

Research Institute of Sciences and Engineering

Office of the Vice Chancellor for Research & Graduate Studies

University of Sharjah



The purpose of this circular is to provide brief information on the current Research Centers and Research Groups in the Research Institute of Sciences and Engineering (RISE).

RISE currently has the following entities/programs:

- Research Centers (1 established and 6 under consideration)
- Research Groups (18 groups)
- Research Support Facilities (8 facilities)
- Interdisciplinary Graduate Programs (3 under consideration)



RISE Research Centers

The current RISE strategic plan includes the following research centers:

Established Centers

- Center for Advanced Materials Research (Established 2015/2016)

Centers Under Consideration

- Renewable Energy Technologies Research Center
- Sustainable Infrastructure & Built Environment Research Center
- Water and Environment Research Center
- Information, Communication & Network Technologies Research Center (It is proposed to replace with two centers; Artificial Intelligence Research Center, and Cyber Security Research Center)
- Biomedical Engineering & Bioinformatics Research Center (Jointly with the Research Institute of Medical and Health Sciences, RIMHS)



Center of Advanced Materials Research (CAMR)

The center was established in 2015/2016, with Dr. Hussain AlAwadhi appointed as Director. The center strives to achieve excellence in materials research through combining local resources and expertise in order to provide solutions to complex technical challenges in material design, enhancement, utilization, and identification. RISE's Center for Advanced Materials Research is well established with 2 active research groups:

- Functional Materials Research Group



- Advanced Materials Simulation and Modeling Research Group

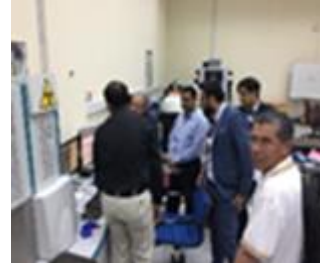
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RISE Research Groups

Functional Materials Research Group

The group focuses on synthesis and characterization of nano-and micro-structured materials for functional applications. It mainly caters for the production of novel materials for enhanced energy harnessing and storage especially in solar thermal, photovoltaic and super capacitance applications.

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Advanced Materials Simulation and Modeling Research Group

This group utilizes advanced computational condensed matter physics techniques to study the properties and predict the potential of technologically viable materials under normal and extreme conditions including very high temperatures, pressures and doses of radiation.

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Sustainable Energy Development Research Group

The mission of this research group is to promote innovative research in the area of sustainable energy, including: renewable energy; energy efficiency; energy management; sustainability; energy-water nexus; and waste to energy.

Priority Lines of research:

- Solar/Wind/Geothermal Energy
- Bioenergy
- Energy Efficiency/ Energy Modeling and Energy Management

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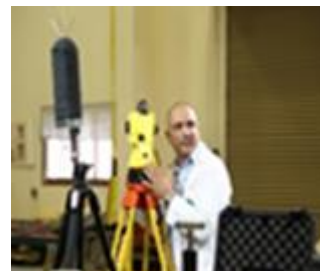
Sustainable Civil Infrastructure Systems Research Group

Research in this group focuses on discovering knowledge and developing creative solutions to address the complex issues in the areas of water resources engineering, environmental engineering, transportation and pavement, geotechnical engineering and geographic information system (GIS) as well as remote sensing.

Priority Lines of research:

- Water and Environment Research
- Transportation/Pavement and Geotechnical Infrastructure Systems
- Sustainable Strategies in Infrastructure Systems
- Geographic Information Systems and Remote Sensing

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Sustainable Construction Materials and Structural Systems Research Group

The mission of this research group is to promote innovative research in the area of sustainable construction materials and structural systems by serving as a platform for collaborative research efforts fostering the interaction between industry and academia in the field of civil engineering.

Priority Lines of research:

- Sustainable Construction Materials
- Sound and Sustainable Structural Systems

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Sustainable Engineering Asset Management Research Group

The goal of this research group is to continuously improve and optimize engineering assets efficiency and effectiveness under safety, environmental, and other operational constraints, with minimum life cycle cost.

Priority Lines of research:

- Quality, human factors, reliability, maintenance, optimization, artificial intelligence, condition monitoring, innovation and project management
- Productivity and performance measurements using Life Cycle Cost/Profit (LCC/P)
- Total Quality Management (TQM) and Quality Control (QC)
- Maintenance strategies

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Information and Network Security Research Group

This research group carries research in information security to help governmental organizations and local institutions to protect their information infrastructure from cyber-attacks, identify threats, quantify risks and take remedial measures to mitigate the effect of possible cyber-attacks.

Priority Lines of research:

- Spatial Database Outsourcing in Cloud Computing
- Social/Wireless Sensor Networks
- Cyber Bullying in Social Networks

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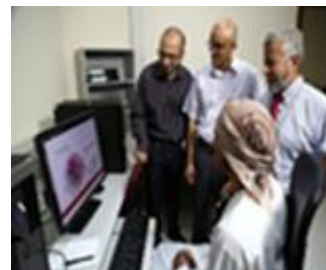


Big Data Mining and Multimedia Research Group

The mission of his group is to conduct leading edge research in data mining, big data, multimedia databases, traffic surveillance, crowd analysis, social networks, and wireless sensor network data streams.

Priority Lines of research:

- Big Data Analytics
- WSN & IoT Data Routing and Integration
- Social Network Data Mining



- Multimedia data analysis & Mining

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Mixed Analog-Digital Smart Electronic Circuits and Systems Research Group

The activities of this research group include theoretical and applied researches in the different fields of Electronics, including analog/digital, linear/nonlinear, and circuits/ systems design.

Priority Lines of research:

- Mixed Analog-Digital VLSI Design
- Devices, Circuits and Systems Modeling
- Algorithms performance optimization, and digital design, system implementation, and verification using the FPGA

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Distributed and Networked Systems (DNS) Research Group

This group is concerned with the design and implementation of local and wide area networks that make up the Internet, wireless/cellular communication networks for exchanging voice, video and data, wireless sensor networks for surveillance, monitoring and information gathering, multi-processor systems for high-performance information processing, and computing clouds for providing centralized computing/storage services to remote users/entities/systems.

Priority Lines of research:

- Communication Systems and Networks
- High-performance, distributed and cloud computing

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Autonomous Robotics and Active Vision Research Group

The mission of this research group is to pioneer innovative knowledge and highly-sophisticated technological solutions to achieve the aspiration of society in the research and development of next generation active vision algorithms coupled with realistic biomimetic kinematics paradigms and articulated physics-based mechanics for the implementation and integration of autonomous robots.

Priority Lines of research:

- Active computer vision integration
- Nonlinear robotic control
- Robot tracking/path following
- Modeling and simulation of dynamic systems
- Advanced software architectures for decision making
- Stereo and color analysis for dynamic obstacle avoidance and navigation

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Environmental and Chemical Biology Research Group

The Environmental and Chemical Biology Research Group is aimed to explore and produce novel understanding of desert ecosystem natural resources, plant biological and physiological processes.

Priority Lines of research:

- Identification of unique short DNA sequence for barcoding all native plants to UAE
- Establishing of a pollen grains bank, a palynological Atlas, a pollen calendar for Sharjah Emirate
- Identifying and assessing the 'Ecosystem function' roles for combating desertification and rehabilitation/restoration of degraded desert ecosystems
- Assessing and conserving the plant diversity in the UAE

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Human Genetics and Stem Cells Research Group

The mission of the research group is to identify and study the genetic causes of monogenic disorders, especially in UAE population, and to conduct research on mesenchymal stem cells differentiation into Adipocytes and neural lineages.

Priority Lines of research:

- Identify mutations involved in human monogenetic disorders
- Find the differentially expressed genes and microRNAs during the differentiation of mesenchymal and dental pulp stem cells into neural and adipocytes lineages
- Whole exome sequencing to unravel the mutations in the affected individuals
- Use of the animal model to assess the therapeutic and functional effectiveness of the mesenchymal and dental pulp stem cells-derived neurons and neural progenitor-like cells

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Ionizing Radiation Research Group

The purpose of this research group is to conduct research in different fields of radiation physics and its applications including the medical applications especially in the areas of medical imaging and radiotherapy.

Priority Lines of research:

- Continuous detection of background radiation
- Dose reduction techniques in radiology
- Establishing Radiation Protection Standards in the UAE
- Assess the variability of exposure rates due environmental as well as geographical conditions and factors

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Organometallic Chemistry Research Group

The purpose of the research group is to advance organometallic chemistry science and technology as it is considered the major precursor for novel classes of compounds and has steered to a major progress in organometallic chemistry applications.



Bioinformatics and Functional Genomics

Jointly with Research Institute of Medical & Health Sciences, RIMHS

The group has three foci, firstly the use of novel bioinformatics algorithms and experimental high throughput genomic methods to characterize role of environmental factors in the onset and development of complex chronic disease. Secondly, the prevention of human diseases such as diabetes, endocrine deficiencies, immunological diseases and cancer through the identification of early diagnostic and prognostic and thirdly the molecular characterization of drugs and chemical compounds on biological systems.



Open UAE Research and Development Research Group

The Open UAE Research & Development Group is the first of its kind in the country, providing new research opportunities related to the successful adoption of Open Source Software (OSS) and Open Source Hardware (OSH) in the region. The group will engage students (undergraduate and graduate at universities and other interested parties) to conduct research on the deployment of OSS/OSH in many sectors to serve multiple purposes i.e. education, smart cities, Internet of Things and their application, astronomy, blockchains, cyber security solutions, intrusion detection, and others. The group provides the necessary training, develop ICT solutions based on OSS/OSH, evaluate and assess these solutions and provide consultancy services to enable government-wide, as well as private sector access, to OSS/OSH. The group initiative is aligned with the mission of the University of Sharjah as well as the economic vision of the UAE 2021.



Priority Lines of research:

- Mobile – Government
- OSS/OSH in Education
- Smart Cities
- Internet of Things (IoT)/ Cyber Physical Systems (CPS) and Related Technologies
- Blockchain and Related Technologies
- Assessment and Evaluation

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Machine Language and Arabic Language Processing

This group is dedicated to improving the current state of the Arabic language electronic usage, which is manifest in two main forms: Modern Standard Arabic (MSA) and Colloquial Arabic dialects (CAD). Its primary mission is to conduct high quality basic and applied research aimed at generating knowledge, information, and tools necessary for producing intelligent Arabic language solutions. The group is also committed to providing education and training to young scientists, researchers, and students who will perpetuate and extend the Arabic research frontier.



Priority Lines of research:

- Construction of MSA and CAD repositories
- Arabic speech recognition/understanding in MSA and Emirati CAD
- Sentiment analysis of MSA and CAD text
- Development of machine-learning based conversational dialog engines (chatbots)
- Use linguistic modeling and deep learning approaches to process MSA and CAD

Contact Information

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