer Dijon France**
   Duration : 3 years + 1 year extension Funding : About 12 000 Euros per year
   Project title : Treatment, Exploration, Breast Cancer by PET Imaging
   Scientific contributions: Thesis, high level publications
3. **CMCU 2015 avec CENIR, Paris France : PHC UTIQUE**
   Duration : 3 years + 1 year extension Funding : About 10 000 Euros per year
   Project title : Functional Medical Imaging fMRI Neurodegenerative Diseases
   Scientific contributions: Thesis, high level publications
4. **DGRST – CNRS avec Neuroscience UCLB Lyon France**
   Duration : 3 years Funding : About 5 000 Euros per year
   Project title : Speech denoising algorithms for cochlear prosthesis …
   Scientific contributions: Thesis, high level publications
5. **DGRST – CNRS avec LAMIH Valenciennes France**
   Duration : 3 years Funding : About 5 000 Euros per year
   Project title : Registration of EEG and MRI data, Localization of brain electrical activities …
   Scientific contributions: Thesis, high level publications

MOBIDOC Project,

ANPR Agency (Research Promoting Agency in Tunisia, funded by the europeen commission)

1. Mobidoc PhD student: Amira Echtioui

Subject : Contribution to the design of BCI (Brain Computer Interface) system based on the motor imagery to control a wheelchair
Partner : The Clinical Investigation Center, designated by its acronym CIC
Headquartered at CHU Habib Bourguiba in Sfax,
Creation Date: 2018
Project status: completed

2. Mobidoc Post doc : Omar Trigui

Subject: Study of an automatic EEG diagnostic assistance system for epileptic patients.
Partner : The Clinical Investigation Center, designated by its acronym CIC
Headquartered at CHU Habib Bourguiba in Sfax,
Creation Date: 2019
Project status: completed

4. Mobidoc PhD student : Hamida Yanes

Subject: Predicting Epileptic Seizures Using EEG Data: Towards an Online Seizure Advisory System
Partner : Service Neurologie
Headquartered at CHU Habib Bourguiba in Sfax,
Creation Date : 2021
Project status: in progress

5. Mobidoc PhD student : Mouna SAHNOUN

Subject: Advanced Segmentation In Functional Medical Imaging PET For Characterization Of A Tumor Zone: Analysis Of A Dynamic Image Sequence In Calculating Blood Flow
Partner : Service Neurologie
Headquartered at CHU Habib Bourguiba in Sfax,
Creation Date : 2021
Project status: in progress

6. Mobidoc PhD student : Hiba MZOUGHI

Subject: Prediction and monitoring of the prognostic evolution of brain tumors on MRI images by data fusion and deep learning
Partner : Service Neurologie
Headquartered at CHU Habib Bourguiba in Sfax,
Creation Date : 2021
Project status: in progress

03 Tuniso-Moroccan Projects in progress …

1. **Project title : Clinical support platform for the analysis of cardiac function at the level of cardiac ultrasound sequences (2D + t)**

- Tunisian project manager: Mohamed GHORBEL
  ATMS, ENET'Com, University of Sfax, TUNISIE
- Moroccan project manager: Karim Mohammed
  Faculté des Sciences de Fès, Université Sidi Mohamed ben Abdallah , MOROCCO.

2. **Project title : Clinical support platform for the exploration of brain cancer "Glioma".**

- Tunisian project manager: Mohamed BEN SLIMA
  ATMS, ENET'Com, University of Sfax, TUNISIE
- Moroccan project manager: Said BOUJRAF
  Faculté de Médecine et de Pharmacie de Fès, University of Sidi Mohamed ben Abdallah, MOROCCO.

3. **Project title : Clinical aid platform for the characterization of neurodegenerative diseases in the Maghreb countries by exploring the different modalities of cerebral (functional) MRI**

- Tunisian project manager: Ahmed BEN HAMIDA
  ATMS, ENIS, University of Sfax, TUNISIE
- Moroccan project manager: Mohamed EL HASSOUNI
  University of Mohammed V, Rabat , MOROCCO

Publications : Essential Courses' Manuscripts

Signals & Systems

A manuscript for publication course involving :

introducing the basic notions on the signals, by detailing some with applications, and then orienting towards the systems and their mathematical formulation…

Advanced Signal Processing

A manuscript for publication course involving :

A presentation to properly introduce the processing of signals in mathematical form, moving towards concretizations ... The system aspect should also figure in this signal processing …

Advanced Digital Signal Processing

A manuscript for publication course involving :

A presentation allowing to properly introducing the digital processing of signals in mathematical form, by starting the digitization, going towards concretizations ... The digital system aspect should also figure in this signal processing…

Speech Processing

A manuscript for publication course involving :

A presentation that begins by introducing the notion of a speech signal, in digital form, and which is oriented towards the extraction of characteristics. Applications such as recognition (isolated words, continuous speech, speaker, etc.) should be mentioned…

Digital filtering

A manuscript for publication course involving :

A presentation allowing a good introduction to digital signal processing. We will detail the notion of filtering in mathematical form, and we will study specific filters with simulations, and then with application examples.

Publications : Chapters & Book Chapters…

Hind Hallabia, Abelaziz Kallel., **Ahmed Ben Hamida**. (2018) Multiresolution Filter Banks for Pansharpening Application. In: Dolecek G. (eds) Advances in Multirate Systems. Springer, Cham. https://doi.org/10.1007/978-3-319-59274-9_5

In perspective

CAD (computer-aided diagnosis) for MRI Glioblastoma explorations

Develop an automatic and accurate computer-aided diagnosis (CAD) system for brain glioma exploration on magnetic resonance imaging.

CAD for MRI MS explorations

Develop an automatic biomedical aided tool involving volumetric segmentation of Multiple Sclerosis lesions.

CAD for CT Scan Cerebral Stroke explorations

Develop a CAD system for image processing in acute ischemic stroke.

CAD for MRI Alzheimer explorations

Develop a novel automatic computer-aided diagnosis (CAD) system for the early detection of Alzheimer's disease (AD) based on supervised machine learning methods.

Publications : Journals

1. **Ahmed Ben Hamida**, M. Samet, H. Ghariani, M. Drira, 'Stimulation Algorithm For Cochlear Implant Based On Spectral Approach Stimulation', Numéro special, **annales** maghrébines, Vol.1, Num.5, 1998.
2. **Ahmed Ben Hamida**, 'A Digital Signal Processing Algorithm Dedicated to Hearing Aid Research', EMBEC'99, Special issue, **Journal:** International Federation for Medical Engineering, Vol.37, 1999.
3. **Ahmed Ben Hamida**, 'FFT Based Stimulation Algorithm for Cochlear Prostheses', EMBEC'99, Special issue, **Journal:** International Federation for Medical Engineering, Vol.37, 1999.
4. **Ahmed Ben Hamida**, M. Samet, M. Drira "A Speech treatment Algorithm Based on a Programmable Filter Bank for Cochlear Prosthesis", Innovation and Technology in Biology and Medicine (**Revue ITBM**), Editions Scientifiques et Médicales ELSEVIER, Vol.21, Num.4, pp.217-226, France, 2000.
5. **A. Ben Hamida,** "Implication of new technologies in deafness healthcare: deafness rehabilitation using prospective design of hearing aid systems," University as a Bridge from Technology to Society. IEEE International Symposium on Technology and Society (Cat. No.00CH37043), Rome, Italy, 2000, pp. 85-90, doi: 10.1109/ISTAS.2000.915583.
6. **Ahmed Ben Hamida**, & M. Samet, 'Spectral Approach Based on FFT Applied to Cochlear Implant', Les **Annales** Maghrébines de l'Ingénieur, ENIT AMI/02/02, Volume 15, Number 2, 2003.
7. Hamadi Ghariani, Sonia Zouari, **Ahmed Ben Hamida**, 'Programmable Generator Dedicated to the Preoperative cochlear Stimulation, Libanese Science **Journal**, Vol., Num 2, ISSN 1561-3410, 2004.
8. Dorra Gargouri, **Ahmed Ben Hamida…**'Source-Filter Models for Formants Estimation', **WSEAS Transaction** On Signal Processing, Issue 5, Volume2, May 2006, ISSN 1790-5022, PP.618-625
9. Med A.Kammoun, D.Gargouri, M.Frikha & **A.BenHamida**, 'Cepstrum vs LPC: Comparative Study for Speech Formant Frequencies Estimation', **GESTS** International **Transactions,** Vol.9, No1, 2006, ISSN1738, pp.87-102.
10. Mohamed Ghorbel, **Ahmed Ben Hamida**, "An Advanced Low Power and Versatile CMOS Current Driver for Multi-Electrode Cochlear Implant Microstimulator", **Journal** Low Power JOLPE, Vol. 2, Num.3, 2006.
11. Med Ghorbel, M.Samet, **A. Ben Hamida** & Jean Tomas, "16-electrode Fully Integrated and Versatile CMOS Microstimulator Dedicated to Cochlear Implant", **Journal** Applied Sciences, Volume 6, Number 15, September 2006.
12. M. Lahiani, N.BenAmor, H.Ghariani & **A.Ben Hamida**, 'Adjustable Filtering Structure Design Dedicated to a Programmable Hearing Aid Apparatus', Int..Journal Physical Sciences, Vol.1, No4, pp.201-211, ISSN1992, 2006.
13. T. Dallèji, M. Zribi & **A. Ben Hamida**, 'On the EM Algorithm and Bootstrap Approach Combination for Improving Satellite Image Fusion', International **Journal** of Signal Processing, Vol.4, No 2, ISSN 1304–4487, pp.85-94, 2007.
14. M. Frikha, **A. BenHamida**, 'On the Optimization of Acoustical Analysis and Modelling Techniques for HMM Isolated Word Recognizer', **GESTS** International **Transaction** on Communication and Signal Processing, Vol.10, No 6, 2007.
15. Mondher Frikha & **Ahmed Ben Hamida**, 'Towards Discriminative Training Estimators for HMM Speech Recognition System', **Journal** of App. Sciences, Vol.7, Num.24, pp. 3891-3899, 2007.
16. Mondher Frikha & **Ahmed Ben Hamida**, 'Noise Robust Isolated Word Recognition Using Speech Feature Enhancement Techniques', **Journal** of App. Sciences, Vol.7, Num.24, pp.3935-42, ISSN 1812-5654, 07.
17. Ahmed RKIK, Mourad Zribi, **Ahmed Ben Hamida...**'Review of Satellite Image Segmentation for an Optimal Fusion System Based on the Edge and Region Approaches', International **Journal** of Computer Science & Network Security **IJCSNS**, Vol 7, N. 10, 2007, ISSN 1304 – 4487, pp. 85-94.

18. Tijani Delleji, Mourad Zribi, and **Ahmed Ben Hamida**, On the EM Algorithm and Bootstrap Approach Combination for Improving Satellite Image Fusion', INTERNATIONAL JOURNAL OF SIGNAL PROCESSING VOLUME 4 NUMBER 2, 2007, ISSN 1304-4478.

19. Ahmed RKIK, & **Ahmed Ben Hamida**, 'On the EM Algorithm and Bootstrap Approach Combination for Improving Satellite Image Fusion', International Journal of SP, **IJSP**, Vol. 5, Num.1, pp. 20-27, 2008.

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28. Tijani Dallèji, Mourad Zribi & **Ahmed Ben Hamid**a, 'Multi-Source Multi-Sensor Image Fusion Based on Bootstrap Approach', The Open Remote Sensing Journal, Vol *2*, pp. 1-10, 2009.

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31. S. Masmoudi, M. Frikha, Med Chtourou & **A.B.Hamida,** ''Constructive Algorithm for isolated word recognition based Artificial Neural Network'', SPRINGER Journal, 2010-11-05

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