Mohammed El Amine Khodja

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IEEE, IAS, IES Graduated Student member

Date and place of birth: June 12th, 1990, at Oran, Algeria.
Relationship status: Married.
Language skills: Arabic, English and French.

Summary Statement

Electrical Engineering professional with over 10 years of experience in **teaching**, **research**, and **innovation**, specializing in **Fault Detection and Diagnosis of Electrical Motors and Drives** using advanced signal processing methods. As a **Startup Program Manager**, incubated **78 projects** and successfully launched **24 startups** over three seasons. Published **15+ papers** in high-impact journals, including **IEEE** and **Springer**, and presented at prestigious international conferences. Recognized for leadership in academia, research, and startup incubation, with a passion for advancing knowledge and mentoring the next generation of engineers. Committed to interdisciplinary research at the intersection of **AI**, **Signal Processing**, and **Renewable Energy Systems**.

Education and Degrees

Ph.D. in Electrical Engineering
University of Sciences and Technology of Oran USTO-MB, Oran, Algeria ***September 2020***

- **Thesis:** Monitoring the severity of bearing faults on an induction motor fed by PWM inverter
- **Honors:** Degree awarded with **Very Honorable distinction**
- **Professional Development:** Fault Diagnosis of Electrical Motors & Drives
- **Membership:** Student Member, IEEE IAS & IES Societies

Master's degree in Electrical Engineering
University of Sciences and Technology of Oran USTO-MB, Oran, Algeria ***July 2013***

- **Thesis:** Designing an Anti-Aliasing Filter -Application to Ball Bearing Fault Diagnosis on a Squirrel Cage Induction Motor
- **GPA:** A+
- **Professional Development:** Fault Diagnosis of Electrical Motors & Drives
- **Ranking:** First in his graduating class and the Leader of Master's Degree program

Bachelor's degree in Electrical Engineering
University of Sciences and Technology of Oran USTO-MB Oran, Algeria ***July 2011***

- **GPA:** A
- Professional Development Studies: **Electrical Engineering**, 2011

Work Experience

National School of Built and Ground Works Engineering - Algiers, Algeria

Assistant Professor ***December 2021 - Current***

- Teach foundational and advanced courses in Electrical Engineering to preparatory class students.
- Develop and deliver engaging and comprehensive lectures, laboratory sessions, and course materials.
- Foster a dynamic and interactive learning environment to encourage student participation and understanding.
- Assess and evaluate student performance through assignments, exams, and projects.
- Provide academic guidance and mentorship to students, helping them to prepare for advanced studies in Electrical Engineering.
- Collaborate with colleagues to ensure the alignment of the curriculum with industry standards and educational best practices.
- Participate in departmental meetings and contribute to the continuous improvement of the Electrical Engineering program.

University Of Sciences and Technology of Oran USTO-MB, Oran, Algeria

Part-Time Assistant Professor ***September 2022 – July 2024***

- Taught courses in Automation, Electrical Machines, and Signal Processing to undergraduate and graduate students.
- Created a stimulating and interactive learning environment to enhance student engagement and understanding.
- Evaluated student performance through assessments, projects, and examinations, providing constructive feedback.
- Offered academic support and mentorship to students, guiding them through complex concepts and practical applications.
- Collaborated with fellow faculty members to ensure cohesive and up-to-date course content.
- Participated in departmental activities and contributed to the continuous enhancement of the Electrical Engineering curriculum.

LDEE Laboratory, University of Sciences and Technology of Oran USTO-MB - Oran, Algeria

Postdoctoral Researcher ***October 2020 - Current***

- Conducted advanced research in fault detection and diagnosis of electrical motors and drives using advanced signal processing methods.
- Developed and executed research projects, contributing to the advancement of knowledge in Electrical Engineering.
- Published research findings in high-impact peer-reviewed journals (IEEE, Springer, …).
- Presented research outcomes at prestigious international conferences and symposiums.
- Collaborated with multidisciplinary teams to explore innovative solutions in Electrical Motors and Drives, and Solar Energy Systems.
- Supervised and mentored junior researchers and graduate students in their research activities.

Omran Incubator – Online Projects Incubator, Volunteering

Program Creator and Manager ***January 2021 - Current***

- Designed and implemented a startup incubation program, supporting **78 projects** over 03 seasons, with **24 successfully launched** which gives 31% success rate (2021: 22 incubated, 7 launched; 2022: 45 incubated, 12 launched; 2023: 11 incubated, 5 launched).
- Provided strategic guidance and mentorship to startup teams, helping them navigate business development challenges and achieve their goals.
- Designed and delivered workshops, webinars, and training sessions on essential topics such as **BMC**, **MVP**, **Product-Market Fit**, **funding**, and **technology integration**.
- Collaborated with industry experts, investors, and mentors to create a robust support network for incubated startups.
- Monitored and evaluated the progress of startups, offering continuous support and adjusting the program as needed to meet evolving needs.
- Secured partnerships and funding opportunities, enhancing resources for program participants.

University Of Sciences and Technology of Oran USTO-MB - Oran, Algeria

Graduate Teaching and Research Assistant ***September 2014 - August 2020***

- Taught undergraduate and/or graduate courses in Electrical Engineering.
- Assisted in the development and implementation of course curricula.
- Conducted research in fault detection and diagnosis of electrical motors and drives using advanced signal processing methods.
- Published research findings in reputable journals (IEEE, Springer) and presented at prestigious international conferences.
- Collaborated with faculty and other researchers on various projects.
- Mentored and supervised students in their academic and research activities.

Algerian Ministry of Education

Middle School Math Teacher ***September 2013 – December 2021***

- Taught mathematics to middle school students, covering topics such as algebra, geometry, and basic arithmetic.
- Developed and implemented lesson plans that catered to diverse learning styles and abilities, ensuring all students could grasp mathematical concepts.
- Created engaging and interactive classroom activities to foster a love for mathematics and enhance students problem-solving skills.
- Assessed and evaluated student performance through quizzes, tests, homework, and projects, providing constructive feedback to support their academic growth.
- Provided additional support and tutoring to students requiring extra help to understand complex mathematical concepts.
- Communicated regularly with parents and guardians about student's progress and addressed any concerns or challenges.
- Maintained a positive and inclusive classroom environment, promoting respect and cooperation among students.
- Participated in professional development opportunities to stay current with educational best practices and improve teaching methodologies.

Languages

- English, Professional Working
- Arabic, Native
- French, Professional Working

Professional Development Courses

- **Integrated Strategic Planning Approach**, Gulf Innovation Academy, 2022.
- **Leading Change Management**, Gulf Innovation Academy, 2021.
- **Lean & Agile Management**, Gulf Innovation Academy, 2021.
- **Personal & Institutional Productivity**, Gulf Innovation Academy, 2021.
- **Google Project Management Certificate**, Google Professional Certificate, 2021.
- **Fundamentals of Digital Marketing Certificate**, Google Certificate, 2020.
- **Training of Trainers in Educational Robotics,** Educational Robotics Algeria, 2019.
- **Training of Trainers**, Global Academy for Training Quality & Talent, 2018.

Professional Relevant Skills

- **Advanced Analytical and Problem-Solving Skills**: Proficient in analyzing complex electrical systems, diagnosing issues, and developing innovative solutions. Strong background in fault detection and diagnosis of electrical motors and drives using advanced signal processing methods.
- **Innovative Teaching Techniques**: Passionate about creating engaging and interactive learning environments. Skilled in utilizing various teaching modalities to make complex electrical engineering concepts accessible to students of different academic levels.
- **Effective Communication**: Exceptional verbal and written communication skills, adept at presenting technical information clearly and concisely. Experienced in delivering lectures, conducting seminars, and presenting research findings at international conferences.

- **Research Excellence**: Strong track record of conducting cutting-edge research in electrical engineering. Experienced in managing research projects, and publishing in high-impact journals. Proven ability to translate research findings into practical applications.
- **Curriculum Development**: Expertise in designing and developing comprehensive curricula that incorporate the latest advancements in electrical engineering. Committed to continuous improvement and integration of innovative teaching tools and resources.
- **Student Mentorship and Guidance**: Dedicated to mentoring students and fostering their academic and professional growth. Skilled in supervising undergraduate and graduate research projects, providing constructive feedback, and supporting student's career aspirations.
- **Technological Proficiency**: Proficient in using modern educational technologies and platforms to enhance teaching and learning experiences. Experienced in developing and delivering technology-enriched learning materials and assessments.
- **Collaborative and Collegial Spirit**: Strong team player with a collaborative approach to academic and research activities. Proven ability to work effectively with colleagues, and community members to achieve common goals.
- **Commitment to Professional Development**: Committed to lifelong learning and professional growth. Actively engaged in professional development activities to stay current with the latest trends and advancements in electrical engineering education and research.

Proofreading of Articles

- IET Electrical Power Applications journal.
- IET Signal Processing.
- Electric Power Components and Systems journal.

Research Interests

- Diagnosis and Fault Detection of Electric Machines and Drives.
- Acquisition, Data processing, Diagnosis and prognosis, Maintenance.
- Advanced Digital Signal Processing Methods.
- Modeling of Electrical Machines and Drives.
- Artificial Intelligence and Machine Learning.
- Renewable Energy Systems, Smart Grid and Power Electronics.

Professional Affiliations and Memberships

- IEEE Industrial Applications Society, since 2016.
- IEEE Industrial Electronics Society, since 2016.
- IEEE Power Electronics Society, since 2016.

Awards

- IES Student & Young Professional Paper Assistant Award at *18th International Conference on Power Electronics and Motion Control IEEE-PEMC*, August 26-30, 2018, Budapest, Hungary

Research Works and Publications

Thesis and dissertation:

1. **M.E.A Khodja**, "**Monitoring the severity of bearing faults on an induction motor fed by PWM inverter**", *Doctoral thesis in Electrical Engineering with a highly honorable mention* – In: Electrotechnics of Photovoltaic Systems, University of Sciences and Technology of Oran (USTO-MB), Algeria. Defended on September 30th, 2020.
2. **M.E.A Khodja**, F. Belhadj "**Designing an anti-aliasing filter - Application to ball bearing fault diagnosis on a squirrel cage induction motor**", *Master thesis in Electrical Engineering* – In Electrical Energy Techniques, University of Sciences and Technology of Oran (USTO-MB), Algeria. Defended on June 19th, 2013.

Book chapters:

1. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, N. Benouzza, A. Bendiabdellah, "**Monitoring and fault diagnosis of induction motors mechanical faults using a modified Auto-Regressive approach**", Advanced Control Engineering Methods in Electrical Engineering Systems – ICEECA 2017 – Part of the Lecture Notes in Electrical

Engineering book series (LNEE, volume 522). Springer, Cham (2019) **SPRINGER**- Print ISBN: 978-3-319-97815-4. Online ISBN: 978-3-319-97816-1. pp. 390-410.
Springer Nature Switzerland AG. Part of Springer Nature
https://doi.org/10.1007/978-3-319-97816-1_30

2. A.H. Boudinar, A.F. Aïmer, **M.E.A. Khodja**, N. Benouzza "**Induction Motor's Bearing Fault Diagnosis using an improved Short Time Fourier Transform**", Advanced Control Engineering Methods in Electrical Engineering Systems – ICEECA 2017 – Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 522). Springer, Cham (2019) **SPRINGER**- Print ISBN: 978-3-319-97815-4. Online ISBN: 978-3-319-97816-1. pp. 411-426.
Springer Nature Switzerland AG. Part of Springer Nature
https://doi.org/10.1007/978-3-319-97816-1_31

Journal papers:

1. M.B. Koura, A.H. Boudinar, A.F. Aïmer, **M.E.A. Khodja**, **"Induction Motor Bearing Faults Diagnosis Using Stator Current and Vibration Analysis"**, ***Periodica Polytechnica Electrical Engineering and Computer Science***, Oct 2021, Vol. 65, Issue 4, pp. 344–351.
https://doi.org/10.3311/PPee.17284
2. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, A. Bendiabdellah, **"Frequency resolution improvements in induction motor fault diagnosis: Experimental validation"** ***Przeglad Elektrotechniczny***, 2021, Vol. 97, Issue 11, p69-73.
3. **M.E.A. Khodja**, A.F. Aïmer, A.H. Boudinar, N. Benouzza, A. Bendiabdellah, "**Bearing fault diagnosis of a PWM inverter fed-induction motor using an improved Short Time Fourier Transform**", ***Journal of Electrical Engineering and Technology - SPRINGER*** – May 2019.Volume 14, Issue 3. pp. 1201-1210. Springer International Publishing AG. Springer Singapore.
https://doi.org/10.1007/s42835-019-00096-y
4. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, A. Bendiabdellah, "**Induction motor rotor faults diagnosis at variable speed using an STFT-MLA combination**", ***International Journal of Electronic and Electrical Engineering Systems - AAGEE*** - Volume 1, No.2. June 2018. pp. 1-5. Association Algérienne de Génie Electrique et Electronique. Online ISSN : 2602-7429.
https://www.asjp.cerist.dz/en/article/114461
5. **M. E. A Khodja**, A. H. Boudinar, A. Bendiabdellah, "**Effect of Kaiser Window Shape Parameter for the Enhancement of Rotor Faults Diagnosis**," ***International Review of Automatic Control (I.RE.A.CO.)***, Vol. 10, No. 6, pp. 461-467, Nov. 2017.
https://doi.org/10.15866/ireaco.v10i6.13077
6. **M.E.A. Khodja**, A.F. Aïmer, A.H. Boudinar, N. Benouzza, A. Bendiabdellah, "**Stator current model validation for rotor faults diagnosis**", ***International Journal on Energy Conversion (I.R.E.CON.)*** –Volume 05, No. 6, 2017. pp. 163-170.
Praize Worthy Prize SRL. ISSN: 2281-5295.
https://doi.org/10.15866/irecon.v5i6.14494
7. A. H. Boudinar, N. Benouzza, A. Bendiabdellah and **M. E. A. Khodja**, "**Induction Motor Bearing Fault Analysis Using a Root-MUSIC Method**," ***IEEE Transactions on Industry Applications***, vol. 52, no. 5, pp. 3851-3860, Sept.-Oct. 2016.
https://doi.org/10.1109/TIA.2016.2581143
8. A. H. Boudinar, **M. Khodja**, F. Belhadj, N. Benouzza, "**Amélioration de l'Analyse Spectrale du Courant Statorique Appliquées au Diagnostic des Défauts de Roulements à Billes**," ***Communication Science &Technologie***, *N° 14, COST*, Jan. 2014.

Conference papers:

1. N. Boutaleb, A. Bendiabdellah, **M.E.A. Khodja**, M. Mohammedi, **"Comparative study of FFT effectiveness of an induction motor supply voltage unbalance diagnosis" the Sixth International Conference on Electrotechnics (ICEL'23),** *Oran, Algeria, Nov 2023.*
2. R. Saidji, A. H. Boudinar, **M.E.A. Khodja**, F. A. Aimer, **"Reliability of the Park's Vector method in induction motor drive's fault diagnosis -Case of IGBT open circuit fault and rotor fault-", the Sixth International Conference on Electrotechnics (ICEL'23),** *Oran, Algeria, Nov 2023.*
3. **M.E.A. Khodja**, A.H. Boudinar, A.F. Aïmer, "**Improvement of Induction Motor Diagnosis using the Kaiser Window Function**", ***2023 International Aegean Conference on Electrical Machines and Power Electronics (ACEMP) & 2023 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM)****, Istanbul, Türkiye, 2023, pp. 1-6.*
https://doi.org/10.1109/ACEMP-OPTIM57845.2023.10287081

4. N. Horri, A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, "**Impact of inverter faults on the performances of SPWM and SVPWM control techniques**", ***2023 International Aegean Conference on Electrical Machines and Power Electronics (ACEMP) & 2023 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM)***, *Istanbul, Türkiye, 2023, pp. 1-6.*
https://doi.org/10.1109/ACEMP-OPTIM57845.2023.10287072
5. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, A. Bendiabdellah, "**Induction motor bearing faults diagnosis based on Auto-Regressive spectral analysis**", ***2023 International Aegean Conference on Electrical Machines and Power Electronics (ACEMP) & 2023 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM)***, *Istanbul, Türkiye, 2023, pp. 1-6.*
https://doi.org/10.1109/ACEMP-OPTIM57845.2023.10287030
6. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, A. Bendiabdellah, "**Assessment of windowing effect on the frequency resolution of the stator current PSD for induction motor broken rotor bars diagnosis**", ***IEEE 1st International Conference on Innovative Research in Applied Science, Engineering and Technology IRASET***, Meknes, 16-19 Apr. 2020, Morocco.
https://doi.org/10.1109/IRASET48871.2020.9092201
7. **M.E.A. Khodja**, A.H. Boudinar, A.F. Aïmer, A. Bendiabdellah, "**Outer race fault diagnosis by comparison between the Power Spectral Density and the Kurtogram**", ***IEEE Joint International Conference: International Aegean Conference on Electrical Machines and Power Electronics & Optimization of Electrical & Electronics Equipment Conference ACEMP-OPTIM***, Istanbul, 26-29 Aug. 2019, Turkey.
https://doi.org/10.1109/ACEMP-OPTIM44294.2019.9007138
8. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, A. Bendiabdellah, "**Induction motor's rotor faults diagnosis at variable speed using an STFT-MLA combination**", ***1st Conference on Electrical Engineering CEE***, organized at the Ecole Militaire Polytechnique of Bordj El-Bahri, Algiers, 22-23 Apr. 2019, Algeria.
9. M. B. Koura, **M.E.A Khodja** and A. H. Boudinar, "**Comparaison entre la Technique Vibratoire et la Technique des Courants Statoriques : Application au Diagnostic des Roulements à Billes**", ***3rd International Conference on Electrical Sciences and Technologies in Maghreb, (CISTEM 2018)***, Algiers, Algeria, Oct. 2018.
https://doi.org/10.1109/CISTEM.2018.8613542
10. A. H. Boudinar, **M.E.A Khodja**, A. Bendiabdellah and N. Benouzza, "**Diagnosis of stator inter-turn fault and supply voltage unbalance using phase-angle and magnitude of the line currents spectra**,"***6th International Conference on Control Engineering & Information Technology (CEIT)***, Istanbul, Turkey, Oct 2018, pp. 1-6.
https://doi.org/10.1109/CEIT.2018.8751911
11. A.F. Aïmer, A.H. Boudinar, **M.E.A. Khodja**, N. Benouzza, A. Bendiabdellah, "**Monitoring and fault diagnosis of induction motors mechanical faults using a modified Auto-Regressive approach**", ***3rd International Conference on Electrical Engineering and Control Applications ICEECA***, organized at the Ecole Nationale Polytechnique of Constantine, Constantine, 21-22 Nov. 2017, Algeria.
12. A.H. Boudinar, A.F. Aïmer, **M.E.A. Khodja**, **"Induction Motor's Bearing Fault Diagnosis using an improved Short Time Fourier Transform***", 3rd International Conference on Electrical Engineering and Control Applications ICEECA***, organized at the Ecole Nationale Polytechnique of Constantine, Constantine, 21-22 Nov. 2017, Algeria.
13. **M. El Amine Khodja**, A. H. Boudinar, N. Benouzza and A. Bendiabdellah, "**Stator current modeling of an induction motor for rotor faults diagnosis**," ***2016 IEEE International Power Electronics and Motion Control Conference (IEEE-PEMC 2016)***, Varna, Bulgaria, 2016.
https://doi.org/10.1109/EPEPEMC.2016.7752146
14. **M. E. A. Khodja**, A. H. Boudinar, N. Benouzza, "**Effet de la fenêtre de pondération de Kaiser sur le diagnostic des défauts rotoriques naissants**," ***First International Conference on Applied Automation and Industrial Diagnostics ICAAID***, Djelfa, Algeria, Mar. 2015.
15. A. Bendiabdellah, A. H. Boudinar, N. Benouzza and **M.E.A Khodja**, "***The enhancements of broken bar fault detection in induction motors***," ***2015 Intl Aegean Conference on Electrical Machines & Power Electronics (ACEMP), 2015 Intl Conference on Optimization of Electrical & Electronic Equipment (OPTIM) & 2015 Intl Symposium on Advanced Electromechanical Motion Systems (ELECTROMOTION)***, Side, 2015, Turkey, pp. 81-86.
https://doi.org/10.1109/OPTIM.2015.7426972
16. A. H. Boudinar, N. Benouzza, A. Bendiabdellah and **M.E.A Khodja**, "**Induction motor bearing fault analysis using Root-MUSIC method***," 2015 Intl Aegean Conference on Electrical Machines & Power Electronics (ACEMP), 2015 Intl Conference on Optimization of Electrical & Electronic Equipment (OPTIM) & 2015 Intl Symposium on Advanced Electromechanical Motion Systems (ELECTROMOTION)***, Side, 2015, Turkey. pp. 87-92.
https://doi.org/10.1109/OPTIM.2015.7426974
17. N. Benouzza, A. H. Boudinar, A. Bendiabdellah and **M.E.A Khodja**, "**Slot harmonic frequency detection as a technique to improve stator current spectrum approach for broken rotor bars fault diagnosis**," ***2015 Intl***

Aegean Conference on Electrical Machines & Power Electronics (ACEMP), 2015 Intl Conference on Optimization of Electrical & Electronic Equipment (OPTIM) & 2015 Intl Symposium on Advanced Electromechanical Motion Systems (ELECTROMOTION), Side, 2015, Turkey. pp. 118-122. https://doi.org/10.1109/OPTIM.2015.7426969

18. **M. E. A. Khodja**, A. H. Boudinar, N. Benouzza, "**Influence des Défauts de Roulement sur la Modélisation du Courant Statorique**," ***Third International Conference on Power Electronics and Electrical Drives ICPEED'14***, Oran, Algeria, Dec. 2014.
19. **M. E. A. Khodja**, A. H. Boudinar, N. Benouzza, A. Bendiabdellah, "**The Effect of Noise Level on the Detection of the Bearing Faults using Stator Current Technique**", ***Third International Conference on Information Processing and Electrical Enegineering ICEPEE'14***, Tebessa, Algeria, Nov. 2014.
20. A. H. Boudinar, **M.E.A Khodja**, F. Belhadj, N. Benouzza, "**Amélioration de l'Analyse Spectrale du Courant Statorique Appliquées au Diangostic des Défauts de Roulements à Billes**," ***Second International Conference on Elecronics, Electrotechnics and Automatic CIEEA'13***, Oran, Algeria, Sept. 2013.

Additional Involvements and Achievements

- **Startups, New Technologies, AI, and Robotics**: Enthusiastic about exploring and integrating new technologies. Actively involved in various tech and robotics clubs, with a strong focus on AI advancements and startup ecosystems.
- **Robotics Competitions**: Served as a coach, judge, and event manager in numerous robotics competitions, including the famous First Lego League robotic competition.
- **Team Achievements**: Led the "Power Mind SO" team to secure 1st place in Engineering Excellence at the 13th Arabian Robotics and Artificial Intelligence Championship in Sharm El-Sheikh, Egypt (July 2022), and 2nd place in Robot Game at the 14th Arabian Robotics and Artificial Intelligence Championship in Doha, Qatar (May 2023).
- **Kung Fu Wu Shu Championships**: African coach, judge, and organizer for Kung Fu Wu Shu: Sanda & Traditional Styles Championships, demonstrating leadership and organizational skills in Martial Arts events.