

Prof. Anis Koubaa

Research Professor / AI, Agentic Intelligence, LLMs & Autonomous Agents / Research Ecosystem Builder

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Holder of Premium Residency – Exceptional Talents Category, Saudi Arabia

RESEARCH LEADERSHIP PROFILE

A senior AI research leader with 20+ years of demonstrated impact in building, scaling, and internationalizing AI research ecosystems. **Founding Director of the AlfaisalX Center for Cognitive Robotics & Autonomous Agents** (Alfaisal University, 2025–Present); former **Aide to the President for Research Governance** and **Director of the Research and Initiatives Center** at Prince Sultan University (2019–2024). Track record of leading high-impact computing research centers, mentoring graduate researchers, and translating frontier AI into national-level initiatives across Agentic AI, Large Language Models, and Autonomous Systems. Highlights:

- **Proven Research Center Leadership:** Founded and directed the largest research lab at Prince Sultan University (**20+ researchers**) and currently serve as **Founding Director of the AlfaisalX Center for Cognitive Robotics & Autonomous Agents** — an AI-first research center built on Agentic AI, LLM-driven autonomy, and cognitive systems.
- **Frontier AI Scholarship:** Pioneer in **Agentic AI, Arabic LLMs (ArabianGPT), Agentic UAVs, and LLM-Robotics Integration**. **19,166+ citations, h-index 76, i10-index 265**, Stanford Top 2% scientists worldwide.
- **Flagship Survey Authority:** Author of the upcoming *“ROS 2 in a Nutshell: A Survey”* accepted at **ACM Computing Surveys (IF 28.0, ranked #1 of 147 in CS Theory & Methods)**.
- **Research Ecosystem Architect:** Drove a **750% increase in research output at PSU** (200 to 1,500+ Scopus publications), establishing 24 specialized labs and elevating PSU to Top 3 in Saudi Arabia.
- **Award-Winning Researcher:** **Abdul Hameed Shoman Award for Arab Researchers in Robotics & Automation (2024)** — the most prestigious research award for Arab scholars; **SDAIA ALLAM International LLM Challenge — 3rd Prize (2024)** from 170+ teams; **AI Leadership Award (2022)**; **KAUST Challenge Award (2021)**; shortlisted for the **Times Higher Education Leadership & Management Award (2022)**.
- **Research-Intensive Profile:** **200+ peer-reviewed publications, 20+ edited Springer books, 10+ granted patents**, and a sustained portfolio of competitive grants from defense, government, and industry partners.

CORE RESEARCH AREAS

- Agentic AI & Autonomous Intelligence
- Arabic NLP & Culturally-Aligned LLMs
- AI for Autonomous UAVs and Robotics
- Cognitive Robotics & Embodied AI
- AI Agent Operating Systems (Agent-OS)
- Computer Vision & Remote Sensing AI
- Research Center Leadership
- Large Language Models (LLMs)
- Retrieval-Augmented Generation (RAG)
- LLM-Robotics Integration (ROS/ROS2)
- Generative AI & Diffusion Models
- AI for Healthcare & Smart Cities
- Federated & Edge AI
- Strategic Research Ecosystem Design

RESEARCH IMPACT & GLOBAL STANDING

Citations & Indices: **19,166+** citations (11,723 since 2021), **h-index 76** (57 since 2021), **i10-index 265** (199 since 2021) — Google Scholar.

Global Ranking: **Stanford University Top 2% Scientists Worldwide** (2020, 2021, 2022) — career-long impact.

National Recognition: **Top Highly Cited Researcher in Saudi Arabia** — Computer Science and Electronics (multiple years).

Research Output: **200+** peer-reviewed publications across IEEE TGRS, FGCS, ACL, ACM Computing Surveys, Springer, and Wiley journals; **20+** edited Springer books; **10+** granted patents.

CURRENT AI RESEARCH CENTER LEADERSHIP

Founding Director, AlfaisalX: Center for Cognitive Robotics & Autonomous Agents *2025 – Present*
Alfaisal University Riyadh, Saudi Arabia

Founding Director of an AI-first research center anchored in **Agentic AI, LLM-driven autonomous agents, and Cognitive Robotics**. Leading institutional research strategy, governance framework, graduate research pipeline, and strategic partnerships with industry, defense, and international academic institutions. Defining the Center’s roadmap across foundation models, agent operating systems, embodied AI, and AI for autonomous UAVs and robotics.

Full Professor of Computer Science and Software Engineering *2025 – Present*
Alfaisal University, College of Engineering Riyadh, Saudi Arabia

Leading graduate research and supervision in Agentic AI, autonomous UAV systems, and LLM architectures. Establishing strategic research partnerships with industry and government agencies.

Founding Member *2025 – Present*
Maghreb University of Science and Technology (MUST) Tunis, Tunisia

Founding member of MUST University (Tunisia) — a private institution delivering North American-style programs in Software Engineering, Data Science, AI, and Cybersecurity. Contributing to academic vision, curricula, and research strategy.

PRIOR EXECUTIVE RESEARCH LEADERSHIP

Aide to the President for Research Governance & Director, Research and Initiatives Center / Innovation Center 2019 – 2024
Prince Sultan University Riyadh, Saudi Arabia

Architected and executed the comprehensive research transformation strategy that elevated Prince Sultan University from unranked to **Top 3 in Saudi Arabia** (Times Higher Education) and Top 25 in the Arab World.

- **Research Output:** Drove a **750% increase** in annual Scopus-indexed publications (200 → 1,500+).
- **Ecosystem Building:** Scaled the university’s research infrastructure from a single lab to **24 specialized research labs** across engineering, computing, and applied sciences.
- **Innovation Center:** Founded the PSU Innovation Center, designing infrastructure, governance framework, and strategic roadmap for technology transfer and entrepreneurship.
- **Recognition:** Instrumental in PSU’s shortlisting for the **Times Higher Education Award in Leadership and Management (2022)**.

Founder & Director, Robotics and Internet of Things Lab (RIOTU) 2017 – 2024
Prince Sultan University Riyadh, Saudi Arabia

Founded and directed the **largest and most impactful research lab at PSU** with **20+ researchers** (faculty, postdocs, graduate students), establishing it as an internationally recognized center in AI for autonomous systems, LLMs, and edge AI. Propelled the university to **#1 in Robotics in Saudi Arabia**. Delivered operational AI deployments in search-and-rescue, surveillance, and autonomous logistics with defense and commercial partners.

Senior Researcher 2008 – 2017
CISTER Research Unit, ISEP/IPP Porto, Portugal

Led research programs in real-time embedded systems, networked autonomous systems, and AI-enabled robotics. Contributed to European research projects and built international research collaborations.

Earlier Roles: Progression from Lecturer to Full Professor at Prince Sultan University, Al-Imam University (CCIS), and INPL/INRIA (France), 2001–2017.

FLAGSHIP AI RESEARCH INITIATIVES

Founder & Leader, ArabianLLM & ArabianGPT (2024 – Present): Conceptualized and led the development of **ArabianGPT** — a native Arabic Large Language Model addressing a critical gap in Arabic AI sovereignty, with strategic relevance to the Gulf region’s AI agenda.

Principal Investigator, Agentic UAVs (2023 – Present): Pioneering next-generation autonomous aerial systems integrating **Agentic AI and LLMs** for cognitive decision-making, tool-calling, and multi-modal perception in defense and emergency-response missions.

Originator, Agent Operating Systems (Agent-OS): Proposed a blueprint architecture for real-time, secure, and scalable AI agents — foundational systems work bridging LLMs, agent infrastructure, and trustworthy autonomy.

Director & Chief Architect, iHUNTER Autonomous Drone System: Full-cycle development of an AI-powered UAV system for autonomous detection, tracking, and interception of aerial targets, designed for critical infrastructure protection.

Internet of Drones Research Program: Established a comprehensive research agenda in drone swarms, cloud-based UAV management, and edge AI for autonomous systems — multiple patents and high-impact publications.

SELECTED FEATURED PUBLICATIONS (2025 – 2026)

Flagship Survey (2026, Accepted): “*ROS 2 in a Nutshell: A Survey*” — **ACM Computing Surveys** (Impact Factor 28.0, ranked #1 of 147 in CS Theory & Methods). Comprehensive survey of ROS 2 architecture, ecosystem, advances, and future directions. Joint work with the AlfaisalX Center.

Federated Learning Survey (2026): “*Federated Learning for Intelligent Transportation Systems: Emerging Trends, Challenges and Future Directions*” — **Computer Science Review** (Elsevier).

Generative AI Survey (2026): “*Fusing LLMs and Diffusion Models: A Comprehensive Survey of Progress, Challenges, and Future Directions in Generative AI*” — **Computer Science Review** (Elsevier).

Self-Driving Universities (2026): “*Toward Self-Driving Universities: Can Universities Drive Themselves with Agentic AI?*” — vision paper on Agentic AI for higher-education transformation.

Graph AI for Health (2026): “*Graph-based EEG Analysis for Seizure Prediction Enhanced with Kolmogorov–Arnold Networks and Self-Supervised Learning*” — **Engineering Science and Technology, an International Journal** (Elsevier).

Computer Vision (2025): “*SSVA: Self-Scanned Visual Attention for Enhanced Mask-Free Shadow Removal*” — **Expert Systems with Applications** (Elsevier).

Agentic AI & Autonomous Systems: “*Agentic UAVs: LLM-Driven Autonomy with Integrated Tool-Calling and Cognitive Reasoning*” (Koubaa & Gabr, 2025). Defines a new paradigm for autonomous UAVs integrating LLMs for cognitive decision-making.

Agent Infrastructure: “*Agent Operating Systems (Agent-OS): A Blueprint Architecture for Real-Time, Secure, and Scalable AI Agents*” (Koubaa, 2025). Foundational systems work for production-grade agentic AI.

Agentic AI Evolution: “*From Pre-Trained Language Models to Agentic AI: Evolution and Architectures for Autonomous Intelligence*” (Koubaa, Accepted, Springer LNNS).

LLM-Robotics Integration: “*Prompting Robotic Modalities (PRM): A Structured Architecture for Centralizing Language Models in Complex Systems*” — **Future Generation Computer Systems** (Elsevier, 2025).

Human-Robot Interaction: “*Next-Generation Human-Robot Interaction with ChatGPT and Robot Operating System*” — **Software: Practice and Experience** (Wiley, 2025). Cited 24+ times.

Generative Vision & Remote Sensing: “*Dehazing-DiffGAN: Sequential Fusion of Diffusion Models and GANs for High-Fidelity Remote Sensing Image Dehazing*” — **IEEE Transactions**

on **Geoscience and Remote Sensing** (2025).

Arabic LLMs (ACL Main Conference): “*Palm: A Culturally Inclusive and Linguistically Diverse Dataset for Arabic LLMs*” — **Proceedings of the 63rd ACL Annual Meeting** (2025).

Inclusive Arabic LLMs: “*Towards Inclusive Arabic LLMs: A Culturally Aligned Benchmark in Arabic Large Language Model Evaluation*” — ACL Workshop on LLMs for Low-Resource Languages (2025).

Arabic LLM Foundation Work: “*ArabianGPT: An Arabic Language Adaptation of GPT-2*” — *Generative AI and Large Language Models*, Springer (2025). Foundation of the ArabianLLM initiative.

Driver Identification Review (2025): “*A Comprehensive Review: Analysis of Machine Learning, Deep Learning, and LLM Techniques for Revolutionizing Driver Identification*” — **Tsinghua Science and Technology**.

UAV Autonomy in GNSS-Denied Environments: “*GNSS-Denied UAV Navigation: Analyzing Computational Complexity, Sensor Fusion, and Localization Methodologies*” — **Satellite Navigation** (Springer, 2025).

Industrial IoT Security: “*Securing Industrial IoT Environments: A Fuzzy Graph Attention Network for Robust Intrusion Detection*” — **IEEE Open Journal of the Computer Society** (2025).

AI for Energy Storage: “*SOH-KLSTM: A Hybrid Kolmogorov-Arnold Network and LSTM Model for Lithium-ion Battery Health Monitoring*” — **Journal of Energy Storage** (Elsevier, 2025).

AI for Agriculture: “*Smart Plant Disease Diagnosis Using Multiple Deep Learning and Web Application Integration*” — **Journal of Agriculture and Food Research** (Elsevier, 2025); “*Enhancing Palm Precision Agriculture: Deep Learning + UAVs for Palm Tree Detection*” — **Ecological Informatics** (Elsevier, 2025).

Self-Supervised Healthcare AI: “*Self-Supervised Learning for Graph-Structured Data in Healthcare Applications: A Comprehensive Review*” — **Computers in Biology and Medicine** (Elsevier, 2025).

RESEARCH FUNDING & FUNDED PROJECTS

Career Funding: Secured competitive research grants from defense, government, and industry partners across two decades. Track record of translating research excellence into externally funded innovation programs.

Recent Funded Projects (2024 – 2026)::

Agentic UAVs for Search & Rescue (SAR) in Hajj: Prince Sultan Defense Studies and Research Center (PSDSARC). **SAR 400,000**. Principal Investigator. Designing and integrating Agentic UAVs powered by LLM-based reasoning for autonomous search-and-rescue operations during the Hajj season. *2026*.

Terrain-Aided Navigation for GPS-Denied UAV Operations: PSDSARC. Principal Investigator. Advanced localization algorithms using terrain features for autonomous navigation in GPS-denied environments. *Status: Completed*.

U-SCAR: Unified AI-Powered UAV Surveillance System: PSDSARC. Principal Investigator. Unified platform for UAV surveillance, target classification, and autonomous response. 2025.

AI-Powered Chatbot for Insurance Claims Management: Tawuniya Insurance Company. Principal Investigator. Generative AI multilingual chatbot for patient engagement and automated claims processing. 2025.

Seerah GPT — Prophetic Biography AI System: ScaleX Innovation. Principal Investigator. Arabic AI Q&A platform built on RAG over curated Sirah and Hadith corpora with LangGraph ReAct agents, ChromaDB, and FastAPI. 2026.

Voice AI Agent for Primary Care (PoC): Artilitica Ltd., Scotland, UK. Principal Investigator. LiveKit + Twilio voice AI agent for sub-300ms patient intake and structured handoff to clinicians. 2026.

ENTREPRENEURSHIP & AI STARTUPS

Active AI entrepreneur translating frontier research into deployed products. Founder of multiple AI ventures spanning enterprise AI transformation, healthcare claims automation, EdTech, and academic research operations.

Founder & CEO
ScaleX Innovation

2023 – Present
Tunisia / Saudi Arabia

AI venture studio enabling enterprise AI adoption through discovery-driven accelerators, pilot-to-production pipelines, and strategic advisory. Operating model spans value-case identification, secure pilots, scaled platformization, and AI governance.

Founder
ClaimKit

2022 – Present
Oman

AI-powered insurance claims automation platform for healthcare, featuring intelligent triage, medical coding (ICD/CPT), and explainability-first decisioning. Deployed to reduce revenue leakage and accelerate claims resolution with regulator-friendly audit trails.

Founder
XEducation

2023 – Present
Tunisia / Saudi Arabia

AI-powered university information system (Django + React) for course assignment, attendance, grading, and accreditation analytics. Value proposition: ABET/NCAAA readiness, anti-cheating safeguards, and data-driven institutional decisioning.

Founder
ReviewAnything

2023 – Present
Tunisia / Saudi Arabia

AI-assisted academic review SaaS with plagiarism detection, AI-generated content detection, rubric alignment, and structured meta-review generation. Improves review quality, consistency, and integrity assurance for journals and graduate schools.

Founder
ReviewPilot

2023 – Present
Tunisia / Saudi Arabia

Automated editorial workflows and research-ops analytics platform for institutions and publishers. Integrates with ReviewAnything and LMS platforms to streamline academic publishing operations.

Innovation Center Founder, PSU (2023): Established the Prince Sultan University Innovation Center, designing infrastructure, governance framework, and strategic roadmap for technology transfer and entrepreneurship across the university.

SELECTED AWARDS & GLOBAL RECOGNITION

- **Abdul Hameed Shoman Award for Arab Researchers** — Robotics and Automation (2024). Most prestigious award for Arab researchers.
- **SDAIA ALLAM International Challenge — 3rd Prize** (2024). Selected from 170+ international teams in a national-level Arabic LLM innovation competition.
- **Stanford Top 2% Scientists Worldwide** (2020, 2021, 2022) — career-long impact.
- **Top Highly Cited Researcher in Saudi Arabia** — Computer Science and Electronics (multiple years).
- **AI Leadership Award** — AI and Cloud Expo (2022).
- **Shortlisted, Leadership and Management of the Year** — Times Higher Education Asia Awards (2022).
- **Senior Fellow of the Higher Education Academy (SFHEA)**, UK.
- **Rector Research Award** (2012); **Rector Teaching Award** (2016) — Prince Sultan University.

PATENTS (SELECTED)

10+ granted patents across edge AI, computer vision, autonomous robotics, UAV systems, blockchain-secured drone networks, and cooperative vehicular control — spanning the Saudi Authority for Intellectual Property (SAIP), USPTO, and IP Australia.

- **2025** — *Multi-Stage Real-Time Face Recognition and Tracking System on Edge Devices* (SAIP SA 2140). Edge AI for real-time computer vision and surveillance.
- **2025** — *Transfer Robots* (SAIP SA 1164). Industrial robotics system for automated material transfer and manipulation.
- **2024** — *Drones Aircraft* (SAIP SA 1097). UAV design with advanced control and aerodynamics.
- **2022** — *Service-Oriented Cloud-Based Management of Internet of Drones* (US Patent 11,473,913). Cloud framework for service-oriented IoD coordination and real-time monitoring.
- **2022** — *System and Method for Controlling UAVs for Search and Rescue* (US Patent 11,334,065). Multi-drone swarm coordination for autonomous SAR missions.
- **2021** — *Blockchain-Based Solution for Internet of Drones Security and Privacy* (US Patent 11,488,488). Blockchain framework securing IoD communications and data integrity.
- **2018** — *System and Method for Operating a Follower Vehicle in a Vehicle Platoon* (US Patent 20170329348). Cooperative V2V platooning for fuel and traffic-flow optimization.
- **2016** — *Operating a Follower Vehicle in a Vehicle Platoon* (AU Patent 2016100586A4). International counterpart to the US platooning patent.

AUTHORED & EDITED BOOKS (20+)

- *Robot Operating System (ROS): The Complete Reference* — Springer 7-volume series. Editor/Author. Springer's **most-downloaded** robotics book series.
- *Generative AI and Large Language Models: Opportunities, Challenges, and Prospects, Volume 1* — Springer (2025). Editor.
- *International Conference on Smart Systems and Emerging Technologies, Edition 2024* — Springer (2025). Editor.
- *Deep Learning for Unmanned Systems* — Springer Studies in Computational Intelligence (2021). Editor.
- *Unmanned Aerial Systems: Challenges and Trends* — Synthesis Lectures on Intelligent Technologies (2023). Editor.
- *Decision Making and Security Risk Management for IoT Environments* — Springer (2023). Co-Author.
- *Unmanned Aerial Systems* — Elsevier (2021). Editor.

TEACHING, MENTORSHIP & GLOBAL EDUCATION REACH

Teaching Profile: Senior Fellow of the Higher Education Academy (SFHEA, UK). Award-winning educator (Rector Teaching Award, 2016). Delivered graduate and senior undergraduate courses on **Artificial Intelligence, Deep Learning, LLMs, Big Data, Mobile Robotics**, and **IoT** at Alfaisal University and Prince Sultan University, with emphasis on advanced graduate-level AI courses and PhD supervision.

Graduate Mentorship: Supervised and co-supervised dozens of MS and PhD students across AI, robotics, and autonomous systems. Established graduate research pipelines that consistently delivered first-author publications in top-tier venues.

Global Education Impact: Created a best-selling ROS/ROS2 course series reaching **30,000+ learners across 150+ countries** — de facto global standard for ROS professional training.

EDITORIAL & PROFESSIONAL SERVICE

- Editor of **20+ Springer publications** on robotics, autonomous systems, IoT, and Generative AI / LLMs.
- Reviewer and program-committee member for IEEE TGRS, FGCS, IEEE TII, IEEE Robotics & Automation Letters, ICRA, IROS, and ACL.
- Frequent invited keynote speaker at AI and robotics conferences (KSU, PSDSARC, RAISE, UPM, ISCAE, Agentic AI summits).

ACADEMIC CREDENTIALS

Habilitation in Computer Science
Doctoral School of ENIS

2011
Tunisia

PhD, Computer Science
National Polytechnic Institute of Lorraine (INPL) & INRIA Lorraine

2001 – 2004
France

MSc, Computer Science
University Henri Poincaré (UHP) Nancy I

2000 – 2001
France

Ranked 9/60. **Engineering Diploma, Telecommunications**
Sup'Com

1997 – 2000
Tunisia

Ranked 3/27.

Professional Fellowship: Senior Fellow of the Higher Education Academy (SFHEA) —
UK professional recognition for excellence in teaching, learning, and educational leadership.

REFERENCES

Available upon request.