

ISMAIL CAN DIKMEN, PhD

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IEEE Senior Member

TEACHING & RESEARCH INTERESTS

Teaching areas: Electric vehicle technologies, automotive electronics, circuit analysis (AC/DC), control systems, sensors and transducers, electronics, signals and systems, measurement techniques, AI/optimization methods, Capstone/senior design

Research areas: Intelligent battery management systems (SOC/SOH/SOP estimation, diagnostics, prognostics), neuromorphic embedded computing for energy systems, embedded AI at the edge, electric vehicle system integration, modeling and simulation (digital twins), functional safety

EDUCATION

PhD, Electrical and Electronic Engineering | Inonu University, Malatya, Turkey | 2016-2022

Thesis: "Design and Application of Smart Battery Management System for Electric Vehicles"

Erasmus exchange: Military University of Technology (WAT), Warsaw, Poland, Faculty of Cybernetics

MSc, Electronic Engineering | Aeronautics and Space Technologies Institute, Istanbul | 2007-2009

Thesis: "Flight Control of VTOL Aircraft with Four Rotors (Quadrotor)"

BSc, Electronic Engineering | Air Force Academy, Istanbul | 1997-2002

Thesis: "Sixed Legged Mobile Robot and Application"

ACADEMIC APPOINTMENTS

Assistant Professor | Istinye University, Istanbul, Turkey | Jan 2026 - Present

Teaching signals and systems, electronics, and EV technologies in a MUDEK-accredited program (Washington Accord signatory). Establishing research program in neuromorphic energy systems and edge AI.

Part-time Lecturer | Yildiz Technical University, Istanbul | 2024-2025

Delivered full-semester MATLAB-supported "Electric Vehicle Technologies" course under Ministry of Industry & Technology / Council of Higher Education university-industry cooperation framework.

Head of Department (Electric & Energy) / Lecturer | Inonu University, Malatya | 2020-2023

Head of Department overseeing three associate degree programs: Hybrid and Electric Vehicle Technologies, Electronics, and HVAC. Prepared the YOK application file for the HEV Technologies program from scratch with ABET-aligned curriculum. Established three teaching laboratories, including a Virtual Reality EV simulation lab developed with SANLAB under a Ministry of Industry grant (algorithm design by the author). Secured funding through 5+ project proposals from university budget, YOK, and Ministry of Industry. Required each faculty member to run at least 2 industry-partnered projects; brought practicing engineers into the classroom. Expanded YOK institutional financial support from 1 program to all 3 within one year. Supervised final-year graduation theses and co-advised one master's thesis.

Lecturer | Malatya Turgut Ozal University | 2019-2020 (and Visiting, Fall 2024)

Taught undergraduate courses in Electric & Energy programs. Contributed to applied R&D activities.

TEACHING PORTFOLIO

Courses Taught

Graduate

- AI and Optimization Methods - Inonu University, 3 semesters (2022-2025)

Undergraduate

- Electric Vehicle Technologies - Yildiz Technical University (2024-2025), developed from scratch under Ministry of Industry & Technology cooperation protocol
- Signals and Systems - Istinye University (2025-present)
- Electronics I - Istinye University (2025-present)

Associate Degree (Inonu University & Malatya Turgut Ozal University, 2019-2023)

- EV Control Systems - 2 semesters
- Automotive Electrical Systems - 4 semesters
- Automotive Electronics - 2 semesters
- Sensors and Transducers / Special Sensor Technologies - 3 semesters
- Basic Electronics - 4 semesters
- AC Circuit Analysis - 1 semester
- Measurement Techniques - 1 semester
- Special Design Motors - 1 semester
- Mathematics I/II and Engineering Mathematics - 5 semesters
- Information and Communication Technologies - 2 semesters
- Scientific Principles of Technology - 1 semester

Industry Training

Electric Vehicle Technologies - TEMSA Skoda Sabanci. Designed department-specific training programs based on needs analysis. Delivered to 315+ staff across Adana Factory (multiple departmental sessions), R&D Center (200 R&D engineers in two groups plus quality assurance team), Istanbul office, Strasbourg (France), and Heilbronn (Germany), 2023-2024. Training effectiveness evaluated through pre/post-test design with published results [J4].

Student Project Supervision

Supervised multiple final-year graduation theses and co-advised one master's thesis in battery state estimation, embedded control, and sensor integration at Inonu University and Malatya Turgut Ozal University. Mentored student competition teams for Teknofest. Designed hands-on final projects with real hardware (vehicle kits with photo-interrupter sensors, Arduino-based software filtering, PID motor control implementation and testing).

Curriculum Development & Laboratory Infrastructure

Designed the "Electric Vehicle Technologies" course curriculum adopted under a national university-industry cooperation protocol. Prepared YOK application file for new Hybrid and Electric Vehicle Technologies program with ABET-aligned content. As department head, established 3 teaching laboratories (including VR EV Lab with Ministry of Industry funding), led program evaluation, and expanded YOK institutional support from 1 to 3 programs by enforcing industry collaboration and curriculum quality standards.

INDUSTRY EXPERIENCE

Mobility Technologies Lead (R&D) | TEMSA Skoda Sabanci Transportation Vehicles Inc. R&D Center, Adana | Jun 2023 - Feb 2025

Led cross-disciplinary R&D projects in automotive and electric mobility. Developed BMS algorithms and software, improving state estimation accuracy by >8%. Built end-to-end modeling and simulation workflows (MATLAB/Simulink) for product families. Contributed to ISO 26262 functional safety activities for BMS software. Ran BMS algorithms on AKIDA neuromorphic development hardware. Developed and delivered company-wide EV Technologies training program to 315+ staff across four locations in Turkey, France, and Germany. Strengthened IP output through patent guidance and publications.

Co-Founder | SusTech Research, Development & Consultancy Ltd. | Jan 2018 - Jun 2019

TUBiTAK 1512 funded startup. Invented an electrical method for battery chemistry identification. Designed and built a complete intelligent BMS (hardware + embedded software) capable of identifying 4 different battery chemistries and automatically adjusting management parameters. Two patents registered from this work. Executed TUBiTAK-supported "E-CAMELEON" project (Grant No. 2170454).

Lead Engineer / Workshop Engineer | MOTAS Inc. (Malatya Municipality), Malatya | Dec 2015 - Jan 2017

Fully electric trolleybus program. Prepared Phase 2 technical specifications as lead engineer. Conducted weekly production inspections at the manufacturer's factory in Ankara. Managed vehicle procurement, maintenance, and repair processes. Supervised up to 56 staff. Product Owner for ERP software development project.

Pilot (Jets & Helicopters), Search and Rescue | Turkish Air Force | Sep 2002 - Mar 2014

1,029 flight hours across jet and helicopter platforms. NATO ISAF Afghanistan (Oct 2011 - May 2012): A-5/7 Plans, Exercise & Evaluation Officer, Kabul International Airport.

PUBLICATIONS

Journal Articles

- [J1] **I. C. Dikmen**, A. Ari, T. Karadag, "Physics-Informed LSTM and EKF Fusion for Robust Battery SoC Estimation," *Turkish J. Science and Technology*, Advanced Online Publication, pp. 57-67, 2026. doi: 10.55525/tjst.1812986
- [J2] **I. C. Dikmen**, "Continuous Monitoring and Modeling of High-Frequency EM Pollution Using Cutting-Edge Regression Techniques," *IEEE Access*, vol. 13, pp. 46627-46637, 2025. doi: 10.1109/ACCESS.2025.3548841
- [J3] **I. C. Dikmen**, N. Yildiran, T. Karadag, "Machine Learning Approaches for Enhancing the SoH Estimation of LTO Batteries," *Int. J. Automotive Science and Technology (IJASTECH)*, vol. 9, no. 1, pp. 48-59, 2025. doi: 10.30939/ijastech..1522403
- [J4] M. P. Gultas, E. Ozel, O. Darendeoglu, P. Cadirci, Z. Urel, **I. C. Dikmen**, T. Karadag, "Investigating the Effectiveness of EV Technologies Training and Its Impact on Workforce Excellence with an Empirical Study," *J. Economics and Business Issues*, vol. 5, no. 2, pp. 35-43, 2025.
- [J5] L. T. Sener, U. Yilmaz, **I. C. Dikmen**, A. Ari, T. Karadag, "Evidence Bound Clinical Decision Support with RAG," *Politeknik Dergisi*, 2025. doi: 10.2339/politeknik.1810629
- [J6] **I. C. Dikmen**, T. Karadag, "Electrical Method for Battery Chemical Composition Determination," *IEEE Access*, vol. 10, pp. 6496-6504, 2022. doi: 10.1109/ACCESS.2022.3143040
- [J7] **I. C. Dikmen**, N. Yildiran, T. Karadag, "Multi-Chemistry Battery Management System for Electric Vehicles," *European J. Research and Development*, vol. 2, no. 4, pp. 126-134, 2022. doi: 10.56038/ejrd.v2i4.176
- [J8] **I. C. Dikmen**, Y. E. Ekici, T. Karadag, T. Abbasov, S. E. Hamamci, "Electrification in Urban Transport: A Case Study with Real-Time Data," *Balkan J. Electrical and Computer Engineering*, vol. 9, no. 1, pp. 69-77, 2021. doi: 10.17694/bajece.837248
- [J9] Y. E. Ekici, **I. C. Dikmen**, M. Nurmhammed, T. Karadag, "Efficiency Analysis of Various Batteries with Real-Time Data on a Hybrid Electric Vehicle," *IJASTECH*, vol. 5, no. 3, pp. 214-223, 2021. doi: 10.30939/ijastech..946047
- [J10] Y. E. Ekici, **I. C. Dikmen**, M. Nurmhammed, T. Karadag, "A Review on Electric Vehicle Charging Systems and Current Status in Turkey," *IJASTECH*, vol. 5, no. 4, pp. 316-330, 2021. doi: 10.30939/ijastech..958368
- [J11] **I. C. Dikmen**, T. Karadag, "Yeni Nesil, Moduler ve Akilli Batarya Yonetim Sistemi," *Avrupa Bilim ve Teknoloji Dergisi*, no. 32, pp. 1103-1112, 2021. doi: 10.31590/ejosat.1045564
- [J12] **I. C. Dikmen**, T. Karadag, C. Yeroglu, "Multi-Parameter Optimization of Sliding-Mode Controller for Quadcopter Application," *Anatolian J. Computer Sciences*, vol. 3, no. 1, pp. 14-28, 2018.
- [J13] **I. C. Dikmen**, A. Arisoy, H. Temeltas, "Dikey Inis-Kalkis Yapabilen Dort Rotorlu Hava Aracinin Ucus Kontrolu," *J. Aeronautics & Space Technologies*, vol. 4, no. 3, pp. 33-40, 2010.

Conference Papers

- [C1] T. Coskun, H. Vishwamith, M. Isik, **I. C. Dikmen**, "Hardware-Accelerated Transformer Framework for Real-Time Battery SoH Estimation," *IEEE HPEC*, 2025. doi: 10.1109/HPEC67600.2025.11196577
- [C2] T. Coskun, H. Vishwamith, M. Isik, J. Naoukin, **I. C. Dikmen**, "Exploring Neuromorphic Computing with Loihi-2 for High-Performance CFD Simulations," *IEEE HPEC*, 2025. doi: 10.1109/HPEC67600.2025.11196267
- [C3] **I. C. Dikmen**, N. Yildiran, T. Karadag, "Efficient SoH Estimation for LTO Batteries Using Liquid Time-Constant Neural Networks," *ICECENG 2024*, Springer, 2025. doi: 10.1007/978-3-031-88999-8_28

- [C4] A. Yunusoglu, D. Le, M. Isik, K. Tiwari, **I. C. Dikmen**, T. Karadag, "Battery State of Health Estimation Using LLM Framework," *IEEE ISQED*, pp. 1-8, 2025. doi: 10.1109/ISQED65160.2025.11014446
- [C5] T. Karadag, N. Yildiran, **I. C. Dikmen**, T. Abbasov, "The Digital Age: Hidden Cost of Risen Mobile Connectivity," *IEEE IDAP*, pp. 1-8, 2025. doi: 10.1109/IDAP68205.2025.11222255
- [C6] D. Le, B. Arig, M. Isik, **I. Dikmen**, T. Karadag, "A Review of Memory Wall for Neuromorphic Computing," *IEEE ICMI*, pp. 1-6, 2025. doi: 10.1109/ICMI65310.2025.11141074
- [C7] M. Isik, J. Naoukin, **I. C. Dikmen**, "NeuroVM: Dynamic Neuromorphic Hardware Virtualization," *IEEE IGSC*, pp. 74-79, 2024. doi: 10.1109/IGSC64514.2024.00023
- [C8] N. Yildiran, **I. C. Dikmen**, T. Karadag, "State of Health Estimation of LTO Batteries Through Data-Driven Techniques and ML," *IEEE IDAP*, 2024. doi: 10.1109/IDAP64064.2024.10711165
- [C9] H. Vishwamith, M. Isik, **I. C. Dikmen**, "HPCNeuroNet: Advancing Neuromorphic Audio Signal Processing with Transformer-Enhanced SNNs," *IEEE INTCEC*, 2024. doi: 10.1109/INTCEC61833.2024.10603084
- [C10] M. Isik, H. Vishwamith, Y. Sur, K. Inadagbo, **I. C. Dikmen**, "Neurosec: FPGA-Based Neuromorphic Audio Security," *ARC 2024*, Springer, pp. 134-147, 2024. doi: 10.1007/978-3-031-55673-9_10
- [C11] M. Isik, K. Tiwari, M. B. Eryilmaz, **I. C. Dikmen**, "Accelerating Sensor Fusion in Neuromorphic Computing: A Case Study on Loihi-2," *IEEE HPEC*, pp. 1-7, 2024. doi: 10.1109/HPEC62836.2024.10938501
- [C12] O. Isik, K. Inadagbo, Y. E. Bulbul, M. Isik, **I. C. Dikmen**, "International Chip Crisis: Country Approaches," *IConSES*, Las Vegas, 2023.
- [C13] **I. C. Dikmen**, T. Karadag, "Onboard Battery Type Determination," *IEEE ISMSIT*, pp. 360-365, 2021. doi: 10.1109/ISMSIT52890.2021.9604658
- [C14] **I. C. Dikmen**, S. Seven, T. Karadag, "A Numerical Study for Automatic Battery Identification in Hybrid Battery Packs for EVs," *OTEKON*, pp. 825-832, 2018.
- [C15] U. Keskinilinc et al. (incl. **I. C. Dikmen**), "EM Field Pollution Measurements and Mappings in a University Settlement," *IEEE IDAP*, pp. 1-5, 2018. doi: 10.1109/IDAP.2018.8620846
- [C16] S. Seven, **I. C. Dikmen**, T. Karadag et al., "Design and Implementation of Ultrasonic Sonar System for Autonomous Vehicles," *IEEE IDAP*, pp. 1-4, 2018. doi: 10.1109/IDAP.2018.8620758
- [C17] A. Arikan et al. (incl. **I. C. Dikmen**), "Control Method Simulation and Application for Autonomous Vehicles," *IEEE IDAP*, pp. 1-4, 2018. doi: 10.1109/IDAP.2018.8620918
- [C18] A. Kayaduman et al. (incl. **I. C. Dikmen**), "Development and Application of Sensor Network for Autonomous Vehicles," *IEEE IDAP*, pp. 1-5, 2018. doi: 10.1109/IDAP.2018.8620748
- [C19] **I. C. Dikmen**, T. Karadag et al., "Metropol Bir Shirde Ulasim Sorunlarinin Toplu Tasima Cozumleri Acisindan Incelenmesi," *ITSC'18*, pp. 10-11, 2018.
- [C20] **I. C. Dikmen**, A. Arisoy, H. Temeltas, "Attitude Control of a Quadrotor," *IEEE RAST*, pp. 722-727, 2009. doi: 10.1109/RAST.2009.5158286

Preprints

- [P1] A. Yunusoglu, D. Le, M. Isik, **I. Dikmen**, T. Karadag, "Neuromorphic Circuits with Spiking Astrocytes for Increased Energy Efficiency, Fault Tolerance, and Memory Capacitance," *arXiv:2502.20492*, 2025.
- [P2] D. Le, A. Yunusoglu, K. Tiwari, M. Isik, **I. Dikmen**, "Multimodal LLM for Intelligent Transportation Systems," *arXiv:2412.11683*, 2024.
- [P3] M. Isik, H. Vishwamith, J. Naoukin, **I. Dikmen**, "HPCNeuroNet: A Neuromorphic Approach Merging SNN Temporal Dynamics with Transformer Attention for FPGA-Based Particle Physics," *arXiv:2412.17571*, 2024.
- [P4] W. A. Pawlak, M. Isik, D. Le, **I. C. Dikmen**, "Exploring Liquid Neural Networks on Loihi-2," *arXiv:2407.20590*, 2024.

Books & Book Chapters

[B1] **I. C. Dikmen**, T. Karadag, "Elektrikli Arac Batarya Yonetim Sistemleri ve Yeni Trendler," in *Muhendislik Alaninda Gelismeler*, Platanus Publishing, vol. 1, pp. 153-169, 2023.

Datasets

[D1] **I. C. Dikmen**, T. Karadag, A. Ari, "2500 Cycle Single Cell Battery Aging Dataset," *IEEE DataPort*, doi: 10.21227/0svj-e338, 2025.

[D2] **I. C. Dikmen**, "LTO Battery Capacity Fading," *IEEE DataPort*, doi: 10.21227/4bqx-gt92, 2024.

PATENTS

- "Neuromorphic Battery Management System (nBMS)" Turkish Patent Application 2025/018585, 2025.
- "Adaptive, Modular, and Intelligent BMS That Can Automatically Determine Battery Chemistry" TR Patent 2021018973, 2021 (granted 2025).
- "An Electronic Method of Determining Battery Chemistry for Lithium-Based Batteries" TR Patent 2021/005464, 2021 (granted 2026).
- "Hybrid and Electric Vehicle Battery Appraisal System and Method" TR Patent Application 2021/018933, 2021.
- "IoT-Based Medical Smart Transport Thermos" TR Patent Application 2022/021732, 2022.

AWARDS & PROFESSIONAL SERVICE

Awards

- First Prize, Most Innovative Scientific-Based Project Category, RDCONF International R&D and Innovation Awards, 2021
- NATO ISAF Medal, International Security Assistance Force, May 2012

Journal Reviewer Service

IEEE Trans. Vehicular Technology (2019-), IEEE Trans. Automation Science and Engineering (2023-), IEEE Computing in Science and Engineering (2018-), IEEE Canadian J. ECE (2018-), Elsevier ISA Transactions (2017-), Springer Electrical Engineering (2024-), Springer Scientific Reports (2025-), Springer J. Intelligent & Robotic Systems (2019-), IET Electrical Systems in Transportation (2018-), Taylor & Francis Cybernetics and Systems (2023-)

REFERENCES

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