جامعة أبوظبي
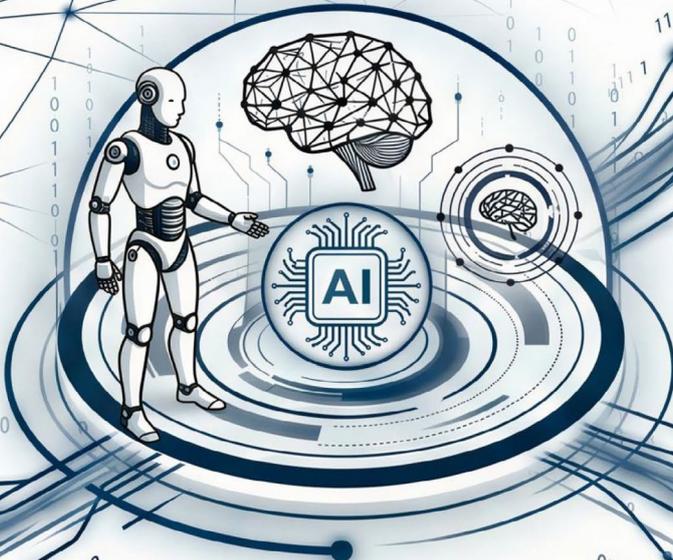**Abu Dhabi University**
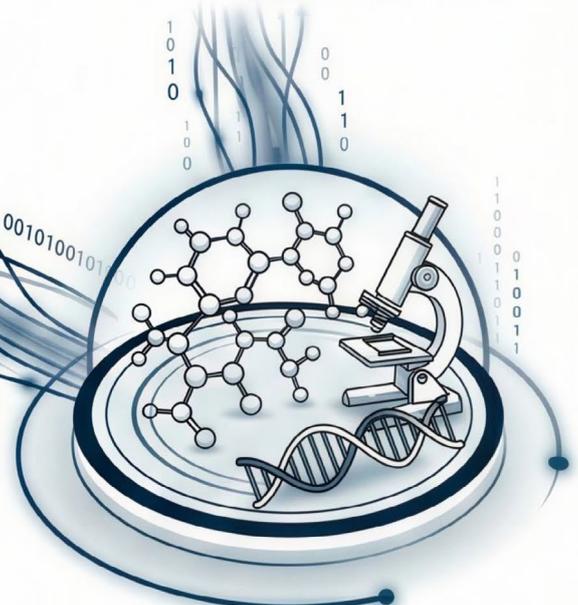
RESEARCH AND INNOVATION PULSE

RISF:
Research Institute for
Sustainable Futures

RIAET:
Research Institute for AI
and Emerging Technology

ADU-CRI:
Cancer Research
Institute

Table of
Contents

RESEARCH MILESTONE: ABU DHABI UNIVERSITY SURPASSES 5,000 SCOPUS-INDEXED PUBLICATIONS

Abu Dhabi University publishes 5,000+ Scopus-indexed research papers in international journals

Key indicators associated with this achievement include:

- 80.5% of publications appear in Q1 and Q2 journals, with 28% published in the world's top 10% journals.
- Field-Weighted Citation Impact (FWCI) of 3.74, significantly exceeding the global benchmark.
- 67.5% of publications produced through international collaboration across North America, Europe, and Asia.
- 155 research outputs cited in policy documents, generating 797 policy citations.
- 33 granted patents and more than 60 patent applications filed with the United States Patent and Trademark Office (USPTO)

ADU's research spans a wide range of interdisciplinary areas including artificial intelligence, engineering and technology, health and biomedical sciences, sustainability, business and economics, and the social sciences, reinforcing the university's growing contribution to regional and global knowledge production. Building on this milestone, Abu Dhabi University continues to expand interdisciplinary research initiatives, strengthen global partnerships, and advance innovation and commercialization pathways. The university's research excellence is further reflected in the recognition of several ADU scholars in Stanford University's Top 2% Most Cited Scientists list, underscoring the institution's increasing international impact.

Abu Dhabi University (ADU), through its Office of Research and Sponsored Programs (ORSP), has reached a major research milestone, surpassing 5,000 Scopus-indexed publications across peer-reviewed journals, international conference proceedings, and scholarly book chapters. The achievement marks an important stage in the university's continued growth as a high-impact, research-driven institution.

Aligned with ADU's commitment to addressing global challenges, 1,541 of these publications are connected to the United Nations Sustainable Development Goals, contributing to areas such as health, clean energy, sustainable cities, and climate action. Collectively, this body of work has generated nearly 64,000 citations, reflecting the broader academic and societal influence of the university's research. In line with ADU's Vision 2027, which positions research and innovation as a central institutional priority, the milestone demonstrates the university's expanding international academic presence and its focus on interdisciplinary collaboration and impactful scholarship.

Ideas in Action

From Research to Impact:
Connecting Campus Innovation with Community Engagement

The **Abu Dhabi University Cancer Research Institute (ADU-CRI)** is advancing initiatives that connect academic research with pressing societal needs. A recent podcast discussion examined how university-led research can extend beyond campus boundaries to support public awareness, education, and community engagement in health-related issues. The conversation highlighted the important role research institutions play in translating scientific knowledge into tangible societal impact.

The discussion focused on an initiative developed through the **Cancer Research and Awareness Student Scientific Forum**, in collaboration with **POP Movement**. This initiative encourages active student participation in research, strengthens mentorship opportunities, and bridges the gap between cancer research and community awareness. Through such programs, students gain valuable insight into how scientific inquiry contributes to prevention strategies, public education, and informed dialogue surrounding cancer-related challenges.

Participants emphasized that cultivating a strong and responsible research culture within universities is essential for sustainable impact. Achieving this requires interdisciplinary collaboration, adherence to ethical research practices, and meaningful opportunities for students to engage in real-world problem solving. By connecting research with public engagement, initiatives like this ensure that scientific discoveries contribute not only to academic advancement but also to improved health awareness and societal well-being. The session featured insights from **Dr. Ash Pachauri, Dr. Saroj Pachauri**, and **Dr. Asiya Nazir**, who shared perspectives on expanding research impact and strengthening collaboration between academia and the wider community. The initiative also reflects the continued support of Abu Dhabi University leadership and faculty members, including **Professor Ghassan Aouad, Professor Barry O'Mahony, Montasir Qasymeh**, and **Dr. Afsheen Raza**, whose leadership continues to create meaningful pathways for student involvement in research.

Through initiatives such as these, **ADU-CRI** continues to strengthen research culture, empower student engagement, and contribute to advancing community health awareness.

Ideas in Action

World Cancer Awareness Day:
Community Engagement for Prevention and Early Detection

The **Abu Dhabi University Cancer Research Institute (ADU-CRI)**, in collaboration with the **College of Health Sciences**, organized a community outreach event at **Khalifa Park in Abu Dhabi** to mark **World Cancer Awareness Day**. The initiative focused on strengthening public understanding of cancer prevention, early detection, and the importance of maintaining healthy lifestyle practices. By bringing academic research and healthcare expertise into a public setting, the event created a meaningful platform for dialogue between the university and the wider community.

The event served as an open space connecting healthcare professionals, students, researchers, and community members. Visitors engaged directly with specialists and participated in educational activities designed to highlight preventive healthcare, risk factors, and the importance of regular screening. Interactive discussions and demonstrations helped participants better understand how medical knowledge and research translate into everyday health decisions.

Several themed zones were established across the venue, including areas dedicated to **fitness, nutrition, healthy living, health screening, and interactive learning**. These spaces encouraged families and individuals to explore practical strategies for maintaining wellbeing and reducing long-term cancer risks. The format made complex health information accessible while promoting active participation from the public.

Leading healthcare organizations participated in the initiative, including **Cleveland Clinic Abu Dhabi, Burjeel Cancer Institute, NMC Healthcare, Sheikh Shakhbout Medical City, and SEHA Sheikh Khalifa Medical City.** Their presence enabled direct interaction with the community, offering guidance on prevention, screening pathways, and health management. The event was further supported by partners including **Himatrix Training Center, Biomedical Scientific Services LLC, MeNow, Breath Creative Space, Dr. Nutrition, Bloom Medical Center, Low Calories Restaurant LLC, Adrenagy, PARA, and the Khalifa Park management team.**

The initiative was organized with strong involvement from the **ADU-CRI Student Forum**, under the leadership of **Dr. Asiya Nazir**, whose coordination and student engagement contributed to a vibrant and impactful event. Continued support from Abu Dhabi University leadership and faculty members, including **Professor Ghassan Aouad, Professor Hamad Odhabi, Professor Barry O'Mahony, Montasir Qasymeh, and Dr. Abdulmajeed Almutary,** further reinforced the university's commitment to community-focused research initiatives. Through initiatives such as this, **ADU-CRI** continues to translate academic knowledge into meaningful public engagement while strengthening awareness around prevention, early detection, and community health.

Cervical Cancer in the MENA Region:
Challenges and Opportunities for Prevention

The **Abu Dhabi University Cancer Research Institute (ADU-CRI)** hosted a regional webinar titled "Cervical Cancer in the MENA Region: Challenges and Opportunities for Prevention," highlighting one of the most preventable yet still prevalent cancers affecting women worldwide. The session examined the current landscape of cervical cancer across the Middle East and North Africa and emphasized the role of research, public awareness, and policy coordination in strengthening prevention and early detection strategies.

The webinar featured **Prof. Haleama Al Sabbah**, a public health expert specializing in women's health and cancer prevention, and was moderated by **Dr. Afsheen Raza**, Director of **ADU-CRI**. Organized under the **Division of Drug Discovery and Development Research** within the Office of Research and Sponsored Programs, the event brought together healthcare professionals, researchers, and participants from across the region to exchange perspectives on evidence-based approaches to improving prevention outcomes.

Discussions highlighted several challenges that continue to affect cervical cancer prevention across the region, including limited public awareness, gaps in screening participation, and uneven access to HPV vaccination programs. Addressing these barriers remains essential for improving women's health outcomes and reducing preventable cervical cancer cases. Participants emphasized the need for coordinated efforts across healthcare systems, educational initiatives, and public policy frameworks.

The session also explored opportunities to strengthen prevention through expanded early detection programs, wider vaccination coverage, and community-based awareness initiatives that are culturally responsive and accessible. Aligning regional efforts with the **World Health Organization's cervical cancer elimination targets** was identified as an important step toward achieving long-term public health impact. Through initiatives such as this webinar, **ADU-CRI** continues to support regional dialogue and promote collaborative approaches to advancing cancer prevention and public health awareness.

Innovation and Discovery
Artificial Intelligence in Engineering:
Advancing Computational Fluid Dynamics Research

The **Research Institute for Sustainable Futures (RISF)** at **Abu Dhabi University** continues to advance engineering research through the integration of artificial intelligence and computational modeling. A recent contribution led by **Dr. Sharul Sham Do**l, Director of RISF and Professor of Mechanical Engineering, examines how artificial intelligence and machine learning are transforming the field of **computational fluid dynamics (CFD)**.
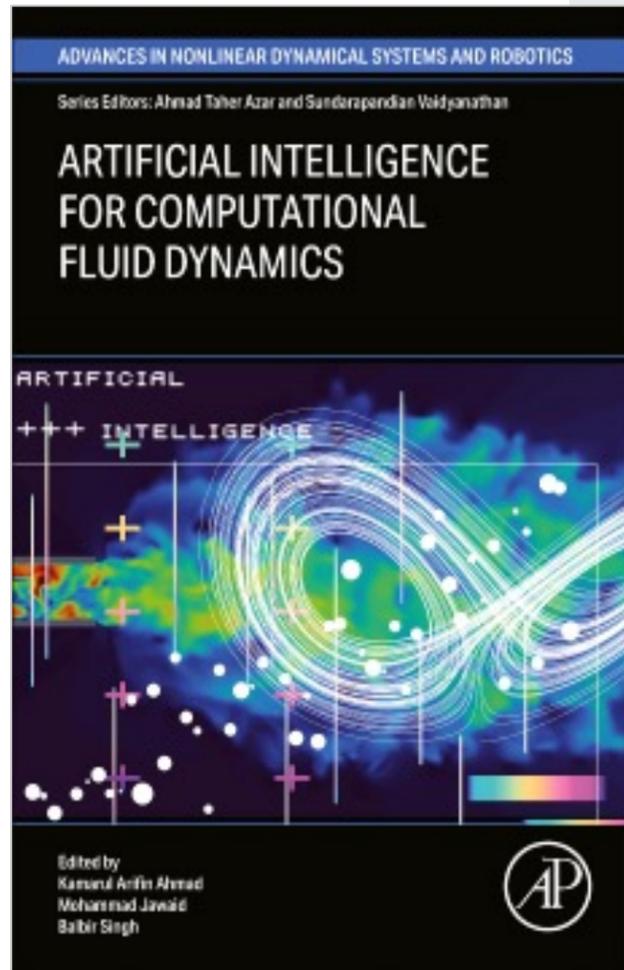
The work explores how modern AI techniques—including machine learning and neural networks—can enhance the modeling, prediction, and solution of complex fluid flow problems. These approaches are helping to improve simulation efficiency, increase predictive accuracy, and expand the capabilities of computational tools used in engineering and scientific research.

This research milestone reflects ongoing collaboration between the **College of Engineering at Abu Dhabi University** and the **Department of Aerospace Engineering at Universiti Putra Malaysia**, highlighting the value of international academic partnerships in advancing high-impact research and innovation.

The outcomes of this collaboration are presented in the recently published book, Artificial Intelligence for Computational Fluid Dynamics, published by **Elsevier**. The publication brings together contemporary research, practical applications, and emerging developments at the intersection of artificial intelligence and fluid dynamics, offering valuable insights for researchers, engineers, and students working in the field.

The book further explores the integration of machine learning, deep learning, and neural networks with high-performance computing to address complex fluid dynamics problems. It also discusses future research directions, including developments related to **quantum computing** and its potential role in next-generation scientific simulations.

This contribution highlights the growing role of AI-enabled engineering research in addressing complex scientific challenges while strengthening international knowledge exchange.

ADVANCES IN NONLINEAR DYNAMICAL SYSTEMS AND ROBOTICS

Series Editors: Ahmad Taher Azar and Sundarapandian Vaidyanathan

ARTIFICIAL INTELLIGENCE FOR COMPUTATIONAL FLUID DYNAMICS

ARTIFICIAL +++ INTELLIGENCE

Edited by
Kamarul Arifin Ahmad
Mohammad Jawaid
Balbir Singh

Innovation and Discovery
Future of Sustainable and Intelligent Air Mobility:
Abu Dhabi University Hosts Industry Dialogue

The **College of Engineering at Abu Dhabi University**, in collaboration with the **Research Institute for Sustainable Futures (RISF)** and the **Research Institute for AI and Emerging Technology (RIAET)**, hosted an educational session titled "Future of the UAE's Sustainable and Intelligent Air Mobility." The event brought together industry representatives, researchers, academics, and students to explore emerging developments shaping the future of urban air transportation.

A key highlight of the session was the participation of **Archer**, a developer of **electric vertical takeoff and landing (eVTOL)** aircraft designed for urban air mobility networks. The discussion provided valuable insights into how next-generation aviation technologies can transform transportation systems while supporting sustainability and efficiency in rapidly growing urban environments.

The seminar served as a platform for dialogue on several important themes, including **green and intelligent air mobility, smart operational systems, safety considerations, and talent development** for future aviation industries. Participants exchanged perspectives on how academia and industry can work together to advance sustainable aviation technologies and prepare the next generation of engineers and innovators.

The initiative reflects Abu Dhabi University's commitment to advancing research, education, and collaboration in areas that support **sustainability, emerging technologies, and national development priorities**. The event was made possible through the continued support of university leadership, including Professor Ghassan Aouad, Prof. Montasir Qasymeh, Dr. Hamdi Mustafa Sheibani, and **Prof. Mohammed Ghazal**, alongside the **participation of Archer Airlines COO Brig. Pil. (R.) Cristiano Tartaglione**.

Through initiatives such as this, **Abu Dhabi University** continues to foster meaningful dialogue between academia and industry while contributing to the development of sustainable and intelligent mobility solutions.

The event provided a valuable platform for engaging with global researchers, industry leaders, and technology innovators working in unmanned systems and simulation technologies. Discussions and demonstrations highlighted emerging trends in autonomous platforms, AI-enabled decision systems, and advanced robotics applications, reinforcing the importance of collaboration between academia and industry in accelerating innovation.

The participation was supported by a dedicated team from the **College of Engineering** and **RIAET**, including **Prof. Mohammad AlKhedher, Dr. Jawad Yousaf, Dr. Taimur Hassan, Eng. Hadeel Salman, Eng. Sarah Alhasan, Eng. Maha Yaghi, Eng. Abdalla Gad, Eng. Leen Babaa**, and **Eng. Hasan Hamdan**, whose efforts contributed to presenting the university's growing capabilities in applied AI and autonomous systems research.

The initiative was made possible through the continued support of Abu Dhabi University's leadership, including **Professor Ghassan Aouad, Dr. Hamad Odhabi, Professor Barry O'Mahony, Dr. Hamdi Mustafa Sheibani, Professor Montasir Qasymeh**, and **Mr. Bassam Mura**, whose commitment to research and innovation continues to strengthen the university's presence on global technology platforms.

Through participation in **UMEX & SimTEX 2026, RIAET** continues to advance research excellence, strengthen industry engagement, and support student innovation in emerging technologies shaping the future of intelligent and autonomous systems.

Innovation and Discovery

Advancing Applied AI and Autonomous Systems: RIAET at UMEX & SimTEX 2026

The **Research Institute for AI and Emerging Technology (RIAET)** at **Abu Dhabi University,** in collaboration with the **College of Engineering**, participated in **UMEX & SimTEX 2026**, held at the **ADNEC Centre Abu Dhabi**. Recognized as the Middle East's premier event for drones, robotics, simulation, and unmanned systems, the exhibition highlights the latest technological advancements while fostering innovation, collaboration, and industry growth. The 2026 edition was held under the patronage of **His Highness Sheikh Hazza bin Zayed Al Nahyan, Deputy Ruler of Abu Dhabi**.

Abu Dhabi University's participation showcased the strength of its **student-led projects and applied research initiatives**, demonstrating how interdisciplinary engineering and artificial intelligence research can translate into practical, real-world autonomous and intelligent systems. These projects reflect the university's commitment to developing technologies aligned with national priorities and the rapidly evolving landscape of advanced systems and robotics.

Global Research Collaboration
RIAET and RISF Engage with SERI–UKM

The **Research Institute for AI and Emerging Technology (RIAET)** at **Abu Dhabi University**, in collaboration with the **Research Institute for Sustainable Futures (RISF)** and the **College of Engineering**, recently held a strategic meeting with the **Solar Energy Research Institute (SERI)** at the **National University of Malaysia (UKM)** in Bangi, Selangor. The engagement focused on strengthening international collaboration in **artificial intelligence, renewable energy, and sustainability-driven innovation**.

The Abu Dhabi University delegation included **Prof. Mohammed Ghazal**, Director of RIAET, and **Prof. Sharul Sham Dol**, Director of RISF, who met with SERI leadership to explore opportunities for joint academic and research initiatives. Discussions highlighted several areas of collaboration, including the co-hosting of international symposiums, expanding research partnerships, student research exchanges, and the development of joint research initiatives supported through seed funding.

A key focus of the discussions was the development of **professional certifications and micro-credentials in artificial intelligence and renewable energy**, aimed at supporting professional development and building capacity in emerging technological fields. The meeting also explored opportunities for **joint degree programs, co-supervised research, and shared laboratory access**, further strengthening collaboration between the institutions.

The delegation was welcomed by **Prof. Dr. Norasikin Ahmad Ludin**, Director of SERI, and **Dr. Adnan Ibrahim**, Deputy Director of SERI, whose insights and hospitality contributed to productive discussions and the strengthening of institutional ties. The visit also included engagement with doctoral researchers involved in joint supervision initiatives, highlighting the value of international collaboration in advancing research capacity and supporting the development of future scholars.

The initiative reflects Abu Dhabi University's continued commitment to expanding global research partnerships and advancing interdisciplinary innovation. Supported by the university's leadership—including **Professor Ghassan Aouad, Professor Barry O'Mahony, Dr. Hamdi Mustafa Sheibani, and Prof. Montasir Qasymeh**—such collaborations continue to strengthen the university's international research ecosystem while advancing work in artificial intelligence, renewable energy, and sustainable development.

Global Research Collaboration
Abu Dhabi University Engages with Sheffield Hallam University

Abu Dhabi University, through the **College of Engineering** and the **Research Institute for AI and Emerging Technology (RIAET)**, recently explored opportunities for international collaboration during a visit to **Sheffield Hallam University** in the United Kingdom. **Prof. Mohammed Ghazal** met with **Dr. Muhammad Akmal** to discuss potential partnerships aimed at advancing research and academic cooperation between the two institutions.

The discussions focused on strategic research areas where artificial intelligence can contribute to emerging engineering challenges. Key topics included **AI-enhanced energy systems, intelligent power management, smart grid analytics, and data-driven modeling** for system stability and optimization. These areas represent growing opportunities for interdisciplinary collaboration that combine artificial intelligence with advanced energy and engineering systems.

During the visit, Prof. Ghazal also attended the **12th Digital Pathology and AI Congress Europe**, a leading international event that brought together **more than 600 participants and over 60 technology providers** to explore developments in AI integration within healthcare. The congress highlighted emerging trends related to clinical trials, regulatory frameworks, ethical considerations, and the broader role of artificial intelligence in medical innovation.

The engagement reflects Abu Dhabi University's commitment to strengthening international partnerships and expanding collaborative research in areas that bridge **artificial intelligence, engineering, and healthcare technologies**. Continued support from university leadership—including **Professor Ghassan Aouad, Professor Barry O'Mahony, Dr. Hamdi Mustafa Sheibani,** and **Prof. Montasir Qasymeh**—remains instrumental in advancing these global initiatives.

Such international exchanges continue to expand Abu Dhabi University's research collaborations while advancing innovation in AI-enabled engineering and healthcare systems.

Global Research Collaboration
Advancing Biomedical Research and Innovation

The **Abu Dhabi University Cancer Research Institute (ADU-CRI)** recently participated in two major scientific events in Dubai focused on emerging trends in biomedical research, precision medicine, and healthcare innovation. These engagements provided valuable opportunities to exchange knowledge with international experts, explore technologies shaping the future of healthcare, and strengthen dialogue between academic institutions and industry leaders.

One of the featured events, **"Enabling Precision Medicine with Multiomics,"** organized by **Gulf Scientific Corporation**, explored how advanced omics technologies are transforming clinical research and patient care. Discussions highlighted developments in next-generation sequencing, proteomics, and genomic analysis, and examined how integrating multiomics data can enhance disease understanding, diagnostics, and personalized treatment strategies. Experts from academia, healthcare institutions, and industry also shared perspectives on applications across areas such as cancer research, cardiovascular disease, and longevity science. The program further examined emerging tools supporting biomedical discovery, including advances in mass spectrometry, nuclear magnetic resonance technologies used in clinical chemistry, and platforms enabling population-scale genotyping and biomarker identification. These innovations are expected to accelerate precision medicine initiatives while strengthening diagnostic capabilities and treatment pathways across healthcare systems.

In addition, the **ADU-CRI** team participated in **WHX Labs Dubai**, part of the **World Health Expo**, which brings together global leaders in laboratory medicine, diagnostics, and healthcare technologies. The event provided a platform to explore innovations in laboratory systems, data-driven diagnostics, and next-generation research infrastructure, while encouraging collaboration between universities, healthcare providers, and technology partners.

Abu Dhabi University was represented by members of the institute including **Dr. Amel Hamdi, Dr. Amal Gadalla, Dr. Asiya Nazir, and Dr. Wael Abdrabou**, with contributions from **Dr. Afsheen Raza** in discussions focused on expanding research collaboration and innovation.

Through participation in initiatives such as these, **ADU-CRI** continues to strengthen industry–academia partnerships and support the translation of scientific discoveries into meaningful healthcare advancements.

Student Research Forum:
Exploring AI-Driven Advancements in Cancer Diagnostics

The **Abu Dhabi University Cancer Research Institute (ADU-CRI)**, in collaboration with the **College of Health Sciences**, continues to encourage student engagement in scientific dialogue through initiatives that connect academic learning with emerging developments in medical research and technology. As part of these efforts, the institute hosted a session within the **ADU-CRI Student Research Forum Webinar Series,** highlighting new directions in cancer diagnostics and interdisciplinary healthcare innovation.

The webinar focused on the topic "AI-Powered Liquid Biopsies in Glioblastoma Cancer: Advancements in Non-Invasive Brain Cancer Monitoring and Diagnosis." The session explored how artificial intelligence is enabling new approaches for detecting and monitoring glioblastoma through liquid biopsy technologies. These emerging methods aim to support earlier identification of disease progression while providing clinicians with tools to monitor patients through less invasive diagnostic procedures.

The discussion was presented by **Tuayyeb Hussain,** who shared insights into how AI-driven data analysis is contributing to advances in cancer diagnostics and biomedical research. Students, academic teams, and healthcare professionals participated in discussions on the future of precision medicine and the growing importance of integrating artificial intelligence with molecular and clinical data to better understand complex diseases such as brain cancer. The webinar formed part of the activities of the **Cancer Research & Awareness Student Scientific Forum**, which aims to create opportunities for students to engage directly with contemporary research topics and exchange knowledge with experts in the field. The session was organized with the support of **Dr. Afsheen Raza** and **Dr. Asiya Nazir**, whose leadership continues to strengthen student involvement in research-focused initiatives.

Through programs such as the **Student Research Forum**, Abu Dhabi University continues to foster a vibrant research culture while supporting the development of future researchers in biomedical science.
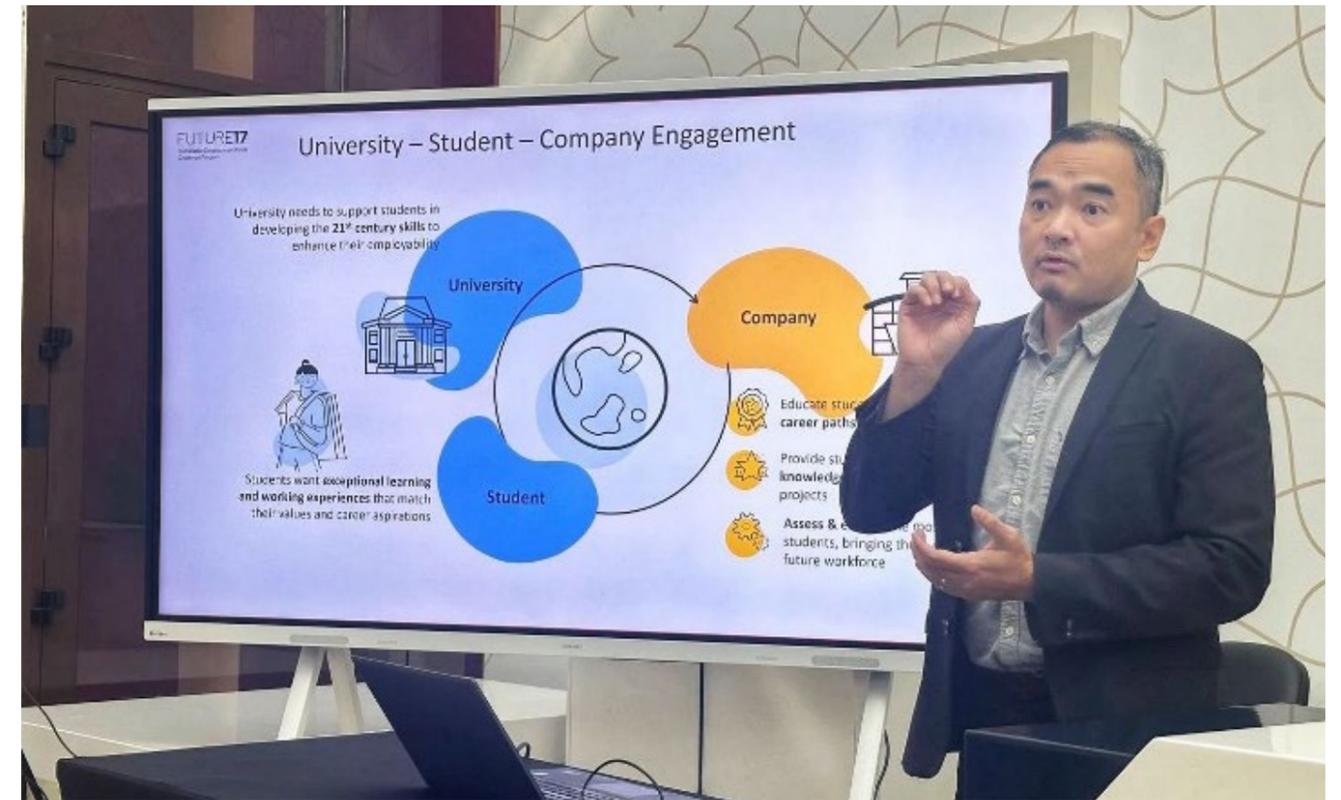
Global Sustainability Leadership:
Abu Dhabi University Launches Future17

The **Research Institute for Sustainable Futures (RISF)** at **Abu Dhabi University** hosted the inaugural gathering for the first cohort participating in the **Future17 initiative by QS Quacquarelli Symonds**. The hybrid event brought together students, mentors, and academic leaders to explore collaborative pathways aligned with the **United Nations Sustainable Development Goals (SDGs)**.

The session introduced participants to a global platform designed to promote international engagement, interdisciplinary collaboration, and innovation-driven solutions to real-world sustainability challenges. Through project-based learning and cross-border partnerships, students engage with peers from institutions around the world while developing practical approaches that contribute meaningfully to sustainable development.

Future17 places students at the center of global collaboration, strengthening leadership capabilities while expanding their academic and professional networks. The program also encourages participants to pursue additional skill-building opportunities through digital platforms, international exchanges, and collaborative research activities connected to sustainability priorities.

The initiative is supported by **Professor Ghassan Aouad,** Chancellor of Abu Dhabi University, with leadership from **Professor Sherine Farouk**, Assistant Chancellor for Global Partnerships and Impact. Academic coordination includes **Professor Mohammed Ghazal** and **Dr. Rahaf Ajaj,** reflecting a collaborative effort across the university.

Through initiatives such as **Future17,** Abu Dhabi University continues to expand international partnerships while preparing students to contribute to global sustainability solutions.

Advancing Marine Research:
Sustainable Scientific Exploration in the UAE

Researchers from the **Research Institute for Sustainable Futures (RISF)** at **Abu Dhabi University** recently visited the **Environment Agency – Abu Dhabi's research vessel Jaywun**, one of the most advanced marine scientific research platforms in the Middle East. The visit provided valuable insight into the technologies and infrastructure supporting marine research and environmental monitoring across the region.

The Abu Dhabi University delegation included **Prof. Sharul Sham Dol** and research assistant **Eng. Mubarak Al-Hamadi**, who explored the vessel's research facilities and operational capabilities. Measuring approximately 50 meters in length, the vessel houses several specialized laboratories dedicated to fisheries research, chemical analysis, bio-physical studies, and wet-lab operations.

Equipped with advanced technologies such as **remotely operated vehicles (ROVs)**, underwater drones, seabed mapping systems, and full **SCUBA-supported research operations**, the platform enables scientists to address key regional challenges. These include climate change impacts, marine ecosystem resilience, blue carbon research, fish stock recovery, and marine pollution monitoring.

The visit also supported ongoing discussions on enhancing the sustainability of marine research activities. Current efforts focus on integrating low-impact technologies, improving energy efficiency during research expeditions, and incorporating circular economy principles into fieldwork practices. Such approaches aim to reduce the environmental footprint of scientific operations while strengthening environmental data collection.

This engagement highlights the importance of collaboration between research institutions and environmental agencies in advancing marine science and sustainable ocean management. Through partnerships such as this, **Abu Dhabi University** continues to contribute to environmental research and the development of solutions addressing regional sustainability challenges.

Advancing AI-Ready Education:
Abu Dhabi University Contributes to Elevate MENA Dialogue

Prof. Mohammed Ghazal, Director of the **Research Institute for AI and Emerging Technology (RIAET)** at **Abu Dhabi University**, participated as a speaker in **Elevate MENA – Spotlight Event 2: Enhancing Curricula to Align with National Visions**, part of **AdvanceHE's regional professional development series.** The session was chaired by **Vic Stephenson**, whose leadership helped guide a focused and insightful discussion throughout the event.

The session brought together educators and academic leaders from across the **Middle East and North Africa** to explore how higher education institutions can respond effectively to national priorities, evolving student expectations, and the increasing role of artificial intelligence in education. The panel included **Dr. Noha Mostafa** from **The British University in Egypt, Dr. Ramalingam Dharmalingam** from **Majan University College in Oman**, and **Dr. Sameh Elsonbaty** from **Liwa University**, each contributing valuable institutional and regional perspectives on curriculum development and reform.

Discussions focused on moving beyond isolated initiatives toward **system-level curriculum design**, emphasizing institutional coherence, strategic alignment, and the responsible integration of artificial intelligence into teaching and learning. Participants highlighted the importance of coordinated efforts across policy, pedagogy, and academic development to ensure that educational programs remain aligned with national visions and future workforce needs.

The **Elevate MENA** initiative continues to provide a platform that is globally informed yet regionally grounded, enabling educators to exchange ideas, gain international recognition, and contribute to advancing higher education across the region.

Through participation in initiatives such as this, **RIAET and Abu Dhabi University** continue to support dialogue, collaboration, and innovation in AI-enabled education and curriculum development.

Featured Insights
Sustainable Agriculture Innovation:
Exploring Technology Solutions for the Global Palm Oil Industry

The **Research Institute for Sustainable Futures (RISF)** and the **Research Institute for AI and Emerging Technology (RIAET)** at **Abu Dhabi University** recently engaged in discussions with **SD Guthrie Berhad**, one of the world's leading producers of certified sustainable palm oil. The meeting focused on exploring opportunities to address industry challenges related to automation, mechanization, and operational efficiency within large-scale agricultural operations.

SD Guthrie Berhad manages an extensive agricultural footprint of approximately **750,000 hectares** across several countries, primarily dedicated to palm oil production. The scale and complexity of these operations present significant challenges that require innovative technological and sustainability-driven solutions.

The discussions explored potential research directions that integrate advanced technologies, automation strategies, and sustainable agricultural practices to improve productivity while supporting environmental responsibility. Collaborative initiatives between academia and industry play an important role in addressing these challenges and developing solutions with practical and long-term impact.

This engagement builds on prior work conducted by students from the **College of Engineering at Abu Dhabi University**, whose projects in this area have received international recognition. Their work secured **first place in the 2024 URIC Innovation Challenge** and was also ranked among the **top five projects in the 2023 Innovation and Entrepreneurship Award at the University of Sharjah**.

The Abu Dhabi University delegation included **Dr. Hamdi Mustafa Sheibani, Prof. Montasir Qasymeh, Prof. Mohammed Ghazal, Prof. Mohammad AlKhedher, Dr. Jawad Yousaf, and A. Zawawi Mohamed**, representing expertise across sustainability, engineering, and emerging technologies.

Through partnerships such as this, **Abu Dhabi University** continues to strengthen collaboration with global industry leaders while contributing to the development of innovative solutions that support sustainable development and technological advancement.

MODERATOR
Dr. Narimane Hadj Hamou
CEO, CLICKS, UAE
CLICKS
Center for Learning Innovations & Customized Knowledge Solutions

PANELIST
Prof. Mohammed Awad
Associate Provost for Student Success, American University of Ras Al Khaimah (AURAK)
AURAK

PANELIST
Prof Nazih Khaddaj Mallat
Vice President, Al Ain University
AL AIN UNIVERSITY

PANELIST
Prof Mohammed Ghazal
Director of the Institute for Artificial Intelligence and Emerging Technologies, Abu Dhabi University
جامعة أبوظبي
Abu Dhabi University

Featured Insights

Leading AI Transformation in Higher Education:
ADU Participates in the AI Future Focus Initiative

Abu Dhabi University, through the **Research Institute for AI and Emerging Technology (RIAET)**, participated in a higher education leadership panel held under the **AI Future Focus Initiative**, an initiative launched by **CLICKS** in collaboration with **Studiosity**. The initiative brings together more than **15 higher education institutions across the UAE** to explore the evolving role of artificial intelligence in academic environments.

The panel session was moderated by **Dr. Narimane Hadj Hamou**, Chair of the **MENA Higher Education Leadership Forum**, and featured academic leaders including **Prof. Mohammed Ghazal** from Abu Dhabi University, **Prof. Nazih Khaddaj Mallat** from Al Ain University, and **Prof. Mohammed Awad** from the American University of Ras Al Khaimah. The discussion focused on how universities can move beyond experimentation with AI tools toward

building sustainable institutional capabilities that support long-term transformation.

Participants highlighted that artificial intelligence in higher education is no longer solely a technological topic but increasingly a matter of **governance, institutional strategy, and leadership**. The session emphasized the importance of coordinated efforts across policy, academic practice, and quality assurance frameworks to ensure responsible and scalable implementation of AI across universities.

Key insights from the discussion underscored the need for leadership-led initiatives, phased implementation strategies, and inclusive stakeholder engagement to successfully embed AI within teaching, learning, and research environments. Panelists also emphasized the importance of building AI literacy among faculty and students while maintaining

strong academic standards and ethical practices.

The event provided an important platform for universities to share institutional experiences and practical case studies. Examples from **Abu Dhabi University, Al Ain University, and the American University of Ras Al Khaimah** illustrated how strategic alignment across governance, academic development, and innovation initiatives can support responsible AI adoption at scale.

Through engagement in initiatives such as the **AI Future Focus Initiative, RIAET and Abu Dhabi University** continue to contribute to regional dialogue on artificial intelligence in higher education while supporting collaborative approaches to digital transformation and academic innovation.
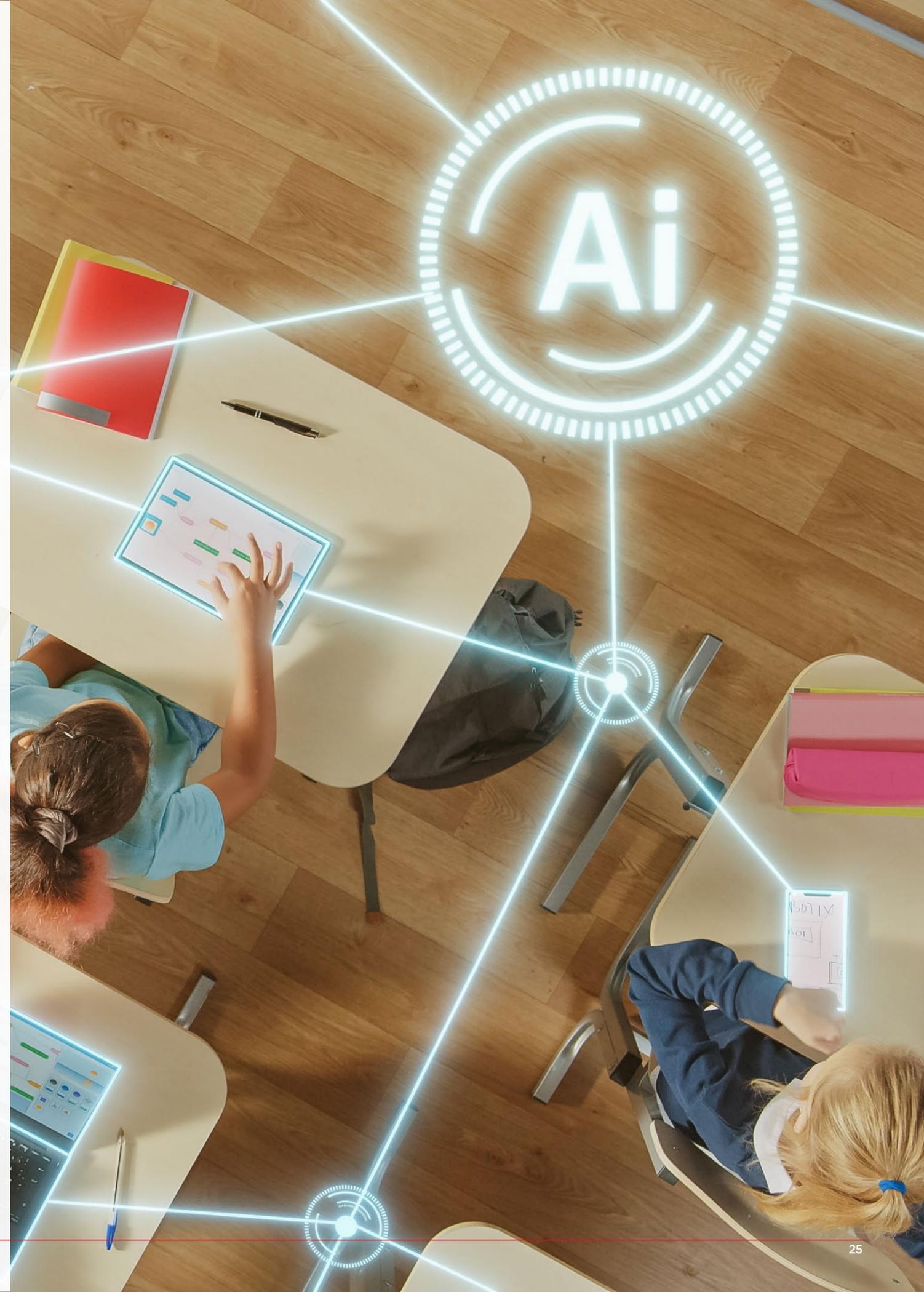
February 2026 Research Publications

Interfacial Engineering and Hydrophilic/Hydrophobic Coatings in Solar Evaporators: Strategies for Balancing Evaporation and Condensation - A Comprehensive Review

Engineering Interfacial Thermal Energy Management via Grooved B4C-Polyurethane Architectures for High-Efficiency Solar-Thermal Desalination

Author(s):

Irshad, M. S. (Hubei University), Maqsood, G. (Hubei University), Arshad, N. (Shenzhen University), Shakoor, B. (University of Wah), Ahmed, I. (Abu Dhabi University), Ali, M. A. (Hubei University), Asghar, M. S. (Hubei University), Li, W. (Hubei University), Li, W. (Hubei University), Mushtaq, N. (Hubei University), Ghazanfar, U. (University of Wah), Rehman, S. U. (Euromed University of Fes), Sabir, M. (Wuhan University of Technology), Saqib, M. (University of Bologna), Mei, T. (Hubei University), Tianxiang, Z. (Hubei University), Shamim, T. (Northern Illinois University), Zhang, J. (Suzhou University of Science and Technology), Wang, H. (Shenzhen University), Dao, V.-D. (PHENIKAA University), Ho, N. X. (PHENIKAA University), Wang, X. (Hubei University)

Index Terms:

Coatings; Condensers (liquefiers); Conversion efficiency; Evaporation; Evaporators; Hydrophilicity; Phase change materials; Phase interfaces; Solar energy; Thermal Engineering; Balancing evaporation and condensation; Energy; Evaporation and condensation; Hydrophilic/hydrophobic; Hydrophilic/hydrophobic coating; Hydrophobic coatings; Interfacial engineering; Photo-thermal; Solar evaporators; Steam generation; Condensation; controlled study; electric potential; enthalpy; evaporation; fresh water; liquid; nonhuman; pharmaceutics; reduction (chemistry); review; solar energy; vapor; water; water vapor

Abstract:

Solar-driven steam generation (SSG) is an efficient process for converting solar energy into thermal energy, demonstrating significant potential for industrial use. Recent progress in interfacial engineering, particularly through innovations in photothermal layer design and condenser optimization, has enabled remarkable solar-thermal conversion efficiencies at the air/liquid interface. This review systematically examines interfacial engineering strategies for high-performance evaporators, emphasizing the critical role of hydrophilic/hydrophobic coatings in achieving sustainable water production. Furthermore, it evaluates condensing structures, comprehensively classifying condensers and their influence on freshwater yield. By analyzing key physical factors, including phase-change dynamics, vapor-liquid equilibrium, and enthalpy reduction strategies for photothermal materials (PTMs), as well as the harnessing of ambient energy for enhanced evaporation, this review offers a framework to elucidate the mechanisms of hydrophilic/hydrophobic coatings and identify potential breakthroughs under optimized conditions. Finally, we discuss the prospective applications of SSG systems with advanced evaporators and condensers, alongside the prevailing challenges in scalability and practical implementation.

Read the paper

Author(s):

Fan, X. (Xinjiang Institute of Engineering), Shi, R. (Xinjiang Institute of Engineering), Ahmed, I. (Abu Dhabi University), Howells, C. T. (Abu Dhabi University), Al Huwayz, M. (Princess Nourah bint Abdulrahman University), Alomar, M. (Princess Nourah bint Abdulrahman University), Shakoor, B. (University of Wah), Shah, M. (University of Wah), Arshad, N. (Hubei University), Ha, V. T. H. (PHENIKAA University), Lien, D. T. (PHENIKAA University), Dao, V.-D. (PHENIKAA University), Sultan Irshad, M. (Hubei University)

Index Terms:

Cost effectiveness; Effluents; Engineering research; Evaporators; Hydrophilicity; Metal ions; Salt removal; Thermal Engineering; Wastewater treatment; Fresh Water; Groove-engineered; Grooved structures; Higher efficiency; Localisation; Solar evaporators; Thermal; Thermal energy management; Thermal localization; Water scarcity; Boron carbide; Economic and social effects; Evaporation

Abstract:

Solar-driven interfacial evaporation represents a sustainable pathway to mitigate global water scarcity; however, its practical implementation is often constrained by the trade-off between high efficiency, structural complexity, and susceptibility to salt fouling. Herein, we developed a scalable, cost-effective solar evaporator fabricated from boron carbide (B4C) nanoparticles, which is anchored on a groove-engineered polyurethane (PU) foam within a polyvinyl alcohol (PVA) matrix, bridging the gap between efficiency and scalability. This cavity-inspired grooved structure couples efficient photothermal conversion, local heat confinement without any solar concentrator, and fast water transport with effective hydrophilicity (zero contact angle). The effective heat localization realized in these grooved structures (42.16 °C) than plain structure (39.06 °C), as simulated through COMSOL heat transfer simulations. Under one-sun irradiation, the optimized evaporator achieves an evaporation rate of 1.55 kg m−2 h−1, a value increased by 28 % compared with plain structure systems (1.21 kg m−2 h−1) while maintaining stable performance across diverse aqueous environments, including seawater, river water, and industrial effluents (MO, MB, RhB) with varying salinity and pH. The system also exhibits exceptional antifouling characteristics, with >99 % salt rejection and > 98 % removal of heavy metal ions (Pb2+, Cd2+). This work combines material innovation with structure design and pushes the development of robust, high-throughput solar evaporators for the real world for desalination and wastewater treatment. The B4C@PU system thereby provides a green route for alleviating water scarcity by simultaneously solving the critical bottlenecks of density, cost, and salt fouling.

Read the paper

Mechanistic Insights into the Pharmacological Actions of Flavonoids: A Comprehensive Review

Author(s):

Rasheed, A. (University of Peshawar), Ali, G. (University of Peshawar), Islam, M. R. (Daffodil International University), Rauf, A. (University of Swabi), Ajaj, R. (Abu Dhabi University), Hemeg, H. A. (Taibah University), Iriti, M. (University of Milan / National Interuniversity Consortium of Materials Science and Technology)

Index Terms:

antidiabetic agent; antioxidant; flavonoid; glycosylated protein; liposome; mitogen activated protein kinase; nanoparticle; phosphatidylinositol 3 kinase; protein kinase B; transcription factor Nrf2; antineoplastic activity; apoptosis; autophagy (cellular); B lymphocyte; bioavailability; biological activity; cancer inhibition; cardiovascular disease; cell protection; chronic disease; degenerative disease; diabetes mellitus; drug delivery device; drug delivery system; drug development; drug mechanism; enhancer region; gene expression; glycosylation; human; hydroxylation; inflammation; molecular docking; neuroprotection; nonhuman; oxidative stress; personalized medicine; pharmacokinetics; pharmacology; prevention; prophylaxis; review; signal transduction; structure activity relation; systems pharmacology

Abstract:

Flavonoids, a diverse group of polyphenolic chemicals found in plants, have significant attention for their diverse pharmacological actions and therapeutic potential. Their ability to target multiple pathways, modulate oxidative stress, and regulate inflammatory mediators is crucial in preventing and managing chronic diseases like cancer, cardiovascular disorders, diabetes, and neurodegenerative diseases. Flavonoids have multitargeted actions, providing a safer and general therapeutic approach compared to single-targeted synthetic drugs. This review provides a comprehensive understanding of flavonoids' biological effects, focusing on their modulation of key molecular signaling pathways such as nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB), mitogen-activated protein kinases (MAPK), phosphatidylinositol 3-kinase (PI3 K)/protein kinase B (AKT), nuclear factor erythroid 2-related factor 2 (Nrf2), oxidative stress, inflammation, and apoptosis. Their anticancer potential is supported by their ability to induce apoptosis, modulate autophagy, and influence gene expression, while their anti-inflammatory and antioxidant properties aid in cytoprotection. Certain hydroxylation and glycosylation patterns enhance their biological efficacy based on structure-activity connections. The review demonstrates the various benefits of these substances, including their hepatoprotective, neuroprotective, anticancer, antidiabetic, and cardioprotective properties, based on both experimental and clinical evidence. It discusses the structure–activity relationship (SAR) that supports their bioefficacy as well as issues with metabolism, bioavailability, and therapeutic translation. It also provides a comprehensive understanding of flavonoids as potential agents for chronic disease prevention and management, integrating pharmacological findings with molecular facts. A method was used to identify works published in reputable journals. Every search result came from PubMed, Scopus, Web of Science, ScienceDirect, Google Scholar, etc The terms flavonoids, pharmacological properties, disease, and mechanism of action were utilized. We selected and investigated research papers, review articles, and original studies that were published up until 2025. Future research should focus on improving flavonoids' bioavailability using advanced drug delivery methods like conjugates, liposomes, and nanoparticles, with extensive clinical trials needed for validation. Furthermore, the potential of flavonoids in therapeutic interventions will be enhanced through the use of computational techniques such as molecular docking, network pharmacology, and precision medicine. Future perspectives emphasize the need for advanced drug delivery systems, clinical trials, and molecular docking techniques to enhance their therapeutic efficacy.

Read the paper

ViT-Stain: Vision Transformer-Driven Virtual Staining for Skin Histopathology via Global Contextual Learning

Author(s):

Hussain, M. A. (National University of Sciences and Technology), Waris, M. A. (National University of Sciences and Technology), Akram, M. U. (National University of Sciences and Technology), Khan, M. J. (National University of Sciences and Technology), Asaf, M. Z. (National University of Sciences and Technology), Javaid, A. (National University of Sciences and Technology), Gilani, S. O. (Abu Dhabi University), Hazzazi, F. (Prince Sattam Bin Abdul Aziz University)

Index Terms:

adult; aged; area under the curve; Article; artificial intelligence; artificial neural network; basal cell carcinoma; benchmarking; controlled study; convolutional neural network; cost effectiveness analysis; deep learning; diagnostic test accuracy study; entropy; geometry; global contextual learning; global health; hallucination; histology; histopathology; human; human tissue; image quality; image reconstruction; image segmentation; learning; learning algorithm; multilayer perceptron; photometry; qualitative research; receiver operating characteristic; receptive field; skin biopsy; spatial analysis; squamous cell carcinoma; training; vision; image processing; pathology; procedures; skin; staining; hematoxylin; Hematoxylin; Humans; Image Processing, Computer-Assisted; Neural Networks, Computer; Skin; Staining and Labeling

Abstract:

Current virtual staining approaches for histopathology slides use convolutional neural networks (CNNs) and generative adversarial networks (GANs). These approaches rely on local receptive fields, struggle to capture global context, and long-range tissue dependencies. This limitation can introduce artifacts in fine textures and cause loss of subtle morphological details. We propose a novel vision transformer-driven virtual staining framework (ViT-Stain) that translates unstained skin tissue images into hematoxylin and eosin (H&E)-equivalent images. The transformer's self-attention enables ViT-Stain to capture long-range dependencies, preserve global context, and maintain fine textures. We trained ViT-Stain on the E-Staining DermaRepo dataset, which pairs unstaained and H&E-stained whole-slide images (WSIs). We validated our model using metrics including SSIM, PSNR, FID, KID, LPIPS, and a novel histology-specific fidelity index (HSFI). Three board-certified pathologists provided feedback for qualitative evaluations. ViT-Stain outperforms leading CNN and GAN models, including Pix2Pix, CycleGAN, CUTGAN, and DCLGAN. It achieves an overall diagnostic concordance of 85% with virtual H&E-stains (Fleiss' κ=0.88). However, the model requires longer training (about 93 hours on A100 GPUs) and inference times (about 2.9 minutes). Our work advances AI-driven diagnostic reproducibility for high-fidelity clinical settings and aligns with the World Health Organization (WHO) global health goals.

Read the paper

Potato Growers' Adoption of Remote Sensing: A UTAUT2 Framework Analysis

Author(s):

Abad, A. (Symbiosis Institute of Business Management, Nagpur), Rede, G. D. (Symbiosis Institute of Business Management, Nagpur), Magar, V. G. (Vasantrao Naik Marathwada Krishi Vidyapeeth), Shamsi, M. S. (University of Tabuk), Maaz, M. A. M. (VIT-AP University), Sathish Kumar, M. (Abu Dhabi University)

Index Terms: -

Abstract:

Remote sensing has enabled more comprehensive monitoring of agricultural resources through satellite and drone data, allowing for precision agriculture with reduced resource wastage and increased sustainability. Despite such obvious advantages, Indian potato growers are not fully embracing remote sensing technologies. A significant gap exists in the research investigating the reasons for acceptance and adoption of remote sensing, especially by potato growers. This paper aims to fill this gap by examining the acceptance and adoption of remote sensing technologies among Indian potato growers. In this study, the exploration of factors that may drive technology adoption has been conducted using structural equation modelling within the UTAUT2 framework. It considered 357 potato growers' respondents on a PAN-India basis. The findings indicate that the interaction of the components about hedonic motivation, price value, facilitating conditions, performance expectancy, and effort expectancy shaped potato growers' intentions to use remote sensing. The supportive infrastructure and training will be sufficient to ensure that adoption is effective and use is successful. This research will help advance remote sensing, which enhances intrinsic motivation, to the extent that remote sensing is applied as part of the farming culture of potato growers. It is most probable that with increased adoption, cumulative effects will occur, leading to significant changes in the sector, addressing mainstream issues in India, such as enhancing productivity, resource productivity, and economic empowerment, thereby developing resilience to the problems of climate change and population growth.

Read the paper

Potato Production Efficiency: A Data Envelopment Analysis Approach

Author(s):

Rede, G. D. (Symbiosis Institute of Business Management, Nagpur), Magar, V. G. (Vasantrao Naik Marathwada Krishi Vidyapeeth), Rede, B. H. (Dr. Sharadchandra Pawar College of Agriculture), Sharma, K. (Abhilashi University), Sathish Kumar, M. (Abu Dhabi University)

Index Terms: -

Abstract:

A data envelopment analysis (DEA) was used to determine the technical efficiency of potato producers in Himachal Pradesh, India. The farmers who cultivate the major varieties Kufri Himalini and Kufri Jyothi displayed apparent differences in performance, with an average technical score of 70.8% and 80.3%, respectively. Many farmers operate below the efficiency frontier, highlighting considerable scope for increasing yields without the use of additional inputs. Through the application of k-means clustering and slack variable analysis, this study determines whether excess inputs can be conserved, such as fertilizers, labours, and pesticides. In potato production, optimal input usage can enhance productivity and ensure environmental sustainability. This study provides evidence-based recommendations to help policymakers and extension agencies strengthen the efficiency and sustainability of smallholder agriculture in the country.

Read the paper

Catalyzing the Hydrogenation of Nitro Group to Amino Group using Greenly Synthesized Fe₃O₄ Nanoparticles for Water Purification

From Agent-Based Models to Takagi–Sugeno Linear Differential Equations (TS-LDEs): A Fuzzy-Logic Bridge Between Discrete and Continuous Dynamics

Author(s):

Ahmad, Z. (University of Swabi), Rauf, A. (University of Swabi), Ajaj, R. (Abu Dhabi University), Zhang, H. (Changchun Institute of qApplied Chemistry, Chinese Academy of Sciences), Bahattab, O. S. (University of Tabuk), Al-Awthan, Y. S. (University of Tabuk), Hemeg, H. A. (Taibah University)

Index Terms:

Catalyst activity; Efficiency; Iron oxides; Kinetic theory; Kinetics; Nanoparticles; Plant extracts; Purification; Rate constants; Remediation; Synthesis (chemical); % reductions; 4-Nitrophenol; Amino group; Catalyse; Euphorbium milli; Functional group transformations; Kinetic study; NaBH 4; Nitro group; Synthesised; Catalysis; Sodium Borohydride; 4 nitrophenol; Euphorbia milii extract; iron oxide nanoparticle; nitric oxide; plant extract; unclassified drug; catalysis; concentration (composition); nanoparticle; organic pollutant; phenol; reaction kinetics; water treatment; Article; enzyme activity; Euphorbia; Euphorbia milii; Fourier transform infrared spectroscopy; hydrogenation; nonhuman; oxidative stress; pH; scanning electron microscopy; temperature; transmission electron microscopy; ultraviolet spectroscopy; water management; X ray diffraction

Abstract:

This study investigates the synthesis, characterization, and catalytic application of Fe3O4 nanoparticles (NPs) derived from the Euphorbia milii leaf extract. The nanoparticles were synthesized by reducing iron salts ($FeSO_4$ and $FeCl_3$) in the presence of the plant extract, with the formation of Fe3O4 confirmed through UV–visible, FTIR, and SEM analyses. The catalytic activity of Fe3O4 NPs was evaluated through the reduction of 4-nitrophenol (4NP) to amino phenol in the presence of sodium borohydride (NaBH4). The reaction exhibited a high reduction in efficiency, achieving 82.63% conversion at 20 min at a 0.1 mM 4NP concentration. The reduction reached 80.36% at 0.2 mM 4NP after 24 min, highlighting the influence of substrate concentration on the reaction rate. Optimization of reaction conditions revealed that a 2.0 mM NaBH4 concentration achieved the highest reduction, with a 90.68% conversion within 14 min. Kinetic studies indicated that the reduction followed pseudo-first-order kinetics with an apparent rate constant (kapp) of 0.0962 min^{-1} and an R2 value of 0.9424. The recyclability of the catalyst was also evaluated, showing that Fe3O4 NPs maintained 82.63% reduction efficiency in the first cycle, which decreased to 71.09% in the third cycle. These findings highlights the potential of Fe3O4 NPs for environmental and industrial applications, particularly in catalytic remediation of organic pollutants.

Read the paper

Author(s):

Bouhanch, Z. (Sidi Mohamed Ben Abdellah University), El Moutaouakil, K. (Sidi Mohamed Ben Abdellah University), Tridane, A. (United Arab Emirates University), Laatabi, A. (Moulay Ismail University), Benrhmach, G. (Abu Dhabi University)

Index Terms:

Autonomous agents; Computational methods; Continuous time systems; Differential equations; Dynamics; Fuzzy inference; Fuzzy rules; Large scale systems; Water resources; Agent-based model; Continuous dynamics; Discrete dynamics; Fuzzy-Logic; Gray-box models; Grey-box models; Interpretability; Linear differential equation; Takagi-sugeno; Takagi–sugenu model; Sensitivity analysis

Abstract:

This paper introduces the Takagi–Sugeno Latent Differential Equation (TS-LDE) framework as a gray-box modeling paradigm that bridges the gap between the microscopic interpretability of agent-based models (ABM) and the analytical tractability of continuous-time dynamical systems. Unlike traditional black-box simulations, TS-LDE explicitly captures latent system dynamics while preserving transparency in the rule-based structure, enabling both explanatory insight and predictive capability. To demonstrate the applicability of the proposed framework, we present four illustrative domains, climate dynamics (CO–temperature interaction), epidemic spreading (SIR), financial contagion, and water/agricultural resource management, as pedagogical demonstrations of the TS-LDE identification pipeline. Each case study serves as a step-by-step illustration of the modeling process: from ABM-inspired data generation, local parameter identification, and fuzzy rule construction, to TS-LDE simulation and sensitivity analysis. Our results show that the TS-LDE models reproduce the essential dynamics observed in their ABM counterparts while offering enhanced stability, smoother trajectories, and greater interpretability. This gray-box approach thus provides a structured and computationally efficient alternative to purely agent-based simulations, serving as a unifying surrogate framework for the analysis of complex systems across domains. The proposed methodology highlights how data-driven yet interpretable dynamical modeling can support deeper understanding, policy assessment, and pedagogical exploration of interconnected socio-environmental and financial systems.

Read the paper

TriGAN-SiaMT: A triple-segmentor adversarial network with bounding box priors for semi-supervised brain lesion segmentation

Author(s):

Alshurbaji, M. (Khalifa University of Science and Technology), Assefa, M. (Khalifa University of Science and Technology), Obeid, A. (Khalifa University of Science and Technology), Seghier, M. L. (Khalifa University of Science and Technology), Hassan, T. (Abu Dhabi University), Taha, K. (Khalifa University of Science and Technology), Werghi, N. (Khalifa University of Science and Technology)

Index Terms:

Brain; Decision making; Image segmentation; Labeled data; Network architecture; Semi-supervised learning; Teaching; Bounding-box; Brain lesion segmentation; Brain lesions; Deep learning; Exponential moving averages; Lesion segmentations; Mean-teacher; Siamese; Teachers'

Abstract:

Accurate brain lesion segmentation in MRI is critical for clinical decision-making, but pixel-wise annotations remain costly and time-consuming. We propose TriGAN-SiaMT, a novel semi-supervised segmentation framework that combines adversarial learning, consistency regularization, and bounding box priors. Our architecture comprises three segmentors (S_0, S_1, S_2) and two discriminators (D_0, D_1). It includes: (1) a supervised branch ($S_0 \leftrightarrow D_0$) trained on a small labeled subset; (2) a Siamese branch ($S_1 \leftrightarrow D_1$) with an identical architecture to $S_0 \leftrightarrow D_0$, but trained on unlabeled data; and (3) a teacher branch (S_2) updated via exponential moving average (EMA) from S_1, following the Mean Teacher (MT) paradigm. The teacher S_2 generates pseudo-labels to supervise S_1. It also provides soft segmentations to guide D_1, which does not see any labeled data. The model enforces consistency at multiple levels: between S_0 and S_1 (Siamese consistency), and between S_1 and S_2 (EMA consistency). Bounding box priors are incorporated as weak supervision for both labeled and unlabeled images, improving lesion localization. Evaluated on the ISLES 2022 and BraTS 2019 datasets, TriGAN-SiaMT achieves DSC scores of 84.80 % and 86.32 %, respectively, using only 5 % labeled data. These results demonstrate strong performance under limited supervision and robust generalization across brain lesions.

Read the paper

A systematic review of secure federated learning based on blockchain and Multi-Party computation

Author(s):

Bhutta, M. N. M. (Abu Dhabi University), Irtaza, G. (University of Education, Lahore), Mehmood, A. (Abu Dhabi University), Hamood, R. (National University of Science and Technology), Makhdoom, I. (National University of Science and Technology), Elhadef, M. (Abu Dhabi University), Rehman, M. H. U. (King's College London)

Index Terms:

Artificial intelligence; Collaborative learning; Distributed computer systems; Information leakage; Learning algorithms; Learning systems; Privacy-preserving techniques; Block-chain; Blockchain-based decentralization; Decentralisation; Decentralised; Decentralized trust mechanism; Federated learning security; Integrity verifications; Machine-learning; Model integrity verification; Privacy preserving; Privacy-preserving machine learning; Secure multi-party computation; Trust mechanism; Blockchain

Abstract:

Federated Learning enables collaborative model training without compromising data privacy. However, security concerns remain, particularly regarding participant contributions and model integrity. This paper explores the potential of integrating Blockchain and Multi-Party Computation techniques to address these challenges in Federated Learning. We systematically review recent research works on examining the capabilities of Blockchain-based Federated Learning and multi-party computation in mitigating security threats in federated learning, such as data leakage and model poisoning. In addition, by analysing the convergence of these technologies, we aim to provide insights into their potential for building more secure, trustworthy, and privacy-preserving Federated Learning. We conclude the review by identifying open research questions and outlining promising directions for future research in this area, as this convergence is not only a technical achievement but a foundational one towards democratised, secure, and privacy-aware artificial intelligence.

Read the paper

The Impact of Civil Case Management on Achieving Complete Justice in Comparative Legal Systems

Author(s):

Allouzi, A. S. (Abu Dhabi University), Alomari, K. M. (Abu Dhabi University), Altarawneh, A. I. (University of Jordan)

Index Terms:

Product liability; Applied field; Case management; Civil case management; Civil procedure law; Emirati; Field studies; Legal system; Private law; Research focus; United Arab Emirates; Efficiency

Abstract:

Civil case management (CCM) has become a key mechanism in modern legal systems, aiming to enhance litigation efficiency and achieve justice. This study examines the effectiveness of CCM in the United Arab Emirates (UAE) in comparison with the American legal system, which pioneered the concept. The research focuses on a hypothetical model based on the causal relationship between CCM and achieving complete justice. The model assumes that effective CCM generates interactions that improve the overall level of justice, provided it successfully fulfills its functions and objectives. This applied theoretical study is structured into three main sections. The first section examines the legal framework of the CCM and its connection to achieving justice. The second section analyzes the CCM's role in the litigation process. The third section presents findings from an applied field study conducted within the Emirati legal system, with comparative insights drawn from American law. The research evaluates the legal provisions introduced by the Emirati legislator in Civil Procedure Law No. (42) of 2022 and its predecessor, the amendment in Civil Procedure Law No. (10) of 2014, which established CCM in UAE courts. A comparison is drawn with the American Federal Civil Procedure Code, particularly since the United States was the first to implement CCM in its courts. The study's theoretical and practical hypotheses explore the relationship between CCM and justice, focusing on how its duties and tasks influence the conduct of civil cases and the speed of their resolution. The findings reveal that UAE law adopts a managerial approach by entrusting case management to court officials rather than judges, unlike American law, where a judge-led system is used. This difference reflects a limitation in the powers and tasks of case management in UAE courts. The applied field study confirms a significant connection between the effective performance of CCM and the achievement of justice under the civil procedure code. Based on these results, the study highlights the need for legislative amendments to enhance the efficiency and effectiveness of CCM in the UAE.

Read the paper

Dense Li1.3Al0.3Ti1.7(PO4)3 (LATP) Solid Electrolytes Synthesized by Taylor–Couette Reactor for All Solid-State Nickel-Rich Lithium-Metal Batteries

Author(s):

Abdelaal, M. M. (Abu Dhabi University), Alkhedher, M. (Abu Dhabi University)

Index Terms:

Cathodes; Chemical stability; Ionic conduction in solids; Ionic conductivity; Lithium alloys; Lithium batteries; Lithium compounds; Solid state devices; Solid-State Batteries; Titanium compounds; Advanced material characterization; Advanced materials; Aluminum titaniums; Battery; Cycling stability; Dense lithium aluminum titania phosphate; Electrochemical storage; Grain-boundaries; Materials characterization; Taylor flow; Titanium phosphate; Grain boundaries; Solid electrolytes

Abstract:

Lithium aluminum titanium phosphate (LATP) is a promising solid electrolyte due to its high ionic conductivity at room temperature, thermal and chemical stability, non-flammability, and compatibility with high-energy cathodes. However, LATP faces significant challenges in practical applications, including interfacial contact with electrodes, high grain boundary resistance, and dendrite formation. In this study, we develop a novel strategy to synthesize dense LATP using a Taylor–Couette Reactor (TCR) for the first time. This method allows producing dense LATP with high purity from highly mixing and homogenization of reactants. Compared to conventional LATP, dense LATP exhibits higher total ionic conductivity (1×10^{-4} S cm^{-1}), a wider stability window (4.5 V versus Li/Li+), and longer cycling stability during lithium plating and stripping. The relative density of dense LATP is higher than that of the conventional variant (96.2% versus 90.3%). Electrochemical performance testing with a lithium nickel cobalt aluminum oxide (NCA) cathode demonstrates higher capacities, particularly at high rates. The capacity retention of NCA at 0.5C over 100 cycles using dense LATP is 83%, significantly better than the 51% retention observed with conventional LATP. Ex situ XRD analysis after cycling test attributes this retention to the improved chemical stability of dense LATP being more stable than the conventional one. This study suggests that LATP is economically viable and more stable for all-solid-state batteries.

Read the paper

Unveiling the dosimetric potential of natural Malaysian zeolite powder: A comprehensive thermoluminescent study

Author(s):

Mat Nawi, S. N. (Sunway University), Khandaker, M. U. (Sunway University / Daffodil International University / Korea University), Mohd Nor Ihsan, N. S. (Universiti Malaya), Masdukin, A. I. (Universiti Malaya), Osman, H. (Taif University), Bradley, D. A. (Sunway University / University of Surrey), Ajaj, R. (Abu Dhabi University), Arifin, Z. (Diponegoro University), Abdul Sani, S. F. (Universiti Malaya)

Index Terms:

Crystalline materials; Dosimetry; Gamma rays; Irradiation; Medical applications; Microporous materials; Powder metals; Synthetic metals; Alkali earth metal; Alkaline-earth metals; Dosimetric properties; Gamma irradiation; Malaysians; Microporous; Natural zeolites; Reproducibilities; Thermoluminescence response; Zeolite powder; Thermoluminescence; zeolite; Article; brachytherapy; dose response; dosimetry; elemental analysis; energy dispersive X ray spectroscopy; external beam radiotherapy; gamma irradiation; gamma radiation; heating; human; kinetic parameters; kinetics; life cycle; nonhuman; powder; radiation sterilization; reliability; reproducibility; scanning electron microscopy; stereotactic radiosurgery; temperature; thermoluminescence dosimetry; X ray spectroscopy

Abstract:

Zeolite is a microporous crystalline material composed of hydrated aluminosilicates of alkali and alkaline earth metals, available in both natural and synthetic forms and commonly used in its powdered state. This study investigates the thermoluminescence (TL) properties of natural zeolite powder under gamma irradiation in the dose range of 0.5–150 Gy. TL glow curve measurements at heating rates of 2–15 °C s−1 revealed an optimal rate of 8 °C s−1 for maximizing TL response. The material exhibited a good linear dose response, high sensitivity at low doses, excellent reproducibility, and a fading of approximately 27 % after 28 days. The effective atomic number (Zeff = 11.53) closely matches that of human bone (11.6–13.8), underscoring its potential for medical dosimetry. Kinetic parameter evaluation further confirmed stable glow peak behavior, with activation energies and trap lifetimes indicating moderately stable trapping centers, thereby reinforcing the reproducibility and reliability of the zeolite TL response. Overall, these findings establish natural zeolite powder as a low-cost, efficient, and sustainable candidate for radiation detection and medical applications.

Read the paper

Harmony in the Digital Labyrinth: The Pursuit of Psychological Well-Being for Youth in the Digital Age

Author(s):

Mehmood, K. (Hubei Engineering University), Hakeem, M. M. (Nagoya University of Commerce and Business), Iftikhar, Y. (National University of Medical Sciences), Rashid, M. (Indian Institute of Technology Kharagpur), Dwivedi, A. (Abu Dhabi University)

Index Terms:

adolescent; adult; female; human; male; psychological well-being; psychology; self concept; social capital; social media; student; university; young adult; Adolescent; Adult; Female; Humans; Male; Psychological Well-Being; Self Concept; Social Capital; Social Media; Students; Universities; Young Adult

Abstract:

Social media offers numerous advantages, yet the dark side of it haunts youth. One of the several potential detrimental aspects appears as social media addiction (SmA), which poses risks to the psychological well-being (PW) of youth. Among university students, excessive social media use can lead to SmA and a subsequent decrease in PW. This study scrutinizes the mediating effects of techno-invasion (TI) and techno-overload (TO), instigated by SmA, on students' psychological well-being, a relationship that previous research has not conclusively explored. Our research constructs a model to examine the moderating effects of social capital, specifically through the lenses of social bonding and social bridging, on the nexus between social media-induced challenges and psychological well-being. This investigation examines the associations between SmA, TO and TI through self-esteem among students. Data collected through a three-wave time-lagged design from 991 university students in Abu Dhabi, UAE, were analyzed with the PROCESS macro. The findings reveal that SmA is significantly negatively related to students' self-esteem, which in turn is associated with increased levels of TI and TO, ultimately reducing psychological well-being. Moreover, the study verifies the moderating roles of social bonding and social bridging in the TI-PW and TO-PW relationships. The paper concludes by addressing the broader implications of these findings and suggesting avenues for future research in this domain. This study demonstrates how SmA reduces self-esteem, which in turn increases TO and TI, ultimately leading to a decline in PW. The findings suggest that improving self-esteem and enhancing social capital through stronger connections with family and friends can help alleviate the negative consequences of SmA on students' well-being, offering valuable contributions to the literature on digital stress and mental health.

Read the paper

The United Arab Emirates as an International Education Hub: Assessing Progress Toward a Knowledge-Based Economy

Author(s):

Jaleel, B. (University of Toronto), Saber, H. (Abu Dhabi University)

Index Terms: -

Abstract:

The purpose of this paper is to examine how the United Arab Emirates (UAE) has progressed as an international education hub and assess the development of its innovation capability in alignment with its aim to transition into a knowledge-based economy. Specific developmental indicators derived from secondary data sources are used to assess the UAE's progress in terms of attracting international students and institutions, developing and retaining a skilled workforce, and building capacity to support research and innovation. The paper finds that the UAE has made modest progress in terms of developing its innovation capability, and that it currently lags behind other education hubs in international co-inventions, multi-stakeholder partnerships, and university-industry collaborations. Findings of this study indicate a need for the UAE to takes a more strategic approach to building international partnerships that are informed by its developmental needs, prioritizing both innovation capabilities and regional relevance.

Read the paper

Stay Connected with ADU!

Scan Me

Follow us

/AbuDhabiUni