

Abdelhakim DORBANE

Curriculum Vitae

Department of Mechanical Engineering
University of Ain Temouchent

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Research Interests

- Machine Learning and its Applications.
- Mechanical Behavior and Microstructural Characterization of Materials.
- Experimental Analysis and Interpretation of Material Properties.

Awards & Honors

- 2015 Awarded under **Best Poster Award, First Place, Research Track** at the **Material Science and Engineering Symposium 2015**, Texas AM University at Qatar.

Education

- 2013–2016 **Ph.D., Materials Science and Engineering**, *Lille University of Science and Technology, France*.
(Mechanical and Microstructural Characterization of a Dissimilar Friction Stirred Welded Aluminum-to-Magnesium Alloy Sheets)
- 2009–2011 **M.S. in Mechanical Engineering**, *Djillali Liabes University, Algeria*.
- 2006–2009 **B.E. in Mechanical Engineering**, *Djillali Liabes University, Algeria*.

Work Experience

University of Ain Temouchent

2020 – **Assistant Professor**.

present **Machine learning techniques and their applications in materials science**:, Employing machine learning techniques in various applications such as mechanical properties forecasting, predicting cutting forces in hard turning and forecasting energy consumption in Photovoltaic's, Surface Fault classification in metallic sheets, etc.

Texas A&M University at Qatar

2016 – 2017 **Postdoctoral Fellow**.

- Produced accurate supporting documentation and materials for research activities, including presentations and reports.
- Presented oral and written analysis at meetings and conferences to share research outcomes.
- Carried out archive research to inform ongoing and new work.
- Employed expert knowledge to design and deliver appropriate research approaches, adapting existing methods and utilizing new ones.

Advisor : **Dr. Bilal Mansoor**, Assistant Professor, Department of Mechanical Engineering, Texas A&M University at Qatar ([Personal Web-page](#))

2013 – 2015 **Research Associate**.

- Collected large volumes of data with high accuracy.
- Designed presentations summarizing research findings.
- Used databases, physical records and digital resources to complete deep Metallography and Mechanical Testing field of research.
- Took part in production of collaborative research reports and publications.

Advisor : **Dr. Georges Ayoub**, Associate Professor, Director of the Human-Centered Engineering Design program, College of Engineering and Computer Science, University of Michigan-Dearborn ([Personal Web-page](#))

Teaching Experience

University of Ain Temouchent

2020 – **Assistant Professor**, Ain Temouchent, Algeria.

- Current
- o Successfully taught courses, tutorial classes, and practical sessions to diverse student levels, including Heat Transfer, Instrumentation & Measurements, CAD/CAM, Heat and Mass Transfer, Strength of Materials, Fluid Mechanics, and Numerical Methods.
 - o Designed teaching materials and structured modules to prepare for the school year's teaching.
 - o Created presentations to enhance the learning experience and elevate comprehension.
 - o Conducted evaluations to measure the performance, productivity, and growth of students.

Djillali Liabes University

2018 – 2020 **Assistant Teacher**, Sidi Bel Abbes, Algeria.

- o Assisted in planning and development of teaching materials, workbooks and class projects.
- o Kept records of student attendance, progress and activities to assess individual mastery of subject matter.
- o Supported teachers in setting, administering and grading assignments and communicated students' progress to parents.
- o Graded homework and tests and computed and recorded results using answer sheets or electronic marking devices.

Publications

Journal Articles

- Under review **Abdelhakim Dorbane**, Fouzi Harrou, Ying Sun, Souâd Makhfi, and Malek Habak. Explainable machine learning for enhancing predictive accuracy of cutting forces in hard turning processes. *The International Journal of Advanced Manufacturing Technology*. Springer, Under review, (**Impact Factor:3.4**).
- 2024 **Abdelhakim Dorbane**, Fouzi Harrou, Bekir Dursun, and Ying Sun. Enhancing predictive capabilities: Machine learning approaches for predicting mechanical behavior in friction stir welded aluminum alloys. *Journal of Materials Engineering and Performance*, pages 1–19. Springer, 2024, (**Impact Factor:2.3**).
- 2024 Salaheddine Jaouaf, Bourassia Bensaad, and **Abdelhakim Dorbane**. Energy efficiency of a house in mediterranean region: insulation and glazing impact. *The Journal of Engineering and Exact Sciences*, volume 10, page pp17038, 2024.
- 2023 **Abdelhakim Dorbane**, Fouzi Harrou, and Ying Sun. Exploring deep learning methods to forecast mechanical behavior of fsw aluminum sheets. *Journal of Materials Engineering and Performance*, volume 32, pages 4047–4063. Springer, 2023, (**Impact Factor:2.3**).
- 2023 **Abdelhakim Dorbane**, Fouzi Harrou, Daniel-Constantin Anghel, and Ying Sun. Machine learning prediction of aluminum alloy stress–strain curves at variable temperatures with failure analysis. *Journal of Failure Analysis and Prevention*, pages 1–16. Springer, 2023, (**Impact Factor:1.2**).
- 2023 Souâd Makhfi, **Abdelhakim Dorbane**, Fouzi Harrou, and Ying Sun. Prediction of cutting forces in hard turning process using machine learning methods: a case study. *Journal of Materials Engineering and Performance*, pages 1–17. Springer, 2023, (**Impact Factor:2.3**).
- 2023 Fouzi Harrou, Abdelkader Dairi, **Abdelhakim Dorbane**, and Ying Sun. Energy consumption prediction in water treatment plants using deep learning with data augmentation. *Results in Engineering*, volume 20, page 101428, 2023, (**Impact Factor:5**).

- 2023 Fouzi Harrou, Abdelkader Dairi, **Abdelhakim Dorbane**, Farid Kadri, and Ying Sun. Semi-supervised kpca-based monitoring techniques for detecting covid-19 infection through blood tests. *Diagnostics*, volume 13, page 1466. MDPI, 2023, (**Impact Factor:3.7**).
- 2017 **Abdelhakim Dorbane**, Georges Ayoub, Bilal Mansoor, Ramsey F Hamade, and Abdellatif Imad. Effect of temperature on microstructure and fracture mechanisms in friction stir welded al6061 joints. *Journal of Materials Engineering and Performance*, volume 26, pages 2542–2554. Springer, 2017, (**Impact Factor:2.3**).
- 2016 **Abdelhakim Dorbane**, Bilal Mansoor, Georges Ayoub, Vasanth Chakravarthy Shunmugasamy, and Abdellatif Imad. Mechanical, microstructural and fracture properties of dissimilar welds produced by friction stir welding of az31b and al6061. *Materials Science and Engineering: A*, volume 651, pages 720–733. Elsevier, 2016, (**Impact Factor:6.4**).
- 2016 **Abdelhakim Dorbane**, Georges Ayoub, Bilal Mansoor, RF Hamade, G Kridli, Rajashekhara Shabadi, and Abdellatif Imad. Microstructural observations and tensile fracture behavior of fsw twin roll cast az31 mg sheets. *Materials Science and Engineering: A*, volume 649, pages 190–200. Elsevier, 2016, (**Impact Factor:6.4**).
- 2015 **Abdelhakim Dorbane**, Georges Ayoub, B Mansoor, R Hamade, G Kridli, and Abdellatif Imad. Observations of the mechanical response and evolution of damage of aa 6061-t6 under different strain rates and temperatures. *Materials Science and Engineering: A*, volume 624, pages 239–249. Elsevier, 2015, (**Impact Factor:6.4**).

In Conference Proceedings

- Accepted on March 4th, 2024 **Abdelhakim Dorbane**, Fouzi Harrou, and Ying Sun. Detecting faulty steel plates using machine learning. In *8th International Conference on Advances in Computing and Data Sciences (ICACDS 2024)*. **Springer**, Accepted on March 4th, 2024.
- Accepted on March 10th, 2024 **Abdelhakim Dorbane**, Fouzi Harrou, and Ying Sun. Enhancing photovoltaic system performance using advanced gradient boosting methods. In *IEEE/IFAC 8th International Conference on Control Automation and Diagnosis (ICCAD'24)*. **IEEE**, Accepted on March 10th, 2024.
- 2023 Fouzi Harrou, Ying Sun, **Abdelhakim Dorbane**, and Benamar Bouyeddou. Sensor fault detection in photovoltaic systems using ensemble learning-based statistical monitoring chart. In *2023 11th International Conference on Smart Grid (icSmartGrid)*, pages 1–6. **IEEE**, 2023.
 - 2022 **Abdelhakim Dorbane**, Fouzi Harrou, and Ying Sun. A tree-driven ensemble learning approach to predict fs welded al-6061-t6 material behavior. In *2022 7th International Conference on Frontiers of Signal Processing (ICFSP)*, pages 184–188. **IEEE**, 2022.
 - 2022 **Abdelhakim Dorbane**, Fouzi Harrou, and Ying Sun. Forecasting fsw material's behavior using an artificial intelligence-driven approach. In *2022 International Conference on Decision Aid Sciences and Applications (DASA)*, pages 1553–1557. **IEEE**, 2022.
 - 2015 **A. Dorbane**, G. Ayoub, B. Mansoor, R. Hamade, G. Kridli, and A. Imad. Mechanical response and evolution of damage of al6061-t6 under different strain rates and temperatures. In *Proceedings of the TMS Middle East—Mediterranean Materials Congress on Energy and Infrastructure Systems (MEMA 2015)*, pages 259–265. **Springer**, 2015.
 - 2015 B. Mansoor, **A. Dorbane**, G. Ayoub, and A. Imad. Friction stir welding of az31b magnesium alloy with 6061-t6 aluminum alloy: Influence of processing parameters on microstructure and mechanical properties. *Friction Stir Welding and Processing VIII*, pages 259–266. **Springer**, 2015.
 - 2014 AH Ammouri, Haig Achdjian, **A. Dorbane**, G. Ayoub, G.T. Kridli, and R.F. Hamade. Characterization of optimized friction stir welded twin roll cast az31b sheets. In *Proceedings of the ASME 2014 International Mechanical Engineering Congress and Exposition*, 2014.

Selected Presentations

- 2022 **A. Dorbane**, F. Harrou and Y. Sun, "A Tree-Driven Ensemble Learning Approach to Predict FS Welded Al-6061-T6 Material Behavior," 2022 7th International Conference on Frontiers of Signal Processing (ICFSP), **Paris, France**.
- 2022 **A. Dorbane**, F. Harrou and Y. Sun, "Forecasting FSW Material's Behavior using an Artificial Intelligence-Driven Approach," 2022 International Conference on Decision Aid Sciences and Applications (DASA), **Chiangrai, Thailand**.
- 2022 **A. Dorbane**, F. Harrou and Y. Sun, Machine learning methods for predicting mechanical behavior of aluminum alloys, Proc. of the Interdisciplinary Conference on Mechanics, Computers and Electrics (ICMECE), **Barcelona, Spain**.
- 2015 Mansoor, B., **A. Dorbane**, G. Ayoub, A. Imad, Friction stir welding of AZ31B magnesium alloy with 6061-T6 aluminum alloy: Influence of processing parameters on microstructure and mechanical properties, TMS Annual Meeting, **Florida, USA**.
- 2015 **A. Dorbane**, G. Ayoub, B. Mansoor, R. Hamade, G. Kridli, A. Imad, Mechanical Response and Evolution of Damage of Al6061-T6 Under Different Strain Rates and Temperatures, TMS Middle East – Mediterranean Materials Congress on Energy and Infrastructure Systems. **Doha, Qatar**.

Conference Involvement & Contributions

- 2024 International Program Committee Member at the **2024 International Conference on Control, Automation and Diagnosis** (ICCAD'24), May 15-17, 2024, Paris, France.
- 2024 Publicity Co-Chair in the **2024 9th International Conference on Frontiers of Signal Processing** (ICFSP 2024), Paris, France, September 12-14, 2024.
- 2024 Special Session organizer at **The 2024 International Conference on Control, Automation and Diagnosis** (ICCAD'24), under the title *Artificial Intelligence-Enhanced Photovoltaic Systems: Advancements and Applications* (Special session 24), May 15-17, 2024, Paris, France.
- 2023 Technical Program Committee (TPC) member in the **2023 8th International Conference on Frontiers of Signal Processing** (ICFSP 2023), Corfu, Greece, October 23-25, 2023.
- 2022 Technical Program Committee (TPC) member in the **2022 7th International Conference on Frontiers of Signal Processing** (ICFSP 2022), Paris, France, September 7-9, 2022.
- 2022 Organizing committee (OC) member in the **2022 II. Interdisciplinary Conference on Mechanics, Computers and Electrics** (ICMECE 2022), Barcelona, Spain, October 06-07, 2022.

Computer skills

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| Programming Languages | Python, Orange3, Matlab, Latex |
| Operating systems | Windows, MacOS, Linux |

Technical skills

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|------------------------------|---|
| Testing and Characterization | Instron/MTS testing at different temperatures, Heat treatment and annealing of metallic materials, Metallography, Optical Microscopy (OM), Scanning Electron Microscopy (SEM) X-ray Diffraction (XRD), Digital Image Correlation (DIC), Energy Dispersive Spectroscopy (EDS), Chemical and electrochemical etching, Chemical reactions in GloveBox. |
| Languages | <ul style="list-style-type: none">English (Proficient reading, writing, and speaking)French (Fluent reading, writing, and speaking)Arabic (Native reading, writing, and speaking) |

Position of Responsibility

2020-Present **Assistant Head of Mechanical Engineering Department Responsible for Enrollment and Graduation Education**, Faculty of Science and Technology, University of Ain Temouchent.

Peer-Reviews

Journal papers

- 4 reviews Journal of materials science
- 2 reviews Journal of Pressure Vessel Technology, Transactions of the ASME
- 1 review Frontiers in Energy Research
- 1 review Journal of Advanced Research in Applied Sciences and Engineering Technology
- 1 review Journal of Engineering and Technological Sciences
- 2 review Results in Engineering
- 1 review WSEAS Transactions on Computers

International conferences

- 1 review International Conference on Control, Automation and Diagnosis, 2024 (ICCAD)
- 6 reviews International Conference on Frontiers of Signal Processing (ICFSP), 2022, 2023, and 2024 (IEEE)

Referees

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