

Abir Hadriche

*Assistant professor, Sound engineering and new technologies department, Higher Institute of Music of Sfax (ISMS), University of Sfax, Tunisia.
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ResearchGate: https://www.researchgate.net/profile/Abir_Hadriche

Google Scholar: <https://scholar.google.com/citations?user=xBy8qccAAAAJ&hl=en>

Areas of expertise: Computer sciences / Signal processing / Electrical engineering

a. Professional

12/09/2014→07/05/2022 ENI-Sfax Tunisia	Computer Systems Engineering	Qualified to direct research
15/09/2009→28/06/2013 INS -Marseille France	Neurosciences	Ph.D.
15/09/2009→28/06/2013 ENI-Sfax Tunisia	Electrical Engineering (Signal Processing)	Ph.D.
15/09/2007→09/06/2008 ENI-Sfax Tunisia	Electronic and Telecommunication	Master degree
15/09/2002→ 28/06/2007 ENI-Sfax Tunisia	Electrical Engineering	Engineering degree

b. Appointments

Since 12/09/2020

Assistant Professor, Information Technology and Signal Processing, Higher Institute of Music Sfax, Sfax University, Tunisia.

Co-**supervision** of PhD thesis (4) and supervision of research masters (4, 2 defended), and engineering students (3, 2 defended).

Since 12/09/2021

head of research master in sound and new technologies, Higher Institute of Music Sfax, Sfax University, Tunisia

12/09/2014 → 11/09/2020

Assistant Professor, Computer Engineering, Higher Institute of Computer and Multimedia, Gabes University, Tunisia.

Co-supervision of PhD thesis (3, 1 defended) and supervision research masters defended (7), and engineering students (3).

15/12/2017 → 11/09/ 2020

Director of Electronics and Telecommunication department and **head of research master** in electronics and telecommunications. Higher Institute of Computer and Multimedia, Gabes University, Tunisia.

15/12/2014 → 14/12/2017

Committee Member of embedded systems master, Higher Institute of Computer and Multimedia, Gabes University.

Head teacher of bio-signal processing discipline, Higher Institute of Computer and Multimedia, Gabes University, Tunisia.

Head teacher of signals and systems courses (continuous and discrete signals and systems), Institute of Computer and Multimedia, Gabes University, Tunisia.

Head teacher of digital signal transmissions course, Institute of Computer and Multimedia, Gabes University, Tunisia.

Head teacher of Research Methodology course for research master student, Institute of Computer and Multimedia, Gabes University, Tunisia.

01/10/2011 → 31/03/2012

Research engineer on virtual brain development in the Brain Recovery Group "research in the field of Computational Neuroscience and Behavioral." Laboratory INSERM UMR 751, Faculty of Medicine, Marseille. France

12/09/2008 → 30/08/2014

Contractual Assistant, National School of Electronics and Telecommunication, Sfax University.

c. Main taught courses

- Signals processing (42h/year, 7 years)
- Digital and analogic electronics (42h/years, 7 years)
- Computer sciences (42h/year, 6years)
- Python (30h/year, 6 years)
- Digital signal transmission (21h/year, 5 years)
- Communication Engineering (21h/year, 4 years)
- Perception and multimedia (42h/year, 4 years)
- Data transmission (21h/year, 4 years)
- object oriented programming (42h/year, 4 years)
- Image processing (21h/year, 2 years)
- Data base (21h/year, 2 years)
- Basis of IA (21h/year, 2 years)
- IOT (21h/year, 2 years)
- project management (21h/year, 2 years)

d. Research topics

- Digital signal processing
- Biomedical signal processing
- Nonlinear signals analysis
- Analysis of EEG, ECG, MEG signals
- Sources localization.
- Embedded systems to predict epileptic seizure.
- Time frequency filtering
- Extraction and localization of Alpha and Gamma oscillations in EEG signals
- Analysis of brain connectivity networks
- Source separation for prediction seizure buildup
- Study of dynamical systems
- Advanced programming with python, Matlab and Java
- Hardware programming with VHDL.
- Deep learning process.

e. Soft skills

Skill Title	Skill level	Total experience	Last used
Matlab	Proficient	16 years	now
Python	Proficient	13 years	now
Digital Signal Processing	Proficient	14 years	now
Data Analysis	Proficient	14 years	now
Java	Intermediate	5 years	2021
VHDL	Intermediate	7 years	2021
Embedded system	Intermediate	5 years	2021
Agile project management	Intermediate	3 years	now

f. Publications

Journal papers

1. *Mapping the dynamic repertoire of the resting brain.* A. **Hadriche**; J-Louis Nandrino; H. Ghariani; A. Kachouri; V.K Jirsa and L. Pezard. *NeuroImage Journal*. 2013 Sep;78:448-62. <https://doi.org/10.1016/j.neuroimage.2013.04.041>
2. *Reduction of Continuous Neuronal model to discrete binary automata.* A. **Hadriche**; N. Jmail; H. Ghariani, A. Kachouri and L. Pezard. *International Journal of Computer Applications IJCA*. 2013 May; 69, N:24, pp: 5-10. May 2013. <https://research.ijcaonline.org/volume69/number24/pxc3888140.pdf>
3. *Different methods for partitioning the phase space of dynamic system.* A. **Hadriche**, N. Jmail; R. ELLeuch and L. P ezard. *International Journal of Computer Applications IJCA*. May 2014, V 93. N  15. <http://research.ijcaonline.org/volume93/number15/pxc3895931.pdf>
4. *Embedded application for evoked potential detection.* Frikha, Tarek, **Abir Hadriche**, Rafik Khemakhem, Nawel Jmail, and Mohamed Abid. *Journal of Information Assurance &*

- Security 11, no. 4 (2016).*
5. A case study of varying the EEG localization error using different electrode configurations: Embedded solution. R Khemakhem, T Frikha, **A Hadriche**, JP Diguët *Journal of Information Assurance & Security Vol. 11 Issue 5 (2016).*
 6. Hand Gesture Recognition System. Z ABBES, CHIBANI, T Frikha, **A Hadriche**. *Journal of Computer Science and Information Security Vol 14, no.6 (2016).*
 7. Separation between spikes and oscillation by stationary wavelet transform implemented on an embedded architecture. N Jmail, R Jarray, **A Hadriche**, T Frikha, C Benar. *Journal of the Neurological Sciences, Vol 381, 2017.* <https://doi.org/10.1016/j.jns.2017.08.3735>.
 8. Integration of stationary wavelet transform on a dynamic partial reconfiguration for recognition of pre-ictal gamma oscillations. N Jmail, M Zaghoud, **A Hadriche**, T Frikha, CB Amar, C Bénar. *Helyon, Vol4, no.2. 2018.* <https://doi.org/10.1016/j.helyon.2018.e00530>
 9. Using centrality measures to extract core pattern of brain dynamics during the resting state. **A. Hadriche**, N Jmail, J. L Blanc and Laurent Pézard. *Computer Methods and Programs in Biomedicine. 179:104985. Octobre 2019.* <https://www.sciencedirect.com/science/article/abs/pii/S0169260718319084>
 10. Assessment of effective networks connectivity among MEG none contaminated epileptic transitory events. **A. Hadriche**, I. Behy, A. Necibi, A. Kachouri, C.B. Amar and N. Jmail. *Computational and Mathematical Methods in Medicine. vol. 2021, Article ID 6406362, 14 pages, 2021.* <https://doi.org/10.1007/s10115-021-01612-1>
 11. Performance Evaluation of SWT and ICA Techniques for Automatic Separation between Oscillations and Epileptic Spikes by SWT and ICA Techniques R. Jarray, **A. Hadriche**, N. Jmail, H. Dadi, C.B. Amar et M. Zaied. *NeuroQuantology 20 (5), May 2022.* <https://doi.org/10.14704/nq.2022.20.5.NO22175>.
 12. Comparison of Inverse Problem Linear and Non-Linear Methods for Source Localization: EEG -TMS study. R. Jarray, **A. Hadriche**, C.B. Amar, M. Zaied and N. Jmail. *September 2022, NeuroQuantology 20(11):5076-5092.* <https://doi.org/10.14704/nq.2022.20.11.NO66515>
 13. Prediction of seizure buildup by analysis of ECG signals. C. Rmili, **A.Hadriche** M.Carrere and N.Jmail. (submitted)

Conference papers and book chapters

- 1- Epileptic MEG networks connectivity obtained by MNE, sLORETA, cMEM and dspm. I. Behy, **A. Hadriche**, R. Jarray and N. Jmail *Hybrid Intelligent Systems. HIS22. Lecture Notes in Networks and Systems, vol 647. Springer, Cham 2023.* https://doi.org/10.1007/978-3-031-27409-1_32.
- 2- Assessment of Epileptic Gamma Oscillations' network connectivity. A. Necibi, **A. Hadriche** and N. Jmail. *Intelligent Systems Design and Applications. ISDA22. Lecture Notes in Networks and Systems, vol 716. Springer, Cham 2023.* https://doi.org/10.1007/978-3-031-35501-1_9
- 3- Effective connectivity of high-frequency oscillations (HFOs) using different source localization techniques. T; Guesmi, **A. Hadriche** and N. Jmail. *Intelligent Systems Design and Applications. ISDA22. Lecture Notes in Networks and Systems, vol 715. Springer, Cham 2023.* https://doi.org/10.1007/978-3-031-35507-3_36.
- 4- Clustering of high frequency oscillations HFO in epilepsy using pretrained neural networks. Z. Sadek, **A. Hadriche** and N. Jmail. *Intelligent Systems Design and*

- Applications. ISDA22. *Lecture Notes in Networks and Systems*, vol 716. Springer, Cham 2023. https://doi.org/10.1007/978-3-031-35501-1_10.
- 5- *Electronic device adapted to stimulate the propagation zone in order to neutralize epileptic flashover*. R. Rmili, **A. Hadriche**, I. Assali, M. Ben Mbarek, M. Carréré and N. Jmail. Amina, November 2022, Monastir, Tunisia (in process).
 - 6- *Realization of an electronic device for the prediction of epileptic seizures by mathematical analysis of ECG signals*. C. Marouani, **A. Hadriche**, M. Ben Mbarek, I. Assali, M. Carréré and N. Jmail. Amina, November 2022, Monastir, Tunisia (in process).
 - 7- *Evaluation Of Techniques For predicting BUILD UP OF Seizure*. 21st Intelligent Systems Design and Applications. **A. Hadriche**, I. Behy, A. Hajjej and N. Jmail. ISDA 2021 At Marrakesh, Morocco December 2021. *Lecture Notes in Networks and Systems*, vol 418. Springer, Cham. https://doi.org/10.1007/978-3-030-96308-8_76.
 - 8- *Evaluation of stationary wavelet transforms in reconstruction of pure high frequency oscillations (HFOs)*. T. Guesmi, **A. Hadriche**, N. Jmail and C. Ben Amar. 18th International Conference On Smart Living and Public Health. Tunisia. ICOST 2020. https://doi.org/10.1007/978-3-030-51517-1_32
 - 9- *A comparison of inverse problem methods for source localization of epileptic MEG spikes* N. Jmail, **A. Hadriche**, I. Behy, A. Necibi, C. Ben Amar. IEEE 19th International Conference on Bioinformatics and Bioengineering, BIBE 2019. Athens, Greece, 2019, pp. 867-870, <https://doi.org/10.1109/BIBE.2019.00161>
 - 10- *Extraction and Localization of Non-contaminated Alpha and Gamma Oscillations from EEG Signal Using Finite Impulse Response, Stationary Wavelet Transform, and Custom FIR*. N Abdennour, A Hadriche, T Frikha, N Jmail. International Conference on Artificial Neural Networks, 511-520, 2018. http://doi.org/10.1007/978-3-030-01421-6_49.
 - 11- *A Comparison Between Modeling a Normal and an Epileptic State Using the FHN and the Epileptor Model*. R Jarray, N Jmail, **A Hadriche**, T Frikha. International Conference on Innovations in Bio-Inspired Computing and Applications (IAS 2017) At Marrakesh, Morocco. http://doi.org/10.1007/978-3-319-76354-5_22
 - 12- *Adaptive architecture for medical application Case study: evoked potential detection using matching pursuit consensus*. Tarek Frikha, **Abir Hadriche**, Rafik Khemakhem, Nawel Jmail, Mohamed Abid. Intelligent Systems Design and Applications (ISDA 2015), At Marrakesh, Morocco., Volume: 15. <https://doi.org/10.1109/ISDA.2015.7489181>.
 - 13- *Embedded EEG localization error using separately lobe for electrodes configuration*. Rafik Khemakhem, Tarek Frikha, **Abir Hadriche**, Ahmed Ben Hmida. Intelligent Systems Design and Applications (ISDA 2015), At Marrakesh, Morocco., Volume: 15. <https://doi.org/10.1109/ISDA.2015.7489191>
 - 14- *The detection of Evoked Potential with variable latency and multiple trials using Consensus matching pursuit*. **A. Hadriche**, N. Jmail, H. Ghariani, A. Kachouri. The first international conference on Advanced Technologies for Signal and Image Processing. IEEE- ATSSIP. 19-21 Mars 2014. Sousse, Tunisia. https://www.academia.edu/79990424/The_detection_of_Evoked_Potential_with_variable_latency_and_multiple_trial_using_Consensus_matching_pursuit
 - 15- *Étapes de simplification des modèles de neurones*. **A. Hadriche**, H. Ghariani, A. Kachouri. Third workshop on electrophysiological signal processing, Avril 2012 Sfax, Tunisie.
 - 16- *Coarse grained dynamical skeleton of brain electrical activity at rest*. **A. Hadriche**, H. Ghariani, L. Pezard. Congrès MMCA, Décembre 2011, Marseille France.
 - 17- *Markov partition and clique approach applied to human brain electrical activity in rest state*. **A. Hadriche**, H. Ghariani, L. Pezard. Journée de l'IFR 131 Septembre 2011, Marseille France.
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- 18- *Markov partition and symbolic dynamics of human brain electrical activity.* **A. Hadriche**, H. Ghariani, L. Pezard. 19^{ème} colloque Ecole doctorale sciences de la vie et de la santé 2011.Marseille France.
- 19- *Détection automatique des k-complex par la DTW et le K-means.* N. Jmail, **A. Hadrich**, A. Kachouri, H. Ghariani. 2nd International Conference: E-Medical Systems: IEEE E-Medisys 2008. Tunisia.
- 20- *Comparaison de différentes méthodes de filtrage de bruit du secteur à 50 Hz affectant les signaux de l'électrocardiogramme.* **A. Hadrich**, N. Jmail, A. Kachouri, H. Ghariani. 2nd International Conference: E-Medical Systems: IEEE E-Medisys 2008.Tunisie.
- 21- *Détection des stades de sommeil.* N. Jmail, **A. Hadrich**, A. Kachouri, H. Ghariani. *Application Médicales de l'informatique, Nouvelle Approches : Amina* 2008. Tunisie.
- 22- *Les méthodes de filtrage du bruit dû aux mouvements de ligne de base des signaux ECG.* **A. Hadrich**, N. Jmail, A. Kachouri, H. Ghariani. *Application Médicales de l'informatique, Nouvelle Approches : Amina* 2008. Tunisie.
- 23- *Représentation fréquentielle des ondes cérébrales et détection automatique des complexes K.* N. Jmail, **A. Hadrich**, A. Kachouri, H. Ghariani. *Huitième journée scientifique des jeunes chercheurs en Génie électrique et informatique : GEI* 2008. Tunisie.

g. Synergistic Activities

- Principal Speaker in the first and second FORUM carried out by IEEE EMBS Chapter, ENIS Student Branch at ENIS 2019 and 2021, Sfax, Tunisia.
- Principal speaker at the Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal, 2019, ERASMUS+ "Staff teaching" project.
- Keynote speaker for the workshop Medical Applications of Computing New Approaches AMINA 2018, Sousse, Tunisia.
- Organization committee Member of the First Biomedical Signal and Image Processing (BSIP) December 2016, Sousse, Tunisia.
- Organization committee Member of the First Workshop on Embedded System (WES), ISIMG, March 2014.
- Organization committee Member of the python for data sciences. December 2017, Sousse, Tunisia.
- Organization committee Member of the second IEEE CIS school on Computational Intelligence: Theory and Applications. (CITA'2015), 12 to 15 November, Tunisie 2015.
- Reviewers committee Member of the 28th International Conference on Artificial Neural Networks" (ICANN'2019).
- Reviewers committee Member of the 4st IEEE Middle East Conference on Biomedical Engineering " (MECBME 2018).
- Reviewers committee Member of the 15th International Conference on Intelligent Systems Design and Applications (ISDA'2015), 14 to 16 December, Morocco, 2015.
- Reviewers committee Member of the International Conference on *Advanced* Technologies for Signal and Image Processing, 2014,2016 and 2020.
- Reviewers committee Member of the 4th IEEE Middle East Conference on Biomedical Engineering (MECBME 2018).
- Reviewers Committee Member of the Neural Processing Letters journal and IET Science, Measurement & Technology.
- Copilot of Management research process in REGIM Laboratory, National Engineer School, Sfax University. Certificate in ISO 9001

h. Spoken language skills

- Arabic: native
- French: native
- English: fluent

i. Award and Honors:

- **Retained** as guest lecturer for the **Erasmus+ mobility** exchange program for academic staff, Portugal, Universidade de Trás-os-Montes e Alto Douro, Vila Real 2019.
- **Best** poster award for the abstract submitted in the XXIII World Congress of Neurology (WCN2017), Kyoto Japan, 2017.
- **Retained** by the High-level scientific stay **SSHN 2015** for a traineeship at the institute of neuroscience and system INS.
- **Member of the SBRA project** which aims to put into practice the skills of research laboratories and French and Swiss hospitals for the benefit of public and individual health (technological progress in the face of breast cancer)
- **Project leader of** young researcher "Hatem Ben Taher" project during the years 2018 and 2019.

j. Collaborators & Other Affiliations

(i) Collaborators

- Laurent Pezard, (CNRS) Aix Marseille University, CNRS, LNSC UMR 7260 Marseille France.
- Noureddine Zerhouni, National school of Mechanics and Microtechnology Besançon France.
- Marcel Carrere, INS, Marseille, France.
- Chokri Ben Amar, National Engineering School of Sfax (ENIS), Tunisia.

(ii) Thesis Advisor and Postgraduate Sponsor

- 7 PhD Thesis Students (1 defended)
 - 9 master students defended
 - 5 engineering students defended
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