

Abderazek Ben Abdallah, Ph.D.

Senior Member, IEEE and ACM

Regent | Dean, School of Computer Science and Engineering | Professor

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PROFILE

Professor and researcher in computer architecture and neuromorphic computing, with more than 20 years of research and academic leadership in Japan. His work spans AI hardware, networks-on-chip and 3D integrated circuits, fault-tolerant many-core systems, and AI-enabled embedded and energy systems. He has authored **more than 160 publications** (including 54 journal and 79 international conference papers) and **4 books**, holds **17 patents** (9 granted), and has led or co-led **17 competitive research grants**. He is an **IEEE CASS Distinguished Lecturer (2026–2027)** and the founder and steering chair of the IEEE MCSoc symposium series (since 2004).

EDUCATION

- **2002:** Doctor of Engineering in Computer Engineering, The University of Electro-Communications (UEC), Tokyo, Japan
- **1997:** M.S. in Computer Engineering, Huazhong University of Science and Technology, Wuhan, China
- **1994:** B.S. in Electrical Engineering, Sfax University (Tunisia) and Huazhong University of Science and Technology (China)

LEADERSHIP AND APPOINTMENTS (UNIVERSITY OF AIZU UNLESS NOTED)

- **2022–Present:** Regent; member of the Management Council and the Education and Research Council
- **2022–Present:** Dean, School of Computer Science and Engineering
- **2022–Present:** Director, Department of Computer Science and Engineering
- **2014–2022:** Head, Computer Engineering Division
- **2014–Present:** Professor (Senior Associate Professor 2012–2014; Associate Professor 2011–2012; Assistant Professor 2007–2011)
- **2002–2007:** Research Associate, then Assistant Professor (2007), The University of Electro-Communications, Tokyo

RESEARCH INTERESTS

- **Neuromorphic Computing and AI Hardware:** spiking neural network processors, 3D-NoC-based neuromorphic systems, on-chip learning, 3D-stacked synaptic memory.
- **Computer Architecture:** energy-efficient processors and multicore/many-core SoCs, queue-based processors and compilers.
- **Networks-on-Chip and 3D-ICs:** 2D/3D NoC architectures and routing, TSV-based 3D integration, photonic on-chip interconnects.
- **Reliability and Fault Tolerance:** fault-tolerant routing, TSV defect recovery, thermal-aware mapping, soft-error resilience.
- **Applications:** AI-enabled biomedical systems and prosthetics, humanoid robotics, and smart energy systems (EV power management and vehicle-to-grid energy trading).

SELECTED HONORS AND AWARDS

- **2026:** IEEE Circuits and Systems Society (CASS) Distinguished Lecturer, 2026–2027 term
- **2025:** Full Member, Sigma Xi, The Scientific Research Honor Society
- **2025:** Book “*Neuromorphic Computing: Principles and Organization*” selected by BookAuthority as one of the “Best Neuromorphic Computing Books of All Time”
- **2010:** National Presidential Award for the Best Tunisian Researcher Living Abroad (Tunisia)
- **Best Paper / Best Student Paper Awards:** PDCAT 2007, BWCCA 2010, BigComp 2019, ETLTC 2021, UNET 2021, IEEE ICET 2023, ICKII 2026 (two awards); Best Presentation Award, FAN 2009
- **Senior Member,** IEEE (2014) and ACM (2016); **Outstanding Achievement Award,** Huazhong University of Science and Technology (1993, 1994)

PROFESSIONAL SERVICE (SELECTED)

- **Conference leadership:** Founder and Steering Chair, IEEE International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoc), 2004–present; General Chair, MCSoc 2017 and 2021; Program Chair, ICoIAS 2025, ICCSD 2025, ICEDA 2024 and 2025; TPC member, IEEE ISCAS 2021 and IEEE COOL Chips (2010–2022)
- **Editorial:** Associate Editor, *IEEE Computer* (2025–), *IEEE Network* (2025–2027), *Frontiers in Neuroscience* (Neuromorphic Engineering, 2025–), and *Intelligence & Robotics* (2025–); Lead Guest Editor, *IEEE Computer* special issue on neuromorphic systems (2025–2026); Guest Editor, *IEEE Transactions on Emerging Topics in Computing* (2014)
- **Review and advisory:** High-Level Committee for Science and Technology under the Prime Minister of Tunisia (2009–2011); grant reviewer for the Hong Kong Research Grants Council, Austrian Science Fund (FWF), and Dutch Research Council (NWO); Distinguished University Professor Committee, Hamad Bin Khalifa University, Qatar (2024); external Ph.D. examiner, University of Otago and Murdoch University; reviewer for leading IEEE and ACM journals
- **University and community:** Chair of the Faculty Assembly, Academic Affairs Committee, and Faculty Development Committee (2022–); Vice Chair, National High School PC Contest (PC-Koshien) Steering Committee (2026–)

RESEARCH SUPERVISION AND TEACHING

- **Supervised to completion:** 78 researchers and students from nine countries (4 postdoctoral fellows, 11 Ph.D., 20 M.S., and 43 B.S.); graduates hold faculty and industry positions in Japan, China, Vietnam, the USA, and elsewhere
- **Teaching:** computer architecture, neuromorphic computing, parallel and embedded systems at the University of Aizu; visiting professor at HKUST, Huazhong University of Science and Technology, and the African University of Science and Technology; invited lecturer at Kyoto Institute of Technology and Tokyo University of Foreign Studies
- **Invited talks:** 23 keynote, invited, and plenary talks, including ICoIAS 2025 (Osaka), MLDAS 2019 (Doha), ICoIAS 2018 and 2019 (Singapore), and ICCAR 2017 (Nagoya)

RESEARCH GRANTS (SELECTED)

- 17 competitive grants as PI or co-investigator, including JSPS KAKENHI, the Fukushima Prefecture Renewable Energy R&D Program, and University of Aizu competitive research funding. Recent examples:
- PI, *Development of a Non-invasive Sensory Neuromorphic Prosthesis Hand for Amputees with Touch and Movement Sensations* (2022–2025)
- Co-PI, *Research and Development of a Neuromorphic Android System with Multi-Modal Sensing and Distributed Intelligence* (CRF-P37)
- Co-investigator, *Neural Network Modeling for an Energy Management System and its Implementation on FPGA*, Fukushima R&D Program (2019–2021)

PATENTS (SELECTED; 9 GRANTED AND 8 PENDING IN JAPAN)

- **JP 7699791 (2025):** *AI Processor*
- **JP 7277682 (2023):** *Spiking Neural Network by 3D Network-on-Chip*
- **JP 7239099 (2023):** *A TSV Fault-Tolerant Router System for 3D Networks-on-Chip*
- **JP 6747660 (2020):** *Setup Method for an Optical Network-on-Chip System Using Non-Blocking Optical Switches*

BOOKS

- A. Ben Abdallah and K. N. Dang, *Neuromorphic Computing: Principles and Organization*, Springer, 1st ed. 2022; 2nd ed. 2025.
- A. Ben Abdallah, *Advanced Multicore Systems-on-Chip: Architecture, On-Chip Network, Design*, Springer, 2017 (Chinese translation available).
- A. Ben Abdallah, *Multicore Systems-on-Chip: Practical Hardware/Software Design*, Atlantis Press, 2013.

SELECTED JOURNAL PUBLICATIONS

- R. Kobayashi, N.-D. Nguyen, A. Ben Abdallah, N. A. V. Doan, and K. N. Dang, “Approximorph: Energy-efficient Neuromorphic System with Layer-wise Approximation of Spiking Neural Networks and 3D-Stacked SRAM,” *IEEE Trans. Computer-Aided Design of Integrated Circuits and Systems*, 2025 (in press).
- N.-D. Nguyen, A. B. Ahmed, A. Ben Abdallah, and K. N. Dang, “Power-Aware Neuromorphic Architecture with Partial Voltage Scaling 3-D Stacking Synaptic Memory,” *IEEE Trans. VLSI Systems*, vol. 31, no. 12, pp. 2016–2029, 2023.
- K. N. Dang, N. A. V. Doan, and A. Ben Abdallah, “MigSpike: A Migration Based Algorithms and Architecture for Scalable Robust Neuromorphic Systems,” *IEEE Trans. Emerging Topics in Computing*, vol. 10, no. 2, pp. 602–617, 2022.
- K. N. Dang, A. B. Ahmed, A. Ben Abdallah, and X.-T. Tran, “TSV-OCT: A Scalable Online Multiple-TSV Defects Localization for Real-Time 3-D-IC Systems,” *IEEE Trans. VLSI Systems*, vol. 28, no. 3, pp. 672–685, 2020.
- T. H. Vu, Y. Okuyama, and A. Ben Abdallah, “Comprehensive Analytic Performance Assessment and K-means based Multicast Routing Algorithms and Architecture for 3D-NoC of Spiking Neurons,” *ACM Journal on Emerging Technologies in Computing Systems*, vol. 15, no. 4, 2019.
- A. Ben Abdallah, A. Canedo, T. Yoshinaga, and M. Sowa, “The QC-2 Parallel Queue Processor Architecture,” *Journal of Parallel and Distributed Computing*, vol. 68, no. 2, pp. 235–245, 2008.

Full publication list: www.u-aizu.ac.jp/~benab/publications-e.html