



NABIL Muhammed GMATI

Full Professor

Personal Data

Nationality | Tunisian

Date of Birth | 19 september 1962

Department | Mathematics

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Language Proficiency

Language	Read	Write	Speak
Arabic	Maternal	Maternal	Maternal
English	Full professional competence	Full professional competence	Full professional competence
French	Fluent	Fluent	Fluent

Academic Qualifications (Beginning with the most recent)

Date	Academic Degree	Place of Issue	Address
June 2005	University Habilitation	University Tunis El Manar	Campus El Manar, Tunis, Tunisia.
February 1992	Phd	University Paris 6 – P.M.Curie	Rue Jussieu, Paris, France.
June 1987	Master Degree	University Paris 6 – P.M.Curie	Rue Jussieu, Paris, France.
June 1986	Bachelor Degree	University Paris 11 – Orsay.	Orsay, France.

PhD, Master or Fellowship Research Title: (Academic Honors or Distinctions)

PhD	
Master	
Fellowship	

Professional Record: (Beginning with the most recent)

Job Rank	Place and Address of Work			Date
Full Professor	Imam Abdurrahman bin Faisal University	Dammam	Saudi Arabia	2018 - Present
Full Professor	Ecole Nationale d'ingénieurs de Tunis	Tunis	Tunisia	2010 - 2018
Associate Professor	Ecole Nationale d'ingénieurs de Tunis	Tunis	Tunisia	2006-2010
Associate Professor	Institut Prép. Des études d'Ing. De Nabeul	Nabeul	Tunisia	2005 – 2006
Assistant Professor	Institut Prép. Des études d'Ing. De Nabeul	Nabeul	Tunisia	1994 – 2005
Develop. Engineer	Dymag Company	Paris	France	Feb 94 – Jun 94
Assistant	Pierre et Marie Curie University	Paris	France	1991 – 1993
Research Engineer	Ecole Nationale Sup. des Techn. Avancées	Paris	France	1987 - 1991

Administrative Positions Held: (Beginning with the most recent)

Administrative Position	Office	Date
Journal Editor In Chief	Arima Journal - https://arima.episciences.org	From 2016
Head of a research Laboratory	Laboratoire de Modélisation Mathématique et Numérique dans les sciences de l'Ingénieur.	2007 – 2016
Coordinator of 10 Tunisian Laboratories	International Associated Laboratory (Associated with the French National Research Center-CNRS)	2009 - 2018

Scientific Achievements

Published Refereed Scientific Researches

(In Chronological Order Beginning with the Most Recent)

#	Name of Investigator(s)	Research Title	Publisher and Date of Publication
21	N. Gmati, F. Jelassi and A. Mohamed.	On the Schwarz Method for the Eddy Currents Model	<u>Computers and Mathematics with Applications</u> . Volume 113, 1 May 2022, Pages 174-188
20	<u>Nouf K.AL-SaleemabTaherGhribacAishahAL-NaghmaishabAbdelhafeez A.ElshekipyadNawalAlmalkiad NabilGmatiadNajoua KamounTurkie</u>	Effect of porosity on structural, optical, thermal, and electrical properties of nickel-foam coated graphene sheets	<u>Journal of Materials Research and Technology</u> . Volume 19, July–August 2022, Pages 300-313
19	Harouna Soumare, Sadok Rezgui, Alia Benkahla, and Nabil Gmati.	Deep Learning algorithms Analysis of Regularization techniques to genomic data.	<u>Array Journal</u> . Volume 11, September 2021, 100068
18	Harouna Soumare, Sadok Rezgui, Alia Benkahla, and Nabil Gmati.	New Neural Network classification method for individuals ancestry prediction from SNPs data.	<i>BioData Mining</i> 14 , 30 (2021).
17	Faker Ben Belgacem, Nabil Gmati and Faten Jelassi1	Computational Zooming in Near Unilateral Cracks by Schwarz Method with Total Overlap	J. Math. Study. Vol. 52, No. 4, pp. 378-393 December 2019
16	E. Darrigrand, N. Gmati, R. Rais	Convergence of Krylov Subspace Solvers with Schwarz Pre-conditioner for the Exterior Maxwell Problem	Computers and Mathematics with Applications, August, 2017.
15	N. Gmati, S. Lanteri, A. Mohamed	Discontinuous Galerkin Method Coupled with an Integral Representation for Solving the Three-Dimensional Time-Harmonic Maxwell Equations'	Applied Acousticc, 108 : 59-62, Vol. 1, 2016.
14	N. Gmati, S. Lanteri, A. Mohamed	Solving the Three-Dimensional Time-Harmonic Maxwell Equations by	Springer International Publishing, Vol.2, 2015, pp 401-408. 2015



		Discontinuous Galerkin Methods Coupled to an Integral Representation	
13	E. Darrigrand, N. Gmati, R. Rais	'Schwarz Method Justification of a Coupling Between Finite Elements and Integral Representation for Maxwell Exterior Problem	Comptes Rendus Mathematiques , 352 (4), pp.311-315, 2014.
12	M. Bouajaji, N. Gmati, S. Lanteri and J. Salhi	Coupling of an Exact Transparent Boundary Condition with a Discontinuous Galerkin Method for the Solution of the Time-Harmonic Maxwell Equations. Spectral and High-Order Methods for Partial Differential Equations	Selected Papers from the Icosahom 2012 Conference, Lecture Notes in Computational Science and Engineering, Springer, 2013
11	F. Ben Belgacem, F.Jelassi and N. Gmati	Total Overlapping Schwarz Pre-conditioners for Elliptic Problems	ESAIM-M2AN, 2011, Vol. 45, pp 91- 113.
10	F. Ben Belgacem, F.Jelassi and N. Gmati	'Convergence Bounds of GMRES with Schwarz Pre-conditioner for the Scattering Problem	<i>International Journal for Numerical Methods in Engineering</i> . Int. J. Numer. Meth. Eng. 2009, 80, pp. 191-209 .
9	N. Gmati and B. Philippe	Comments on the GMRES Convergence for Preconditioned Systems	Large-Scale Scientific Computing. Revised papers in the 6th International Conference, LSSC 2007, pp 40-51.
8	M. Azaiez, A. Ben Abda, R. Ben Fatma, N. Gmati	Missing Boundary Data Recovering for the Helmholtz Problem	CRAS Mécanique, 335 pp. 787-792, 2007.
7	C. Hazard, N. Gmati, C. Ben Amar, K. Ramdani	Numerical Simulation of Acoustic Time Reversal Mirrors', in SIAM Journal of Applied Mathematics	Vol. 64, N.3, pp. 2067-2076, 2006 .
6	N. Gmati et N. Zrelli	Numerical Study of Some Iterative Solvers for Acoustics in Unbounded Domains	ARIMA, Vol.4, pp. 1-23, 2006.
5	F. Ben Belgacem, M. Fourní, N. Gmati et F. Jelassi	On the Schwarz Algorithms for Elliptic Exterior Boundary Value Problems	ESAIM-M2AN, Vol. 39, N.4, 2005.

4	A.S. Bonnet-Bendhia, D. Drissi, N. Gmati	Mathematical Analysis of the Acoustic Diffraction by a Muffler Containing Perforated Ducts	M3AS, Vol.15, N.7, 2005.
3	A.S. Bonnet-Bendhia, D. Drissi, N. Gmati	Determination of Muffler's Transmission Losses by a Homogenized Finite Element Method	Journal of Computational Acoustics, Vol 12, N.3, September 2004.
2	F. Ben Belgacem, M. Fournié, N. Gmati et F. Jelassi	Comment traiter des conditions aux limites à l'infini pour quelques problèmes extérieurs par la méthode de Schwartz alterné	C. R. Acad. Sci. Paris, Ser. I 336 , 277- 282 (2003).
1	A.S. Bonnet-Bendhia, N. Gmati	Spectral Approximation of Boundary Condition for an Eigenvalue Problem	SIAM J. NUMER ANAL, Vol 32, N.4, pp 1263-1279, August 1995.

Refereed Scientific Research Papers Accepted for Publication

#	Name of Investigator(s)	Research Title	Journal	Acceptance Date

Scientific Research Papers Presented to Refereed Specialized Scientific Conferences

#	Name of Investigator(s)	Research Title	Conference and Publication Date
1	N. Gmati, F. Jelassi, B.Philippe	Gmres preconditioners based on domain decompositions	8th workshop of the ERCIM WG Matrix computations and statistics. Salerno, Italy, september 2006.
2	C. Ben Amar, N. Gmati, C. Hazard, K. Ramdani	Mathematical and numerical study of a time reversal mirror	The 7th International Conference on Mathematical and Numerical Aspects of Wave Propagation "Waves 2005", Providence, USA, June 2005.
3	F.Ben Belgacem, N. Gmati, M.Fournie, F. Jelassi	Handling the Boundary conditions at infinity for some exterior problems by the alternating Schwarz method	The 6th International Conference on Mathematical and Numerical Aspects of Wave Propagation "Waves 2003", Finland, July 2003.
4	N. Gmati, N. Zrelli	A domain decomposition method for the Helmholtz equation on an unbounded waveguide	AMRTMA - L'analyse Mathématique et ses applications à l'acoustique et à la mécanique - Fréjus, France, Juin 2002.



5	A.S.Bonnet-Bendhia, D.Drissi, N. Gmati	Determination of muffler's transmission losses by homogenization and finite element method	5th International Conference "Waves 2000", Santiago de Compostela, Espana, July 2000
6	C.Farhat, N.Gmati, U.Hetmaniuk	An efficient substructuring method for analyzing acoustics in a concentric hole-cavity resonator	5th International Conference "Waves 2000", Santiago de Compostela, Espana, July 2000.

Completed Research Projects

#	Name of Investigator(s) (Supported by)	Research Title	Report Date
1	Nabil Gmati, Nejib Zenzemi	INRIA team project: EPICARD team co-directed with Nejib Zenzemi, https://team.inria.fr/carmen/research/epicard/	2017
2	Nabil Gmati, Mohamed Jaoua	Mathematics for Development Project: Coordinator for a project funded by the French Ministry of Immigration for National Identity and Solidarity	2011
3	Nabil Gmati, Eric darrigrand	STIC project: Fast multipole methods and Schwarz methods with overlap for diffraction problems. (ENIT-LAMSIN, INRIA-Rennes)	2010
4	Nabil Gmati, Anne Sophie Bonnet Ben Dhia, Amel Ben Abda.	STIC project: Direct and inverse problems in wave propagation. (ENIT-LAMSIN, INRIA-POEMS)	2005
5	Nabil Gmati, Anne Sophie Bonnet Ben Dhia,	CMCU Project: Numerical and experimental study of wave propagation problems in confined or unbounded environments. (ENIT, National School of Advanced Techniques and University of Maine).	2001
6	Nabil Gmati, Mohamed Jaoua, Kamel Mekki.	PIRD project: Sound study of exhaust silencers, by finite elements. (National School of Engineers of Tunis and ERECA Company)	2000



7	Nabil Gmati, Marc Lenoir.	CNRS-DGRST project: Study of the diffraction problems in acoustics and electromagnetics. (National School of Engineers of Tunis and National School of Advanced Techniques).	1999
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Current Researches

#	Research Title	Name of Investigator(s)
1	Finite element method for heat conduction in perforated graphene structure.	<u>Nouf K.AL-Saleema, Tahar Ghrib, Nabil Gmati</u>
2	A coupling method between integral representation and finite elements in acoustics for axisymmetric geometry.	Nabil Gmati, Aicha Al wehebi, sami brini, Faten Jelassi, Naouel Zrelli.
3	Image encryption algorithm based on pixel permutation	Malek Fehaid, Nabil Gmati, and Al.

Contribution to Scientific Conferences and Symposia

#	Conference Title	Place and Date of the Conference	Extent of Contribution
1	KAUST 2022 Workshop on statistics	KAUST, Saudi Arabia – 30 october to 3 november 2022	Conference: A Neural Network classification method for individuals ancestry prediction from SNPs data.
2	More than 50	More than 50	More than 50
3	Conference and seminar contributions	Conference and seminar contributions	Conference and seminar contributions

Membership of Scientific and Professional Societies and Organizations

- Member of the organization : Youth for science Fundation (Mission: Diffusion of the scientific culture).
- Member of the ASDS : African Society of Digital sciences.

Teaching Activities

Undergraduate

#	Course/Rotation Title	No./Code	Extent of Contribution (no. of lectures/Tutorials. Or labs, Clinics)
1	Mathematical equations for physics.		(15 lectures) 45 Hrs.
2	Numerical analysis. Linear systems.		(7 lectures) 21 Hrs.
3	Numerical Analysis. Non linear equations.		(7 lectures) 21 Hrs.
4	Linear algebra and vector spaces.		(30 lectures) 60 Hrs.
5	Linear and Bilinear Algebra		(30 lectures) 90 Hrs.
6	Real Analysis. Calculus.		(30 lectures) 90 Hrs.



7	The finite element method and the finite difference method.		(7 lectures) 21 Hrs.
٨	Real Analysis	Math403	(30 lectures) 60 Hrs.
٩	Introduction to Mathematical Modeling	Math409	(30 lectures) 60 Hrs.
١٠	Functional analysis	Math484	(30 lectures) 60 Hrs.
١١	Differential equations	Math310	(30 lectures) 60 Hrs.
١٢	Applied Matrix Theory	Math504	(30 lectures) 60 Hrs.
١٣	Numerical Analysis	Math305	(30 lectures) 60 Hrs.
١٤	Calculus 2	Math205	(30 lectures) 60 Hrs.

Brief Description of Undergraduate Courses Taught: (Course Title – Code: Description)

1	
2	

Postgraduate

#	Course/Rotation Title	No./Code	Extent of Contribution (no. of lectures/ Tutorials. Or labs, Clinics)
1	Numerical and Mathematical Analysis of the Finite Element Method		15 lectures (45 Hrs)
2	Numerical and mathematical analysis of domain decomposition method.		15 lectures (45 Hrs)
3	Numerical and mathematical analysis of wave propagation phenomena.		15 lectures (45 Hrs)
4	Numerical and mathematical analysis of the boundary element method.		15 lectures (45 Hrs)
5	Numerical Linear Algebra	Math525	(20 lectures) 60 Hrs.
6	Inverse and Ill posed Problems	Math551	(20 lectures) 60 Hrs.
7	Numerical Methods of ODE	Math538	(20 lectures) 60 Hrs.
8	Applied Analysis	Math523	(20 lectures) 60 Hrs.

Brief Description of Postgraduate Courses Taught: (Course Title – Code: Description)

1	
2	



Course Coordination

#	Course Title and Code	Coordination	Co-coordination	Undergrad.	Postgrad.	From	To
1	Numerical and Mathematical Analysis of the Finite Element Method	Nabil Gmati			(X)	2012	2015
2	Numerical and mathematical analysis of domain decomposition method.	Nabil Gmati			(X)	2004	2009
3	Mathematical equations for physics.	Nabil Gmati		(X)		2006	2018
4	Numerical analysis. Linear systems.	Nabil Gmati		(X)		2006	2018
5	Numerical Analysis. Non linear equations.	Nabil Gmati		(X)		2006	2012
6	Linear algebra and vector spaces.	Nabil Gmati		(X)		2009	2009
7	Linear and Bilinear Algebra	Nabil Gmati		(X)		1994	2005
8	Real Analysis. Calculus.	Nabil Gmati		(X)		1994	2005
9	The finite element method and the finite difference method.	Nabil Gmati		(X)		1988	1989
١٠	Real Analysis	Nabil Gmati	(X)			2018	2019
١١	Introduction to Mathematical Modeling	Nabil Gmati	(X)			2019	2022
١٢	Functional analysis	Nabil Gmati	(X)			2019	2020
١٣	Differential equations	Nabil Gmati	(X)			2019	2022
١٤	Applied Matrix Theory	Nabil Gmati	(X)			2019	2022
15	Numerical Analysis	Nabil Gmati	(X)			2019	2022
16	Calculus 2	Nabil Gmati	(X)			2021	2022
17	Numerical Linear Algebra	Nabil Gmati		(X)		2018	2022
18	Inverse and Ill posed Problems	Nabil Gmati		(X)		2021	2022
19	Numerical Methods of ODE	Nabil Gmati		(X)		2022	2023
20	Applied Analysis	Nabil Gmati		(X)		2022	2023

Guest/Invited Lectures for Undergraduate Students

#	Activity/Course Title and Code	Subject	College and University or Program	Date

Student Academic Supervision and Mentoring

#	Level	Number of Students	From	To



Supervision of Master and/or PhD Thesis

#	Degree Type	Title	Institution	Date
1	Master	Diffraction of an acoustic wave by an axisymmetric obstacle, numerical resolution by a boundary element method.	ENIT	1996
2	Master	Study of the Localised finite element method for the calculation of guided waves in optical fibers.	ENIT	1998
3	Master	Resolution of a diffraction problem in a essentially axisymmetric domain by domain decomposition and Fourier series decomposition.	ENIT	2001
4	Master	Alternating Schwarz method for the Poisson problem in an unbounded domain.	ENIT	2004
5	Master	Study and implementation of the calculation of the attenuation acoustics of an exhaust silencer, using three-dimensional finite elements.	ENIT	2002
6	Master	Fast multipole method for finite element coupled with an integral representation.	ENIT	2004
7	Master	Discontinuous Galerkin method coupled with an integral representation for the Maxwell equations in harmonic regime.	ENIT	2009
8	Master	Iterative method for Discontinuous Galerkin method coupled with an integral representation in propagation of electromagnetic waves.	ENIT	2011
9	Master	Numerical and theoretical study of the method coupling finite element method and Fourier Representation.	ENIT	2012
10	Master	Convergence study of the stochastic gradient applied for Deep Learning.	ENIT	2016
11	Phd	Resolution of a wave propagation problem in a exhaust muffler by a technique coupling the finite elements and Homogenization.	ENIT	2004
12	Phd	Subdomain iteration method for conditions at the transparent limits in wave propagation.	ENIT	2005
13	Phd	Alternate Schwarz method for the problems of wave propagation in unbounded domain.	ENIT	2006
14	Phd	Theoretical and numerical study of the method of time reversal.	ENIT	2007
15	Phd	Koslov's algorithm for the Helmholtz equation.	ENIT	2011
16	Phd	Fast multipole method for finite element coupling and integral representation.	ENIT	2013



17	Phd	Numerical and theoretical study of Discontinuous Galerkin method coupled with an integral representation for propagation of electromagnetic waves.	ENIT	2018
18	Phd	Optimization of Deep Learning neural networks for Genomics.	ENIT	2022
19	Phd	FE approximation for an hybrid Naghdi equations for shells with G 1-midsurface	ENIT	2020

Ongoing Research Supervision

#	Degree Type	Title	Institution	Date

Administrative Responsibilities, Committee and Community Service (Beginning with the most recent)

Administrative Responsibilities

#	From	To	Position	Organization
1	2016	Present	Journal Editor In Chief	Arima Journal - https://arima.episciences.org
2	2007	2016	Head of a research Laboratory	Laboratoire de Modélisation Mathématique et Numérique dans les sciences de l'Ingénieur.
3	2009	2018	Coordinator of 10 Tunisian Laboratories	International Associated Laboratory (Associated with the French National Research Center-CNRS)

Committee Membership

#	From	To	Position	Organization
1	2012	2014	Member of the recruitment committee	Ministry of higher education
2	2015	2018	Member of the sectorial committee of mathematics	Ministry of higher education

Scientific Consultations

Volunteer Work

#	From	To	Type of Volunteer	Organization
1	2016	2018	Coordinator	Youth for science foundation
2	2017	2017	National coordination of the project	National science Feast
3	2012	2014	Member of the scientific committee	ENIT

Personal Key Competencies and Skills: (Computer, Information technology, technical, etc.)

1	Computer science languages: Fortran, Pascal, Python, Matlab
2	Scientific computing: Melina, melina++, Xlife++, Ideas, Rayon, Ansys, Freefem



Last Update

03/11/2022