Pr. Tarik BORDJIBA

Ph.D. in Energy and Materials Sciences
Vice Rector of doctoral studies and scientific research
Professor in the department of process engineering
Leader of research team ''Renewable Energy''
University 8 Mai 1945 Guelma, Algeria

bordjiba.arik@univ-guelma.dz
bordjiba_tarik@yahoo.ca

Pr. Tarik Bordjiba is an accomplished academic leader and energy and materials science researcher with over 15 years of experience in university teaching, scientific research, higher education administration, and strategic planning. As Vice Rector overseeing doctoral studies, university habilitation, and scientific research, he has successfully driven initiatives to enhance academic programs, foster interdisciplinary research, and build collaborative partnerships. Pr. Bordjiba holds a Ph.D. in Energy and Materials Sciences from the National Institute of Scientific Research (Canada) and a Magister in Solid Physics. His expertise spans nanotechnology, renewable energy, and advanced materials, demonstrated through prolific publications in high-impact journals and presentations at international conferences. He has led research teams, secured competitive funding, and received awards for innovation in electrochemical capacitors and renewable energy applications. Pr. Bordjiba combines technical expertise with a strong vision for advancing education and research to address global challenges.

Highlights

- Led the conception of national policy and strategy to improve the international ranking, global visibility, and promotional profile of Algerian higher education institutions.
- Directed the strategy and managed all operations for the university's doctoral school and scientific research activities.
- Served as a key member of the Rectorate's executive leadership team, participating in institutional governance, strategic planning, and budgetary decisions.
- Developed and taught core curriculum in Physical Sciences, Energy, and Materials Science.
- Formulated and proposed original research concepts in nanotechnology for energy applications.
- Managed a portfolio of research projects in renewable energy; defined project scope, timelines, and resource allocation for team.
- Executed and delivered complex research on novel supercapacitor materials, resulting in 20 peer-reviewed publications and 1 US PATENT.

- Designing and executing academic programs (reaching and research).
- Mentored and supervised a cohort of undergraduate, master's, and doctoral students, resulting in successful thesis defenses and publications.
- Managed a team of faculty researchers, providing guidance on research development, funding applications, and teaching methodology.
- Oversaw administrative staff responsible for program accreditation, student services, and laboratory operations.
- Fostered a collaborative academic environment between students, faculty, and administration to enhance research output and educational quality.

Experience

2019-07 - Current

Vice Rector in charge of Postgraduate Studies, University Habilitation and Scientific Research
Université 8 Mai 1945 Guelma, Guelma

2023-10 - Current

Member of the National Commission for the Promotion of Visibility and Ranking of Algerian Higher Education and Scientific Research Institutions
Ministry of Higher Education and Scientific Research in Algeria

2019-01 - Current

Full Professor
Université 8 Mai 1945 Guelma, Guelma

2013-06 - Current

Renewable Energy Team Leader
Université 8 Mai 1945 Guelma, Guelma

2017-10 - 2019-07

Mission Head in Vice Rectorate in charge of Postgraduate Studies, University Habilitation and Scientific Research
Université 8 Mai 1945 Guelma, Guelma

2011-10 - 2019-01

University Lecturer
Université 8 Mai 1945 Guelma, Guelma

2009-01 - 2011-06

Associate Researcher
Université du Québec à Montréal (UQAM), Montréal, Canada

2008-01 - 2009-01

Postdoctoral Researcher
Université du Québec à Montréal (UQAM), Montréal, Canada

Languages

Arabic

English

French

Education

2007-11 **PhD: Sciences of Energy and Materials**
Institut National de la Recherche Scientifique (INRS-EMT) - Canada

2000-10 **Magister: Solid Physics**
Constantine University – Constantine, Algeria

1997-06 **Bachelor of Science: Solid Physics**
Constantine University – Constantine, Algeria

1992- 07 **Baccalauréat (high school diploma): Natural science**
Lycée Mahmoud Ibn Mahmoud –Guelma, Algeria

Expertise

MATERIALS SYNTHESIS & PROCESSING

- Graphene synthesis (mechanical exfoliation, CVD)
- Chemical and electrochemical synthesis of nanostructured metal oxides
- Synthesis of carbon nanotubes (CNTs) via Chemical Vapour Deposition (CVD) on various substrates (carbon paper, metallic foils, graphite, silicon, quartz)
- Chemical modification, functionalization, and purification of carbon nanotubes
- Synthesis of nanocomposite materials (metal oxide/CNT, carbon aerogel/CNT)
- Chemical synthesis of carbon aerogels and related nanostructures
- Electrophoresis deposition and separation techniques
- Thin film deposition via ultra-high vacuum (UHV) systems

MATERIALS MODELING & CHARACTERIZATION

- **Theoretical Modeling:** Density Functional Theory (DFT) for electronic structure and material properties
- **Structural Analysis:** X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Micro-Raman Spectroscopy
- **Surface & Chemical Analysis:** X-ray Photoelectron Spectroscopy (XPS), FT-IR Spectroscopy, BET Surface Area Analysis

- **Thermal Analysis:** Thermogravimetric Analysis (TGA)
- **Optical Analysis:** UV-Visible Spectroscopy
- **Electrochemical Analysis:** Cyclic Voltammetry (CV), Galvanostatic Charge/Discharge (GCD), Electrochemical Impedance Spectroscopy (EIS)

EQUIPMENT & LABORATORY DEVELOPMENT

- Installation, calibration, and operation of Chemical Vapour Deposition (CVD) systems
- Installation, calibration, and operation of Plasma-Enhanced Chemical Vapour Deposition (PECVD) systems
- Design and setup of custom experimental apparatus for electrophoresis and graphene synthesis

Patents

US PATENT: Development of all solid electrochemical capacitors based on carbon nanotubes, metal oxide and solid electrolyte, under consideration, invention and intellectual property office of Defense Research and Development Canada

Publications in indexed journal

- Electrochemically activated binder-free carbon nanocomposite electrode for enhanced electrochemical capacitor, Riane Nor El Houda Chiheb, Zineb Nabti, Ali Benayahoum, Chaima Chaib, **Tarik Bordjiba**, Samia Bouakkaz, Ahcene Lemzadmi, Amel Boudjemaa, Journal of Energy Storage, 102, 2024, 113980
- Optimizing Energy Management of Hybrid Battery-Supercapacitor Energy Storage System by Using PSO-Based Fractional Order Controller for Photovoltaic Off-Grid Installation, Zermane Akram Issam, **Tarik Bordjiba**, Journal Européen des Systèmes Automatisés, 2024
- Integration of Solar Energy in Waste Management: Modeling Performance Analysis and Degradation Evaluation of a Grid-Connected Photovoltaic Power Plant for an Ecological Sorting Center, Zermane Akram Issam, **Tarik Bordjiba**, YMER, 23, 2024, 80-100
- Antioxidant activity and pKa calculations of 4-mercaptostilbene and some derivatives: A theoretical approach, Benayahoum, Ali, Bouakkaz, Samia, Bordjiba Tarik, Abdaoui Mohamed, Journal of Molecular Liquids, 275, 2019-02-01, 221-231
- Free-standing and binder-free electrochemical capacitor electrode based on hierarchical microfibrous carbon–graphene–Mn3O4 nanocomposites materials, Nabti Zineb, **Bordjiba Tarik**, Poorahong, Sujittra, Boudjemaa, Amel, Benayahoum, Ali, Siaj, Mohamed, Bachari, Khaldoun, Journal of Materials Science: Materials in Electronics, 29, 17, 2018, 14813–14826
- Electrodeposition of manganese oxide on carbon paper and their applications in renewable energies, Zineb Nabti, **Tarik Bordjiba**, Sara Bezzazi, Imane Saidia, IEEE xplore, 2018 International Conference on Electrical Sciences and Technologies in Maghreb (CISTEM), 2018-10-28 to 2018-10-31
- Neural Networks Prediction of Ionic Mobilities in SF6-N2 mixture, Ahcene Lemzadmi, Assia Guerroui, **Tarik Bordjiba**, A. k. Moussaoui, J. Electrical Systems, 14, 1, 2018, 86-94

- Synthèse et Caractérisation des Nanoparticules de l'Oxyde de Manganèse Bien Dispersées sur le Microfibres de Carbone et Leurs Applications en Energies Renouvelables, Zineb nabti, **Bordjiba Tarik**, Benayahoum Ali, Khaidoun Bachari, Fourth International Conference on Energy, Materials, Applied Energetics and Pollution, Constantine, Algeria, 2018
- Corrosion resistance of monolayer hexagonal boron nitride on copper, Mahvash, S. Eissa, **Tarik Bordjiba**, A. C. Tavares, T. Szkopek, M. Siaj, Scientific Reports, 7, 42139, 2017
- Development of Composite Material Based on Porous Microfibrous Carbon and Zinc Oxide for Energy Storage Application, Youcef Guetteche, **Tarik Bordjiba**, Bilel Bouguerne, Zineb Nabeti, Ourida Mahmoudi, Ahcen Lemzademi, Int. J. Electrochem. Sci., 12, 2017, 1874 – 1884
- Density Functional Theory Study of the Interaction of 2- Mercaptobenzimidazole and Gold, Palladium and Nickel atoms, Ourida Mahmoudi, **Tarik Bordjiba**, Abed Mohamed Affoune, International Journal Of Electrochemical Science, 11, 2016, 4427-4441
- Substitutional doping of bore, aluminum, silicon, phosphor and nitrogen in graphene for fuel cell: Density functional theory study, **Tarik Bordjiba**, Hicham Aguibi, Ourida Mahmoudi, Youcef.Guetteche, IEEE xplore, The Second International Conference on Renewable Energy Research and Applications ICRERA, 2013, 923 – 926
- Molding versus dispersion: effect of the preparation procedure on the capacitive and cycle life of carbon nanotubes aerogel composites, **Tarik Bordjiba**, Mohamed Mohamedi, Journal of Solid State Electrochemistry, 15, 2011, 765-771
- Development of new nanocomposite based on nanosized-manganese oxide and carbon nanotubes for high performance electrochemical capacitors, **Tarik Bordjiba**, Daniel Bélanger, Electrochimica Acta, 55, 2010, 3428–3433
- Direct redox deposition of manganese oxide on multi scaled carbon nanotubes/microfibers carbon electrode for electrochemical capacitor, **Tarik Bordjiba**, Daniel Bélanger, Journal of the Electrochemical Society, 156, 2009, A378-A384
- New Class of Carbon Nanotubes Aerogels Electrodes for Electrochemical Power Sources, **Tarik Bordjiba**, Mohamed Mohamedi, Lê H. Dao, Advanced Materials, 20, 4, 2008, 815-819
- On the charge storage mechanism of binderless nanocomposite electrodes formed by dispersion of carbon nanotubes and carbon aerogels, **Tarik Bordjiba**, Mohamed Mohamedi, Lê H. Dao, Journal of the Electrochemical Society, 155, 2, 2008, A115-A124
- Enhanced structural and electrochemical properties of nanostructured carbon nanotubes coated microfibrous carbon paper, **Tarik Bordjiba**, Mohamed Mohamedi, Lê H. Dao, Brahim Aissa, My Ali El Khakani, Chemical Physics Letters, 441, 2007, 88-93
- Novel binderless nanostructured carbon Nanotubes-carbon Aerogel composites for supercapacitors, **Tarik Bordjiba**, Mohamed Mohamedi, Lê H. Dao, Electrochemical Society Transaction, 6, 25, 2008, 183
- Binderless carbon nanotubes / carbon fiber composites for electrochemical micro power sources, **Tarik Bordjiba**, Mohamed Mohamedi, Lê H. Dao, Nanotechnology, 18, 2007, 35202-35207
- Synthesis and electrochemical capacitance of binderless nanocomposite electrodes formed by dispersion of carbon nanotubes and carbon aerogels, **Tarik Bordjiba**, Mohamed Mohamedi, Lê H. Dao, Journal of Power Sources, 172, 2007, 991-998

Other Publications

- Les supercapacités électrochimiques solides, **Tarik Bordjiba**, Daniel Bélanger, Progress report, 2009-01-01 to 2009-04-30, Defence Research and Development Canada
- Development of new nanocomposite based on manganese oxide for supercapacitors application, **Tarik Bordjiba**, Daniel Bélanger, Progress Report, 2008-01-01 to 2008-04-30, Defence Research and Development Canada.
- Metal Oxide Material and Current Collector Efficiency for Electrochemical Supercapacitors, Gwenaël Chamoulaud, **Tarik Bordjiba**, Daniel Bélanger, Annual report, 2007-01-01 to 2008-01-01, Defence Research and Development Canada.

International Conferences

- Activité catalytique du graphène appliqué sur des alliages cuivre-nickel pour la réaction de dégagement d'hydrogène, Chaib Chaima, Chiheb Riane Nor El Houda, **Tarik Bordjiba**, Conférence Internationale des énergies renouvelables CIER, Hammamet, Tunisie, 2022
- Modeling, Simulation And Performance Analysis Of 21.6 Kw Grid Connected Photovoltaic System Using Pvsyst Software, Zermane Akram Issam, **Tarik Bordjiba**, International World Energy Conference, Turkey, 2021
- A binderless Carbon Electrode material derived from Nuts shell waste for Renewable energies and Energy storage applications, Chiheb Riane Nor El Houda, Nabti Zineb, **Tarik Bordjiba**, International World Energy Conference, Turkey, 2021
- Graphène Haute Performance Sur Alliages Cuivre-Nickel Pour Réaction D'évolution De L'hydrogèn, Chaib Chaima, Chiheb Riane Nor El Houda, **Tarik Bordjiba**, International World Energy Conference, Turkey, 2021
- Binderless graphene / three-dimensional microfibrous carbon paper composites electrode for electrochemical applications, **Tarik Bordjiba**, Zineb Nabti, Samia Bouakkaz, Ali Benayahoum, Ahcene Lemzadmi, The 190th International Conference on Science, Engineering & Technology (ICSET), Istanbul, Turkey, 2019-12-01
- Novel strategy for preparation of nanocomposites electrode based on graphene, **Tarik Bordjiba**, Zineb Nabti, Samia Bouakkaz, Ali Benayahoum, Ahcene Lemzadmi, VI. International Energy Technologies Conference Entech '19, Istanbul, Turkey, 2019-12-01
- Solid State Electrochemical Capacitors, Daniel Bélanger, **Tarik Bordjiba**, 234th meeting of the electrochemical society and The Americas International Meeting on Electrochemistry and Solid State Science AiMES 2018 Meeting, Cancun, Mexico, 2018
- Electrodeposition of manganese oxide on carbon paper and their applications in renewable energies, Zineb Nabti, **Tarik Bordjiba**, Sara Bezzazi, Imane Saidia, 2018 International Conference on Electrical Sciences and Technologies in Maghreb (CISTEM), Alger, Algeria, 2018-10-31
- Synthèse et Caractérisation des Nanoparticules de l'Oxyde de Manganèse Bien Dispersées sur le Microfibres de Carbone et Leurs Applications en Energies Renouvelables, Zineb Nabti, **Tarik Bordjiba**, Benayahoum Ali, Khaidoun Bachari, Fourth

International Conference on Energy, Materials, Applied Energetics and Pollution, Constantine, Algeria, 2018

- Amélioration de la stabilité des caractéristiques physico-chimiques et microbiologiques des conserves de tomates exposées à l'air et à la température ambiante, Zineb Nabti, **Tarik Bordjiba**, Razika Mehalel, Séminaire International sur L'Agroalimentaire « SIA 2018», Guelma, Algeria, 2018
- Nouvelle approche pour le développement des électrodes à base de papier carbone et oxyde de manganèse pour application en stockage d'énergies renouvelables, Nabti Zineb, **Tarik Bordjiba**, Vème Colloque International de Chimie (CIC-5), Batna, Algeria, 2018
- Synthèse et Caractérisation de Nanocomposites à base de Nanotubes de Carbone et Oxyde de Zinc pour Application en Energies Renouvelables, Zineb Nabti, **Tarik Bordjiba**, Ourida Mahmoudi, Asma Allele, Wahida Salmi, The Third International Symposium on Mineral Industry and Environment, Annaba, Algeria, 2017-10-11 to 2017-10-13
- Prediction of mobilities in SF6-N2 gas mixture using artificial neural networks, Ahcene Lemzadmi, A. Guerroui, Abdelkarım Moussaoui, **Tarik Bordjiba**, the International Conference on Recent Advances in Electrical Systems (ICRAES'17), Tunis, Tunisia, 2017
- Monolayer of 2-Mercaptobenzimidazole on Nickel substrate Density Functional Theory Approach, Mahmoudi Ourida, **Bordjiba Tarik**, Hamzaoui Chokri abdel Halim, Lemzadmi, Achène, The Third International Symposium on Mineral Industry and Environment, Annaba, Algeria, 2017-10-11 to 2017-10-13
- Monolayers of 2-Mercaptobenzimidazole on Nickel Substrate Density Functional Theory Approach, Ourida Mahmoudi, **Tarik Bordjiba**, The Third International Symposium on Mineral Industry and Environment, Annaba, Algeria, 2017-10-11 to 2017-10-13
- Efficacité inhibitrice de la Molécule Benzotriazole sur la corrosion de l'Acier X-70 dans un milieu Acide, Benayahoum Ali, **Bordjiba Tarik**, Bouakkaz Samia, MakhloufAbd El fetah, The Third International Symposium on Mineral Industry and Environment, Annaba, Algeria, 2017-10-11 to 2017-10-13
- Temperature Measurements of Corona Discharge in SF6-N2 Gas Mixture, Ahcene Lemzadmi, A. Guerroui, **Tarik Bordjiba**, ELECTROTECH '16 / IV. International Electric and Electronic Engineering and Technologies Conference, Turkey Istanbul, 2016-09-29 to 2016-09-30
- Study of interaction between the molecule 2-Mercaptobenzimidazole and metal atom substrate for self-assembled monolayers, Ourida Mahmoudi, **Tarik Bordjiba**, Mohamed affoune, The Global Advanced Materials &Surfaces Forum, Dubai, United Arab Emirates, 2015
- Substitutional doping of bore, aluminum, silicon, phosphor and nitrogen in graphene for fuel cell, **Tarik Bordjiba**, Hicham Aguibi, Ourida Mahmoudi, Youcef.Guetteche, The Second International Conference on Renewable Energy Research and Applications ICRERA, Madrid, Spain, 2013-10-20 to 2013-10-23
- Advanced Nanocomposite Material Based on Manganese Oxide Nanowires and Carbon Nanotubes for Capacitive Energy Storage, **Tarik Bordjiba**, Daniel Bélanger, Materials Research Society (MRS), Boston, Massachusetts, USA, 2009-11-01
- Facile Method for the Deposition of Metal Oxide Nanowires on Carbon Nanotubes, **Tarik Bordjiba**, Daniel Bélanger, Materials Research Society (MRS), Boston, Massachusetts, USA, 2009-11-01

- Development of new nanocomposite based on manganese oxide for supercapacitors application, **Tarik Bordjiba**, Daniel Bélanger, 214th meeting of the electrochemical society (ECS), Honolulu, Hawaii, USA, 2008-10-01
- Novel approach for the development of three Dimensional electrodes for electrochemical power sources, **Tarik Bordjiba**, Daniel Bélanger, the electrochemical society (ECS) Canadian Section Fall 2008 Symposium, Montréal, Canada, 2008-11-01
- Novel binderless nanostructured carbon nanotubes - carbon aerogel composites for supercapacitors, **Tarik Bordjiba**, Mohamed Mohamedi, Lê. H. Dao, 211th meeting of the electrochemical society (ECS), Chicago, Illinois, USA, 2007-05-01
- A new class of nanocomposites for high performance supercapacitors, **Tarik Bordjiba**, Mohamed Mohamedi, Lê. H. Dao, Conference of NanoQuebéc, Montréal, Canada, 2007-02-01
- Novel Free-Standing Carbon Nanotubes-based-Nanostructured Electrodes for Electrochemical Power Sources, Brahim Aïssa, Hiro. Takahashi, **Tarik Bordjiba**, Zohra Hamoudi, Mohamed Mohamedi, My Ali El Khakani, NanoQuebéc, Montréal, Canada, 2007-02-01
- Synthesis and characterization of new nanostructured material based carbonized aerogels and multi-wall carbon nanotubes for supercapacitors application, **Tarik Bordjiba**, Lê. H. Dao, ACFAS meeting, Montréal, Canada, 2006-04-01
- Development of advanced supercapacitors based on carbon nanotubes/carbonized aerogel composite materials, **Tarik Bordjiba**, Lê. H. Dao, the 207th meeting of the Electrochemical society (ECS), 2005-05-01, Québec, Canada
- Development of advanced supercapacitors based on carbon nanotubes/carbonized aerogels composite materials, **Tarik Bordjiba**, Lê. H. Dao, Nanotech-Albany, Albany, New York, USA, 2004-10-01
- Development of nanostructured composites of carbon nanotubes and carbonized aerogel, **Tarik Bordjiba**, Lê. H. Dao, workshop Jacques Cartier, Montréal, Canada, 2004-09-01
- Development of advanced supercapacitors based on carbon nanotubes/carbonized aerogels composite materials, **Tarik Bordjiba**, Lê. H. Dao, Conference of NanoQuebéc, Montréal, Canada, 2004-09-01

TEACHING EXPERIENCE

- Renewable Energy (Doctoral's Level), Lecture & Directed Studies
- Nanomaterials (Doctoral's Level), Lecture & Directed Studies
- English Scientific writing (Doctoral's Level), Lecture & Directed Studies
- Research methodology (Doctoral's Level), Lecture & Directed Studies
- Energy Storage (Master's Level), Lecture & Directed Studies
- Two-Phase Flow, (Master's Level), Lecture & Directed Studies
- Structure of Matter, (Bachelor's Level), Lecture & Directed Studies
- Chemistry 2, (Bachelor's Level), Lecture & Directed Studies and Practical Work.
- Agri-Food Processes, Bachelor's Program,
- Chemistry 1, Bachelor's Program, Directed Studies and Practical Work.
- Technical English and Terminology, Master's Program,

EDITORIAL SERVICE

Served as a peer reviewer for numerous high-impact, indexed journals in materials science and electrochemistry, including:

- *Renewable energy*
- *Journal of the Electrochemical Society*
- *Electrochimica Acta*
- *ACS Nano*
- *Journal of Power Sources*