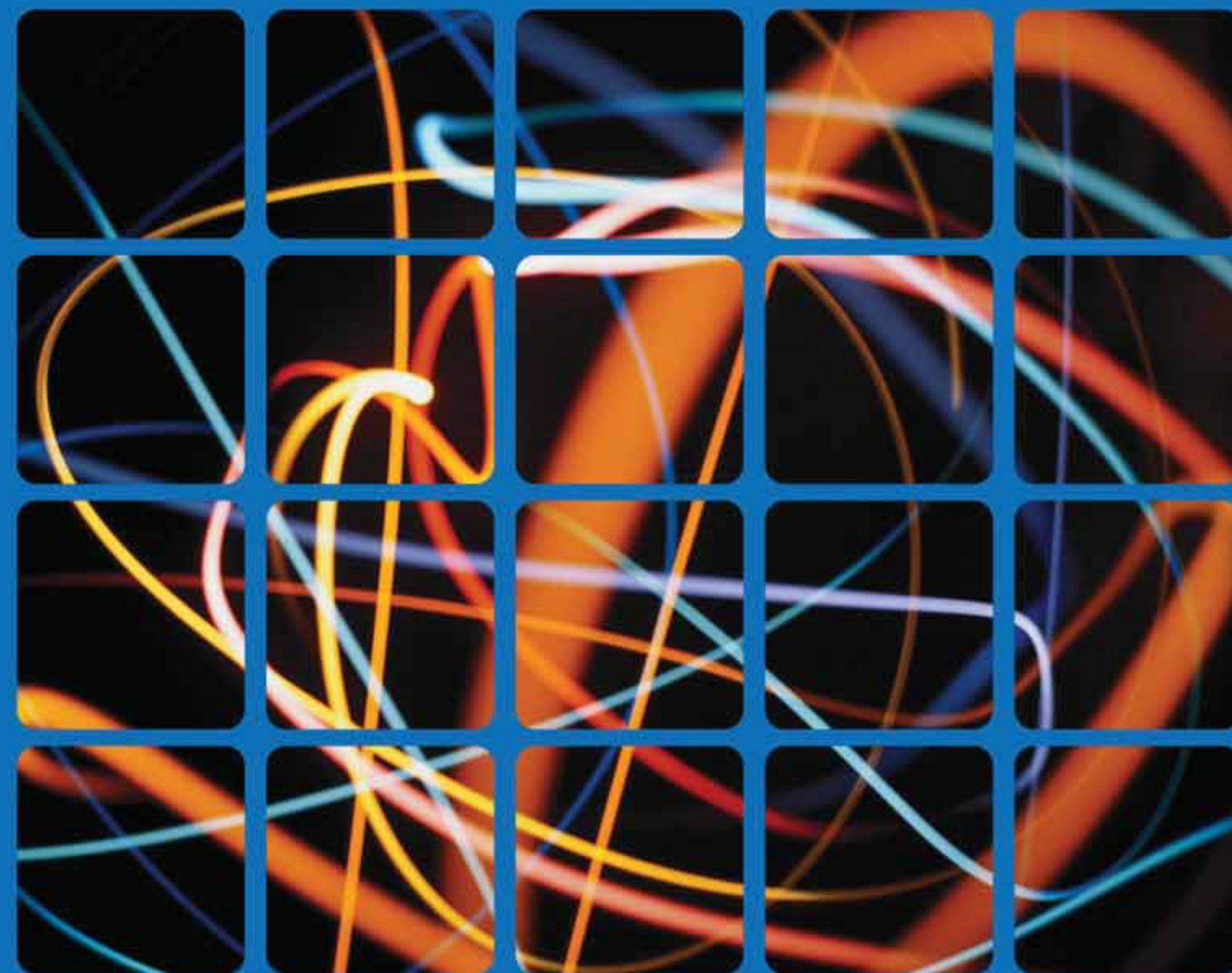




King Fahd University of Petroleum & Minerals

Deanship of Scientific Research

Dhahran, Saudi Arabia



RESEARCH GROUPS



King Fahd University of Petroleum & Minerals
Dhahran, Saudi Arabia

Deanship of Scientific Research

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RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS

RECTOR'S MESSAGE.....	5
VICE-RECTOR'S MESSAGE	7
DEAN'S MESSAGE.....	9
DEANSHIP OF SCIENTIFIC RESEARCH.....	10
Introduction.....	10
Vision.....	10
Mission.....	10
Goals.....	10
OVERVIEW OF RESEARCH GROUPS.....	12
Introduction.....	12
Definition.....	12
Objective.....	12
Activities.....	12
ARABIC COMPUTING RESEARCH GROUP	14
CONCRETE RESEARCH GROUP.....	16
ELECTRICAL POWER AND ENERGY SYSTEMS RESEARCH GROUP.....	18
LASER RESEARCH GROUP.....	20
THERMOELECTRIC RESEARCH GROUP.....	22
WATER RESEARCH GROUP.....	24
INTELLIGENT SYSTEMS RESEARCH GROUP.....	26
AIR CONDITIONING AND REFRIGERATION RESEARCH GROUP.....	28
DISTRIBUTED CONTROL RESEARCH GROUP	30
WIRELESS BROADBAND COMMUNICATION RESEARCH GROUP	32
THEORETICAL PHYSICS RESEARCH GROUP.....	34
RESERVOIR CHARACTERIZATION RESEARCH GROUP.....	36
MAINTENANCE RESEARCH GROUP.....	38

TABLE OF CONTENTS

RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS

RECTOR'S MESSAGE

It gives me great pleasure to write this message regarding formation of thirteen research groups established at King Fahd University of Petroleum and Minerals

Under the enlightened and wise guidance of the Custodian of the Two Holy Mosques, King 'Abd Allah ibn 'Abd al-'Aziz, the Government of Saudi Arabia is committed to enhance the standards of education and research across the Kingdom, and King Fahd University of Petroleum and Minerals is proud to be associated with this noble effort.

The formation of Research Groups at KFUPM is one of the several initiatives the university has embarked upon to further improve its position as an institution of research excellence. Currently KFUPM is at the stage of having new dimensions of research that fables focused research in strategic areas with International Impact.

The main objective of forming the Research Groups at KFUPM is to achieve excellence in the areas of national importance and emerging fields of knowledge. In the first cycle of this scheme, six research groups were approved followed by another seven groups bringing the total number to thirteen research groups composed of a team of researchers, post-doctoral fellows, and graduate students with established track records and are aligned with the strategic research areas of the Kingdom and the University.

I am optimistic that the research groups will achieve excellence and global leadership. I am also very pleased to express my whole-hearted appreciation for all the efforts of the Deanship of Scientific Research in the formation and administration of these Research Groups.

Prof. Khaled S. Al-Sultan
Rector of the University



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RECTOR'S MESSAGE
RECTOR'S MESSAGE
RECTOR'S MESSAGE

RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS

VICE-RECTOR'S MESSAGE

I am pleased to introduce this brochure that presents the descriptions of the research groups established at the University. The thirteen groups selected were among many applicants for similar recognition. Rigorous selection criteria were used for the establishment of research groups including a thorough review by international reviewers and the alignment of the research areas with the strategic research plan of the Kingdom and the University.

The research groups were formed to establish excellence in the areas of relevance to the Kingdom and the University, build research capacity in the University, create a high quality research environment, and develop links with similar reputed international and national research groups.

I am pleased to extend my best wishes and support to these research groups. I also seize the opportunity to extend special thanks and sincere appreciation to the Deanship of Scientific Research for their efforts in the formation and administration of the research groups.

Prof. Sahel N. Abduljawad
Vice Rector for Graduate Studies & Scientific Research



VICE-RECTOR'S MESSAGE
VICE-RECTOR'S MESSAGE
VICE-RECTOR'S MESSAGE
VICE-RECTOR'S MESSAGE

RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS
RESEARCH GROUPS

DEAN'S MESSAGE

I am pleased to present to you the brochure of the research groups at KFUPM. These research groups were formed to attain and maintain excellence and leadership in research in certain specific areas of national importance and emerging fields of knowledge. It is envisaged that establishing focused research groups, composed of a team of specialized researchers with established track records, conducting research in the priority areas, will lead to excellence and global leadership.

The other goals of establishing research groups are to provide high quality training to young researchers, enhance the quality of graduate programs at KFUPM, conduct cutting-edge high-impact research, collaborate with leading national and international research groups and attract renowned scientists to KFUPM.

Thirteen research groups have been formed in important and strategic areas as described in this brochure. The vision and mission, objectives and research areas for each group are summarized in the brochure. The contact information of the coordinators of research groups, including their web links, are also provided on the relevant pages.

I take this opportunity to thank the university administration for their continuous support for research activities. My thanks and appreciations are also due to research group coordinators and the associated teams for their efforts in making this program a success. Our thanks and appreciations also go to the Deanship of Scientific Research (DSR) team for their continuous efforts in serving the KFUPM scientific community with utmost efficiency and effectiveness.

I invite you to visit the web page of the Deanship of Scientific Research (www.kfupm.edu.sa/dsr) to learn about our other activities. Your comments and suggestions on our activities and programs are highly appreciated.

Prof. Mohammad S. Al-Homoud
Dean, Scientific Research



DEAN'S MESSAGE

DEAN'S MESSAGE

DEAN'S MESSAGE

Introduction

In order to attain and maintain excellence and leadership in research areas of national importance and emerging fields of knowledge, the research efforts and capabilities of KFUPM researchers need to be nurtured, enhanced, focused and properly directed. The Deanship of Scientific Research (DSR) at King Fahd University of Petroleum & Minerals (KFUPM) was originally established to achieve this goal. It started as a part of the Deanship of Graduate Studies in the year 2000, and then became an independent Deanship in September 2005. DSR is responsible for planning, management, promotion and support of research activities in the University.

Vision

To establish a conducive research environment and provide support for research that enables KFUPM to take an international leadership role in innovative and high quality research in cutting edge knowledge areas and technologies that involves key fields of significant socio-economic impact on the Kingdom of Saudi Arabia.

Mission

To provide a stimulating environment and continuous support that empowers KFUPM faculty and researchers to enhance the university's national, regional, and international leadership role in high quality research and scholarly activities in science, engineering, management and other related fields of significant importance to the Kingdom and worldwide.

Goals

The Deanship of Scientific Research plans to accomplish its mission and achieve its longterm vision through the following goals:

1. Establish well structured, efficient and effective research management process University-wide.
2. Promote a conducive research environment University-wide.
3. Enhance research productivity and quality.
4. Identify and promote areas of research which are priorities to the Kingdom and beyond.
5. Reach out to all scientific research constituents.



Introduction

Promoting focused research that will lead to excellence is the main goal of this new research funding scheme initiated by KFUPM. This funding scheme is devised to encourage building teams of researchers that will focus on a specific field of science. Research can be directed to a particular priority area by establishing focused research groups composed of a team of specialized researchers with established track records. It is expected that the research groups will eventually achieve excellence and global leadership.

Definition

A research group working on a priority research area consists of a structured team hosted by a department or a group of departments and made up of expert faculty, researchers, post-doctoral fellows, graduate students, and technicians.

Objectives

The objectives of establishing the research groups are as follows:

1. Establish excellence and carry out fundamental, applied and/or interdisciplinary research of high quality in key cluster areas of relevance to KFUPM and of importance to the Kingdom of Saudi Arabia, and in emerging fields of knowledge that promote research of high international impact;
2. Build research capacity and provide high quality training and a conducive research environment for promising young faculty and researchers, post-doctoral research fellows, and graduate students;
3. Provide a high quality research environment for the development and enhancement of graduate programs as well as the enhancement of undergraduate teaching at KFUPM, and
4. Develop links and collaboration with renowned national and international research groups.

Activities

Expected contributions and activities of the research groups include the following:

- Develop specialized graduate courses in the field of the group.

- Conduct innovative research that leads to obtaining intellectual property rights through patents.
- Publish research papers in high quality ISI journals.
- Conduct or participate in funded research projects.
- Build, equipment, maintain and operate research facilities.
- Write/edit/translate books in the field of the group.
- Organize lecture series by members and invited speakers.
- Participate in teaching and supervising graduate students.
- Enhance undergraduate education.
- Hold regular seminars/meetings.
- Host visits by distinguished scholars.
- Organize workshops, symposia and conferences.
- Recommend hiring promising researchers in the field.
- Utilize sabbatical leave, summer travel programs and international scholarship programs to build links with leading international experts and research centers in the area of the group.
- Represent KFUPM at international events, workshops, and conferences in the area of the group.
- Network with leading research centers in the field through exchanging visits, joint supervision of graduate students, joint organization of events and joint research projects.
- Build and maintain an efficient website that contains information about the group members, their activities and accomplishments.

The titles of Research Groups are as follows:

1. Electrical Power and Energy System

2. Thermoelectric Process Optimization
3. Lasers and Their Applications
4. Water Research Group
5. Arabic Computing Research Group
6. Concrete Research Group
7. Interdisciplinary Research Group for Reservoir Characterization
8. Intelligent Systems Research Group (ISRG)
9. Research Group on Maintenance
10. Research Group on Air Conditioning and Refrigeration
11. Theoretical Physics Group (TPG)
12. Control, Computation and Communications Research Group
13. Optimum Broadband Wireless Communications (OBWC)

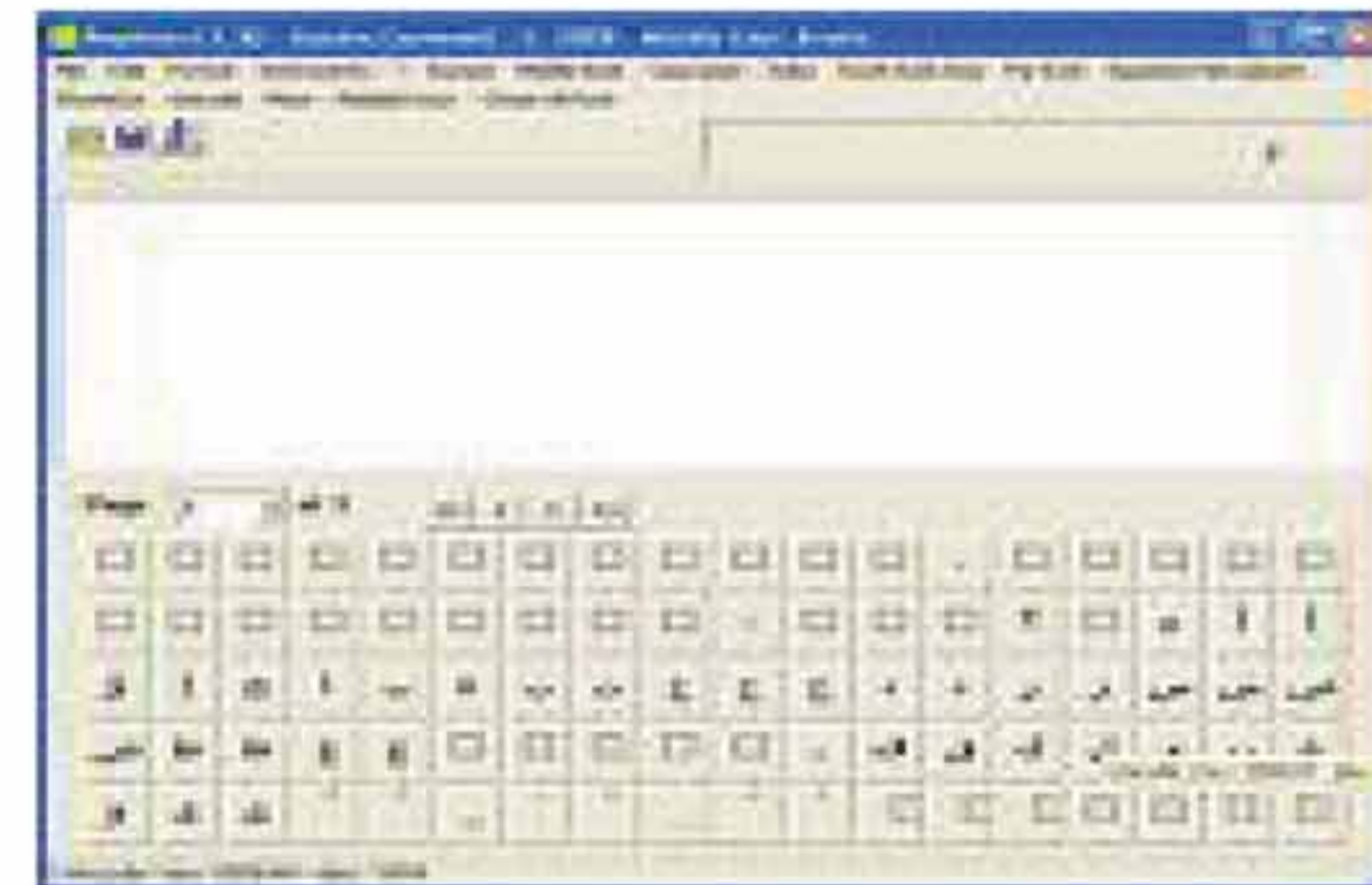
Introduction

More than a thousand years ago, the Arabic language has had well-established theoretical studies. However, it has received much less interest with regard to its application in the context of computers and computing. The Arabic Computing Group (ACG) aims to address Arabic computing in a more organized, collective, consistent and rational manner utilizing the available state-of-the-art computing related technologies with the objective of serving the needs of the Kingdom, Arab world, and world IT industry.

The Group will research both theoretical and applied fields related to the use of computers in Arabic language. It will conduct research and facilitate the development of tools, systems, software, and standards related to Arabic language computing. Moreover, the Group also aims to provide tools, equipment, consultancy, and resources that serve the Arabic language computing needs of interested institutions, industries, and the public at large. ACG intends to provide a joint platform for faculty and students at KFUPM to conduct and promote research and development, software development, consultation, and training activities for short and long-term solutions to Arabic language computing needs of the Kingdom.

ACG members have been active in Arabic language computing research for over 20 years. The combined contribution of the Group, in this area, exceeds 50 publications, several patents, and a number of funded projects.

The Group aims to become a leading world center and a focal point of R&D in the area of Arabic language computing.



Vision

To become a regional leader that is recognized worldwide in research, education and development of Arabic language computing-related technologies, tools, and standards, fostering national and international collaboration.

Mission

To promote advanced research (basic and applied) in the area of Arabic language computing and to strengthen interaction between KFUPM and the industry and other institutions in the Kingdom and the Middle East.

Objectives

The objectives of the Group are as follows:

- To establish a strong research program in the areas of Arabic speech processing, Arabic document analysis and recognition, and Arabic computational linguistics.
- To prioritize research activities in the area of Arabic language computing and prepare a long-term research master plan.
- To promote Arabic language computing education at all levels, K-12, university and graduate levels.
- To establish national and international collaboration and exchange programs with other research institutions.
- To produce intellectual property that could generate revenue for the long term activities of the group.
- To publish research papers in related disciplines in high quality journals.
- To attract funded research projects.

Research Areas

- Arabic speech processing
- Arabic document analysis and recognition
- Arabic computational linguistics



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Introduction

The main objective of the Concrete Research Group (CRG) is to bring together researchers working in the area of concrete and related building materials on a single platform with the ultimate aim of focusing their research efforts in a rational manner. Research programs that are in line with the strategic needs of the construction industry in the Kingdom of Saudi Arabia are conducted by the Group. In addition to research work, dissemination of related information through seminars/workshops/conferences is the other major activity of the Group. The Group also plays the role of advisory body to the University in terms of development of graduate courses and recruitment of graduate students, post doctoral fellows, and teaching staff.



Vision

To conduct focused and innovative research in the area of concrete and related building materials. To become the leading concrete research group in the region which plays a major consultative and advisory role.

Mission

To conduct applied and fundamental research, both short and long-term in the area of concrete and related topics, develop the existing human and physical resources, facilitate technology transfer through mutual visits of local and international experts, and develop awareness in the local construction industry on various concrete related problems and their solutions.

Objectives

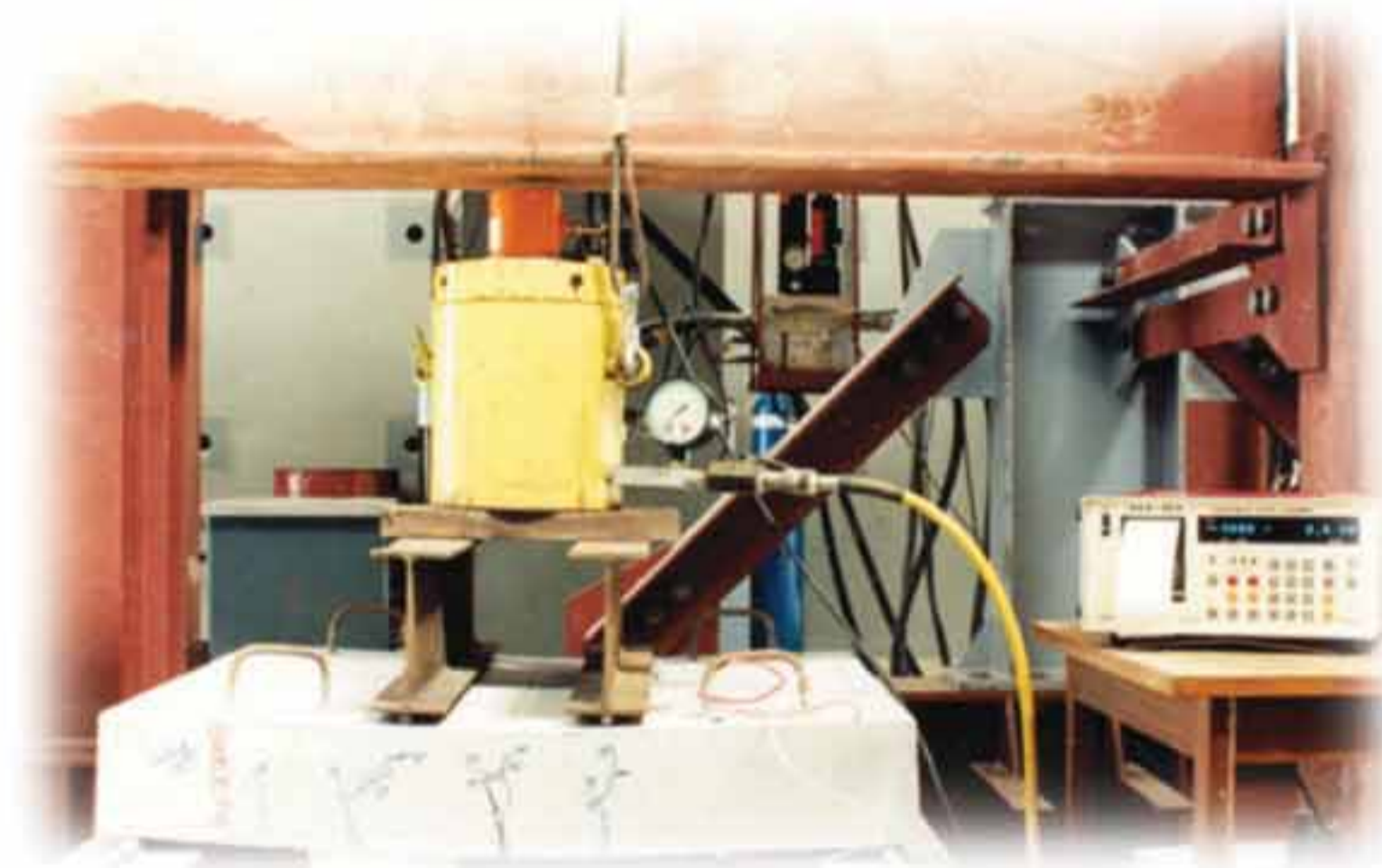
- Utilize the available pool of human resources and facilities in the university to conduct basic and applied research.
- Develop new materials and techniques for the production of durable concrete structures compatible with the local environmental conditions.
- Establish state-of-the-art laboratories for research and graduate teaching in concrete and allied areas.
- Provide support to the academic programs at KFUPM in the area of concrete.
- Disseminate information on problems associated with concrete as well as their prevention and other related issues to the local construction industry.
- Initiate certification and training programs in the field of concrete and related building materials.
- Encourage scholarly activities by the Group members.
- Develop international collaboration through exchange of visits by the Group members to related centers of excellence and by international experts in the field to KFUPM.



Research Areas

- Development and improvement of building materials utilizing local resources and technology
- Mechanisms and modeling related to concrete durability
- Nondestructive testing and assessment
- High strength and high performance concrete

- Inhibitors and surface coatings to withstand the local harsh environmental conditions
- Performance evaluation of specialty and non-ferrous reinforcement bars
- Utilization of local industrial by-products leading to the production of "greener" concrete
- Metallic and non-metallic coatings for reinforcing steel
- Evaluation of repair materials and repair systems
- Development of reliable service-life prediction models
- Development of electrochemical methods for corrosion protection
- Use of nanotechnology for the production of efficient cements, coatings, and inhibitors



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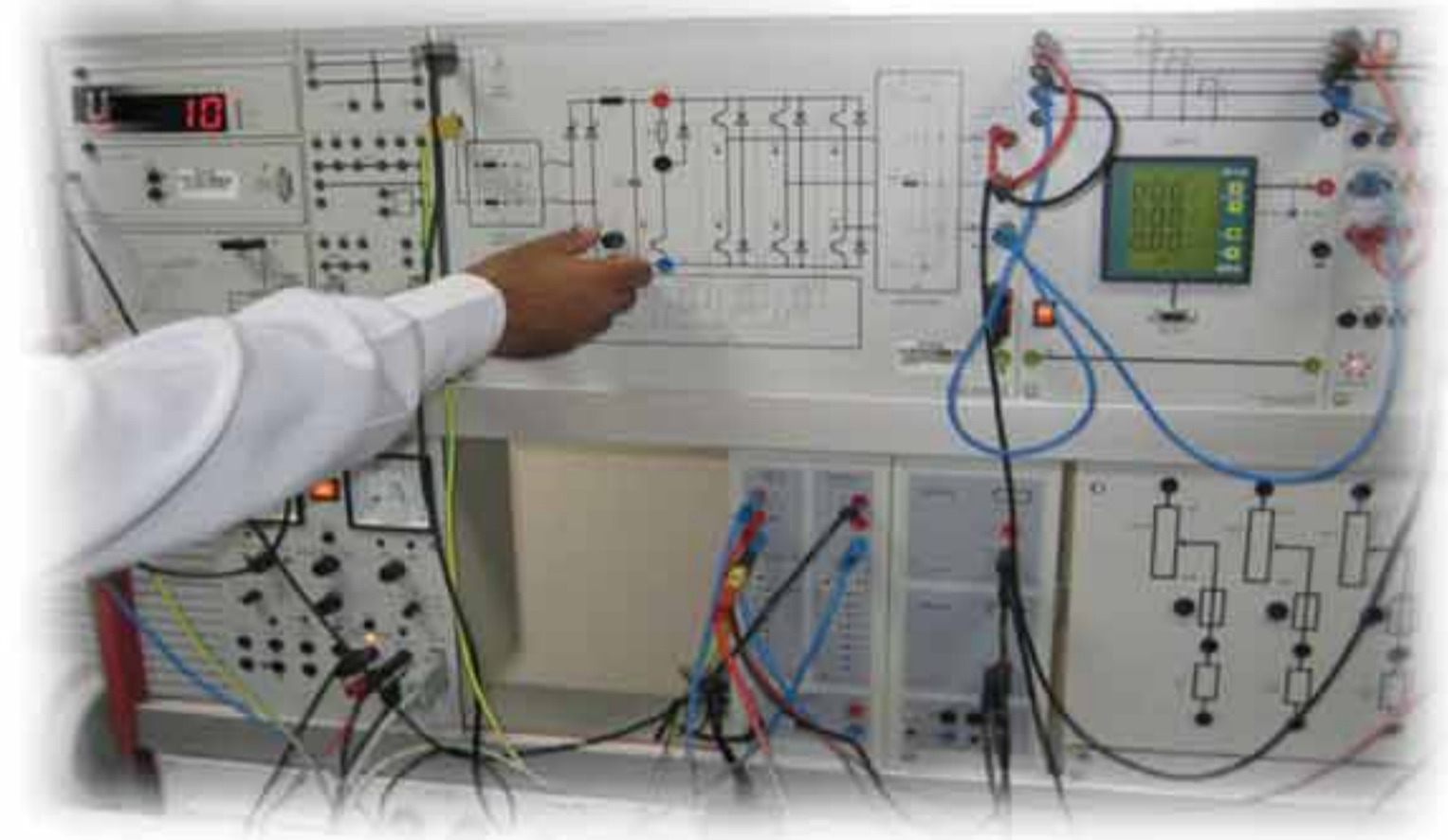
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Introduction

The Electrical Power and Energy systems Research Group (PERG) was established to bring together researchers with related interests and expertise and to consolidate research efforts in a rational and effective manner.

Research programs that are in line with the strategic needs of the power industry in the Kingdom of Saudi Arabia will be strongly supported by PERG. Participation of graduate students and faculty members from different departments is encouraged. The other major activity of the Group will be the dissemination of knowledge/information in the field of electrical power and energy systems through seminars, workshops, and conferences.



Vision

To achieve expertise to a level that it will increasingly attract concerned national and international industries and academia, particularly the ones in this region and to draw worldwide talent for training and to university educational programs at the graduate and post graduate levels, in electrical power and energy technology and management.

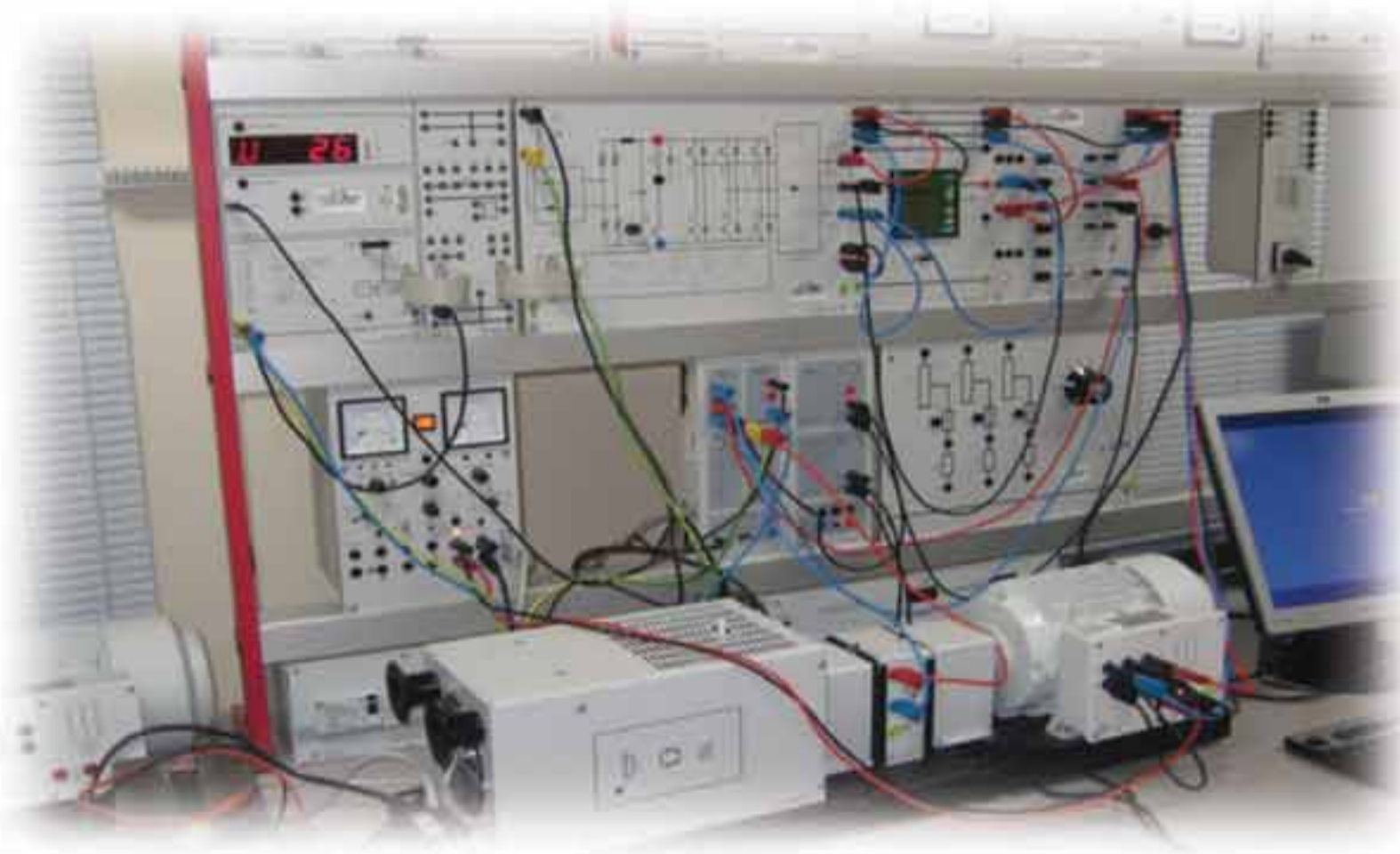
Mission

To conduct basic, applied, and interdisciplinary research in electrical power and energy systems which will form the essential constituents of strategic and major research by academia and industry and to align research with modern international needs.

Objectives

The objectives of the Group are as follows:

- Establish highly focused research programs that will generate novel concepts, methods of analysis, evaluation and testing in power and energy systems;
- Prioritize research activities in electrical power and energy systems and prepare a long-term research master plan;
- Broaden undergraduate and graduate education in the areas of the Group's research concentration, thereby providing a strong workforce base and highly skilled manpower for local industries;
- Enhance international competitiveness of Saudi Arabia in electrical power and energy systems;
- Promote cooperation and efficiencies in research by strengthening domestic and international research linkages, and particularly by significantly increasing the current industrial affiliations; and
- Collaborate with research institutions, industry, and related organizations worldwide to promote latest technology in the area of electrical power and energy systems.



Research Areas

- Wide area power system monitoring and protection
- Power system analysis and control
- Renewable energy and system integration (Wind and PV)
- Power quality
- Energy markets and management



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Introduction

The Laser Research Group (LRG) was established to bring together researchers working in the area of lasers and their applications and to focus on the laser research efforts in a more rational and affective manner.

LRG will spare no effort to support the Research Programs that are consistent with the strategic needs of the industry in the Kingdom of Saudi Arabia and the academic department at KFUPM. Graduate students and faculty members from different departments are invited to participate in the Group's studies. The other major activity of the Group will be the dissemination of knowledge/information in the field of lasers via seminars, workshops, and conferences.



Vision

To develop innovative research and disseminate up-to-date knowledge in the selected fields of lasers and their applications.

Mission

To develop human and physical resources in order to conduct laser-related fundamental and applied research and to become a recognized research group in laser science and technology.



Objectives

The objectives of the Group are as follows:

- Develop and maintain laser research infrastructure at KFUPM;
- Develop human resources in order to conduct basic and applied research in the field of lasers;
- Encourage interdisciplinary and collaborative laser research activities with Saudi and regional universities, selected international laser centers, local industry and governmental agencies;
- Establish a continuous learning culture among graduate students, researchers and technical staff to keep up with new trends in the laser research and technologies; and
- Monitor modern international research activities and align group research activities accordingly.



Research Areas

- Spectroscopy
- Lasers in environmental science applications
- Lasers in petroleum and petrochemicals applications
- Synthesis and characterization of nano-materials
- Non-destructive testing utilizing lasers



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Introduction

The development of clean energy and related technologies are key factors for creating a future based on sustainable energy resources. There are many forms of clean energy resources; however, the efficiencies, operational difficulties, and costs are limiting factors in the adoption of these resources. Thermoelectric energy conversion systems are a potential avenue in this field. This technology requires a thorough understanding of the physical aspects of thermoelectric effects to establish the fundamentals of high efficiency processing and development of new materials. The Thermoelectric Research Group (TRG) has been established to conduct research into the thermoelectric effects, formulations, and process optimization in relation to new materials development.

The strength of TRG relies on the group members, who have established research credentials in the area of thermal sciences, process optimization, and dynamics of systems. The Group members have the potential to conduct state-of-the-art research in the area of thermoelectric power generation in line with national needs. Integration of graduate students will enhance the research potential and the strength of the Group.

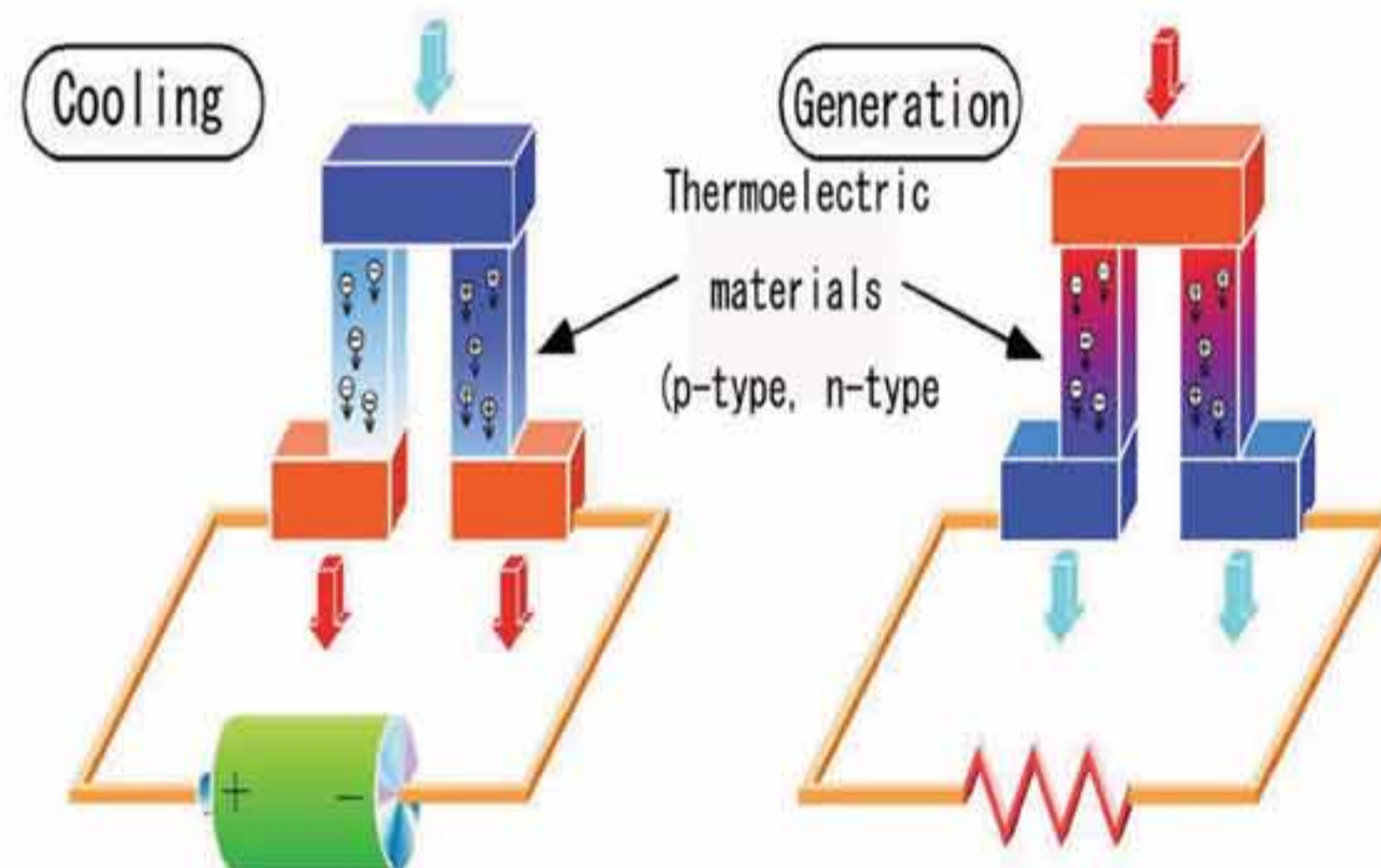


Vision

To develop world-class expertise and disseminate knowledge on thermoelectric power generation with regard to promoting clean energy in the Kingdom of Saudi Arabia.

Mission

To develop outstanding research activities in the area of thermoelectric power generation. It is expected that the research outcome will contribute to the knowledge and sustainable development of KFUPM through the provision of innovative approaches and solutions to the problems facing the development of thermoelectric power generation.



Objectives

The objectives of the Group are as follows:

- Develop facilities and train graduate students in the area of thermoelectric power;
- Establish links with world class research centers and renowned researchers to exchange technical knowledge and information;
- Generate an effective environment for multi-disciplinary research by including researchers from different departments of the university; and
- Develop methods and devices that may find practical applications in the community.



Research Areas

- Thermoelectric transport theory
- Thermoelectric efficiency optimization
- Thermoelectric materials
- Measurement of thermoelectric properties
- Thermoelectric generation and applications



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Introduction

The Water Research Group (WRG) is a multidisciplinary research team that focuses on issues related to water resources in the Kingdom of Saudi Arabia. The main objective of WRG is to conduct basic and applied research by exchanging ideas and establishing cooperation among researchers from different scientific disciplines who have interests in issues related to water resources. The Group will also aim to develop, adopt and transfer technologies and methodologies to ensure efficient and sustainable water management in the Kingdom of Saudi Arabia.



Vision

To improve the understanding of the variability of the water resources in the Kingdom which will provide information needed for their sustainable development.

Mission

To establish its own identity by building the necessary manpower to conduct current and future research. In addition, the group will establish links with national and international research centers and initiate research collaborations of importance to the Kingdom of Saudi Arabia. It will also utilize the available pool of human resources and facilities in the University to conduct basic and applied research in the area of water resources management.



Objectives

The objectives of the Group are as follows:

- Promote scientific research on issues and problems related to water resources in KSA;
- Conduct training courses on the subject for practitioners and researchers of water resources in arid and semi-arid parts of the world;
- Produce technical publications related to the activities of the Group; and
- Provide high quality, well trained and informed professionals as future experts in the area of water resources through an extensive graduate education program.

Research Areas

- Water resources management and planning
- Water conservation
- Hydrology/hydraulics modeling
- Water treatment and reuse



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Introduction

Intelligence is a general cognitive function of human brains that entails a set of skills in problem solving. It reflects the capability to perceive and learn from experience, discover knowledge and engage in various forms of reasoning and planning under uncertainty conditions, act autonomously to achieve and optimize its objectives, solve complex tasks, and adapt to changing situations. The development of computing machines and programs, such as robots and software agents that mimic the capability of human brains in solving complex problems is gaining a growing role in several real-world and industrial applications. Numerous advances and developments in all aspects of Intelligent Computing Systems (ICS) have been witnessed over the years.

The aim of the ISRG Research Group is to promote research and development on various aspects of artificial intelligence, machine learning and soft computing techniques and their interdisciplinary applications that can benefit both private and public sectors in the Kingdom in many areas including education, government, agriculture, bioinformatics, healthcare, business and finance, oil and gas exploration, petrochemical industries, environment, communication networks and information security. This goes in line with the National Plan for Strategic and Advanced technologies, under the information technology program, which fosters and supports national research that could lead to technological products and to establishing advanced industries, which contribute to the advancement of the national economy and support sustainable development.

The proposed group will also enable and foster knowledge sharing among researchers who have common interest in machine learning; soft computing; artificial intelligence; bio-inspired optimization and evolutionary computation;



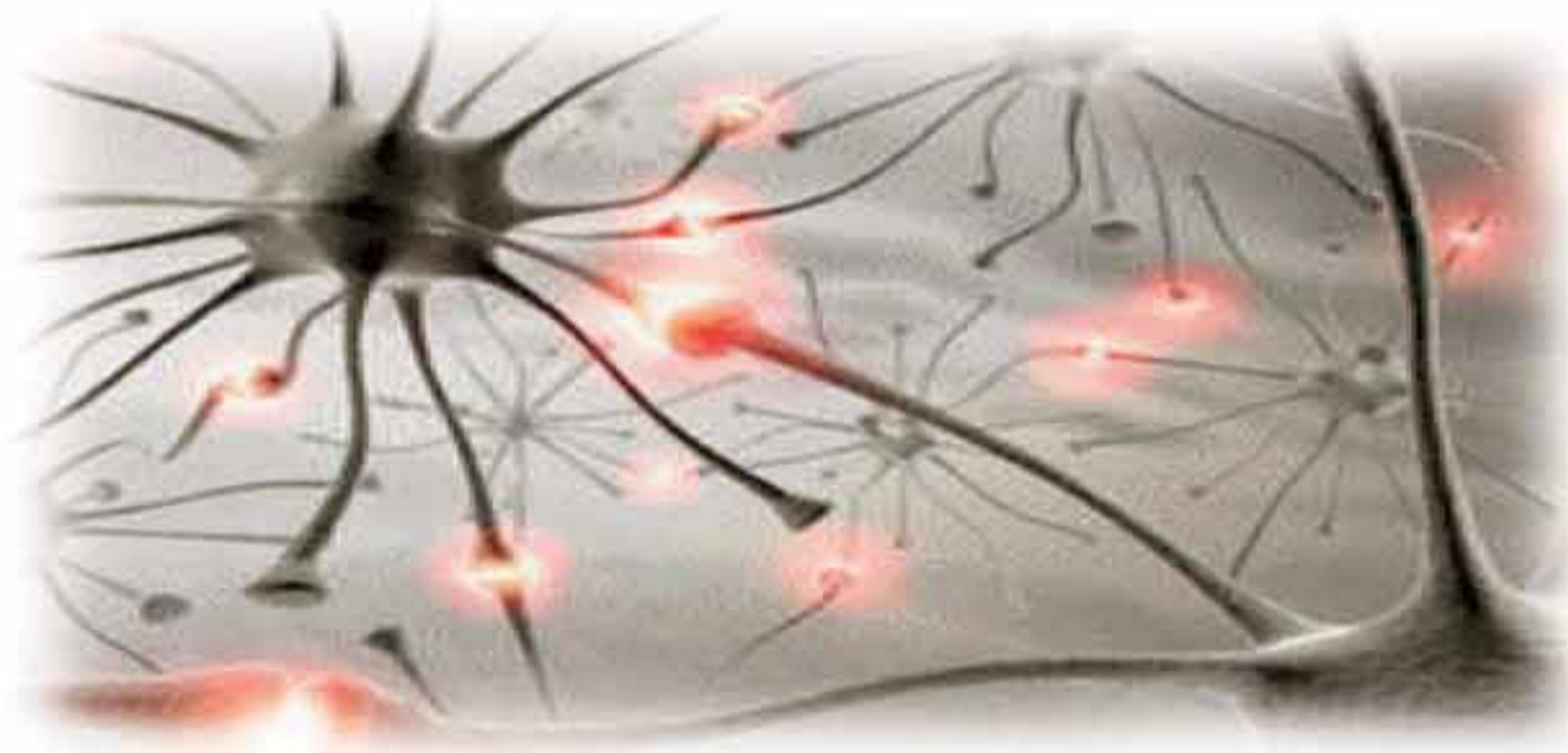
autonomous agents and decision support systems; predictive and adaptive systems; applications in communication networks; pattern recognition; speech recognition; computer vision; data mining; information retrieval; biometric identification and information security; software engineering; biomedical and bioinformatics; intelligent control and automation; intelligent tutoring and assessment systems; computational modeling and statistical data analysis.

Vision

To be a creative group that is recognized nationally and internationally as one of the expert research groups in Intelligent Computing Systems.

Mission

To conduct and promote advanced interdisciplinary research within KFUPM on various aspects related to Intelligent Systems, to collaborate with other researchers both nationally and internationally, and to transfer the outcome of our research to the industry, the government and the public sector.



Objectives

- Conduct research and share knowledge and research outcome
- Promote and lead research in various aspects related to Intelligent Systems and attract more funded research projects
- Build strong links and collaborations among researchers at KFUPM, the Saudi industry, and the research and development community at large.



Research Areas

- Soft computing, artificial intelligence, machine learning and data mining
- Bio-inspired optimization and evolutionary computation
- Predictive and adaptive systems
- Computational modeling and statistical data analysis
- Autonomous agents and decision support systems
- Dynamic programming and reinforcement learning



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Introduction

Air Conditioning and Refrigeration Research Group (ACR-RG) was established at KFUPM to integrate and facilitate cutting-edge research and innovative energy efficient technologies in air conditioning and refrigeration that are suitable and reliable under harsh operating conditions such as those of Saudi Arabia. Research on the implementation and use of Integrated Solar Concentrated Power Refrigeration and Air Conditioning Systems (SCPRACTS) will be of a major emphasis of the group research. The group will also work to strengthen the link between the R&D facilities in the local air conditioning and refrigeration industry and the researchers at the University.



Research programs that are aligned with the national, strategic and the strategic needs of the air conditioning and refrigeration local industry in the Kingdom of Saudi Arabia in addition to the academic department of KFUPM would be strongly supported by ACR-RG. Participation of graduate and undergraduate students and faculty members from different departments is encouraged. The other major activity of the Group will be the dissemination of knowledge/information in the field of laser through seminars/workshops/training program and conferences.

Vision

To be a leading research group focusing on cutting-edge research and innovative energy efficient technologies pertinent to air conditioning and refrigeration, energy conservation and the utilization of solar energy in refrigeration and airconditioning systems.

Mission

To conduct successful researches that contribute to the sustainable development of the Kingdom in the area of energy conservation and contribute to the reduction of global warming via research on energy efficient technologies and providing innovative solutions to the economic and technical problems pertinent to air conditioning and refrigeration.



Objectives

- Conduct basic and applied research on the cutting edge and innovative energy efficient technologies in air conditioning and refrigeration that are suitable and reliable under harsh operating conditions similar to those prevalent in Saudi Arabia.

- Conduct research on innovative technologies for the utilization of solar power concentrating technologies in refrigeration and air conditioning systems.
- Conduct research to develop and use simulation tools for refrigeration and air conditioning systems and components.
- Facilitate technology transfer to the local manufacturers.
- Conduct research to develop sensors and control systems for refrigeration and air conditioning under extremely hot and humid conditions.
- Arrange of workshops and training programs on energy efficient technologies in refrigeration and air conditioning.

Research Areas

- Energy efficient technologies
- Integrating concentrated solar power with refrigeration technologies
- Modeling and simulation of refrigeration and air conditioning systems
- Sensors and control systems for refrigeration and air conditioning systems
- Plans and methodologies to develop the local manufacturing facilities.
- Plans and methodologies to apply energy labeling



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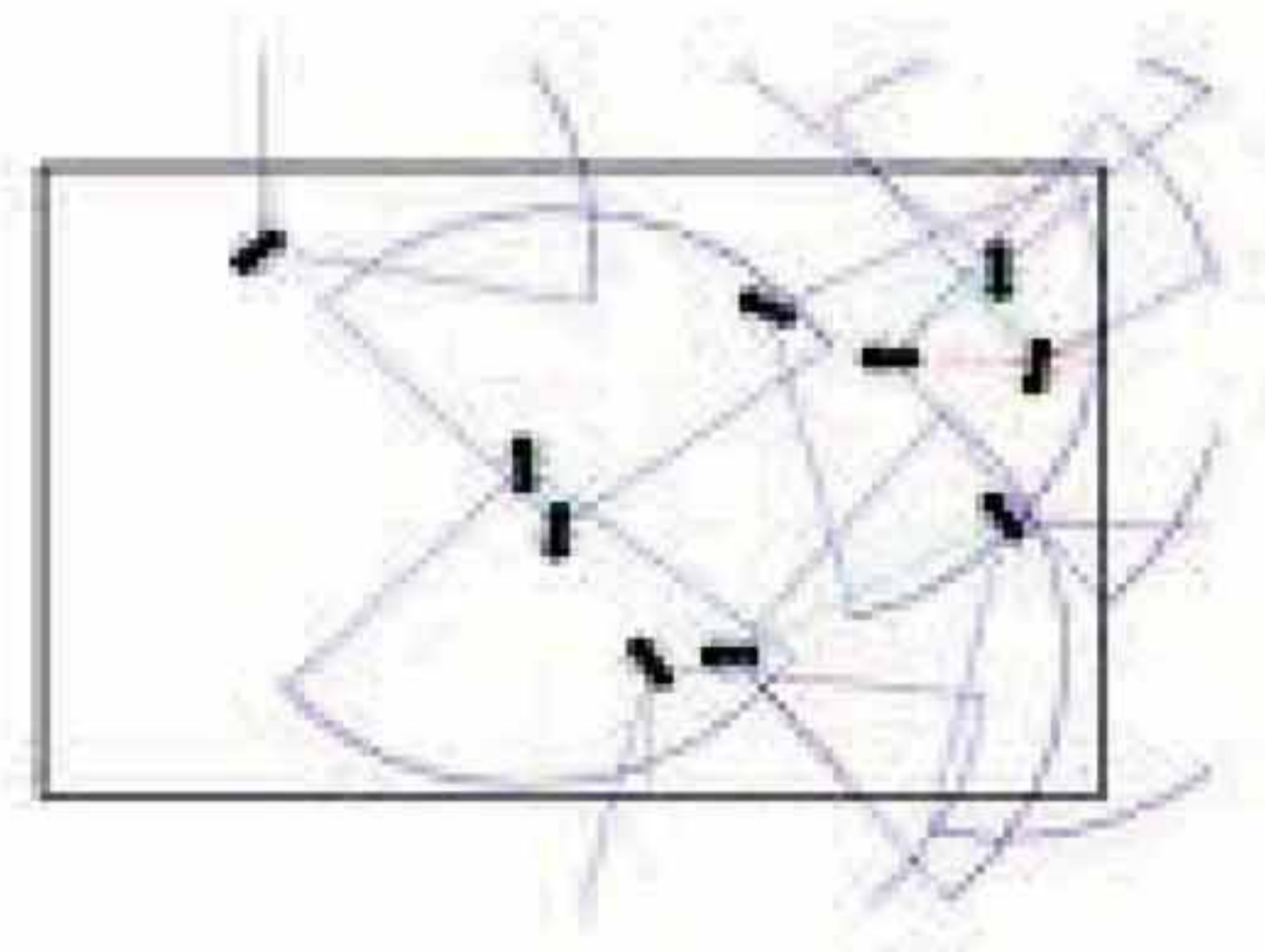
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Introduction

The Distributed Control (DC) research group was formed to undertake interdisciplinary research investigations into unified approaches to control design, online computation and networked communications and to address widespread application needs of systems engineering areas. While the members of the group will strive to integrate the advances in the individual areas, they also aim to examine new areas including interconnected systems, networked and embedded systems, remote control strategies, robust control with design constraints, control engineering methods and techniques with limited communications.



Vision

To become a leading group in the use of new analytical machinery and the application of control systems technologies and math tools to cope with the underlying problems and applications.

Mission

To conduct research along the following major fronts: modeling and analytical tools, software and computing and hardware and applications. The major theme of research and development would be to tackle problems of contemporary interests in the research arena, provide implementable solutions and propose suitable application areas in the Kingdom and the Middle East.



Objectives

To undertake research investigations into systems engineering applications of contemporary importance. These investigations would aim at developing new analytical tools, customizing available algorithms, implementing improved methods for practical applications and, whenever possible, building up lab-scale prototypes.

To organize seminars, short courses, make presentations and/or conduct round-table discussions on all aspects of research.

To apply for research support, whenever possible, from appropriate bodies to disseminate the expected result effort, expose the SE-COE-KFUPM research expertise and to link with research and development centers in KSA.



Research Areas

- Decentralized control and filtering
- Reliable embedded control
- Estimation and control with limited communications
- Control over wireless networks
- Robust and real-time control



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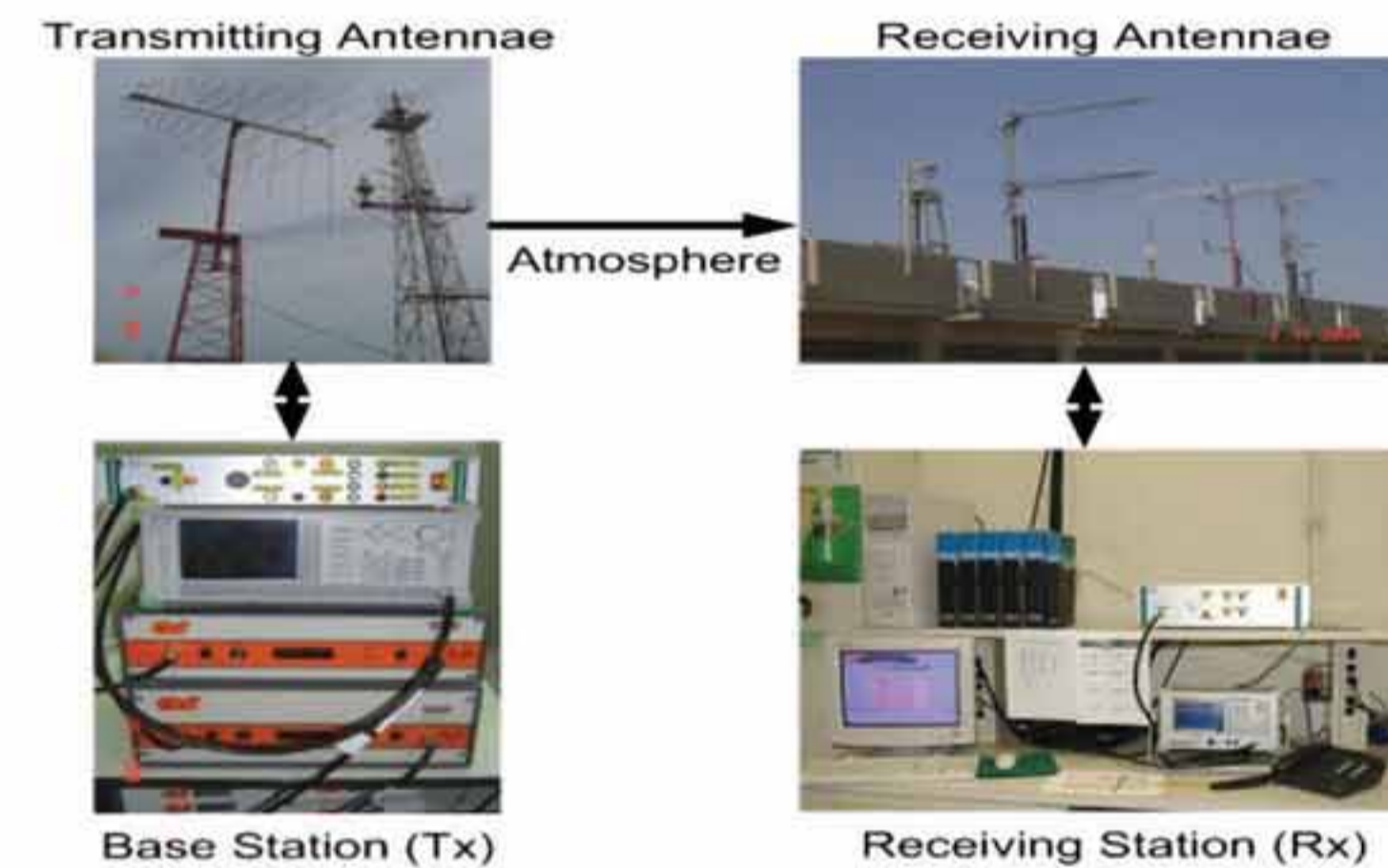
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Introduction

The rapid advances in information technology during the past three decades has shifted the communication paradigm, particularly in wireless communications, resulting in new research areas and issues. In view of these developments, the Wireless Broadband Communication Research Group (BWRG) was established to assemble a critical mass of researchers to conduct research in emerging issues in wireless communication and networks.

Research programs envisioned by the group fall into several critical areas and are directed toward meeting the future needs of telecommunication of the Kingdom of Saudi Arabia and the academic departments of KFUPM. Participation in the group is open to faculty members and graduate students from all departments. The group intends to establish new international collaborations and strengthen the existing ones.



Vision

To become an internationally acclaimed source of quality and far reaching research in broadband wireless communications.

Mission

To explore new topics of research and conduct high quality research in broadband wireless communication, produce high quality graduate engineers for the telecommunication industry, develop a research laboratory in wireless communications, and promote collaboration between research centers and universities nationally and globally.



Objectives

- To promote excellence in wireless broadband research.
- To publish research results in high caliber journals.
- To produce persons of high intellect and skills to contribute to the development of the Kingdom of Saudi Arabia.
- Coordinate with the industry to solve problems of national interest.
- To promote collaboration with renowned researchers at national and international levels.

Research Areas

- Wireless channel characterization and signal processing.
- Systems beyond 3G – OFDMA, CDMA etc.
- Wireless systems cross-layer designs and optimization of resources.
- Cooperative and cognitive networks.
- Network scalability.
- Advanced error control techniques.
- Wireless sensor networks.



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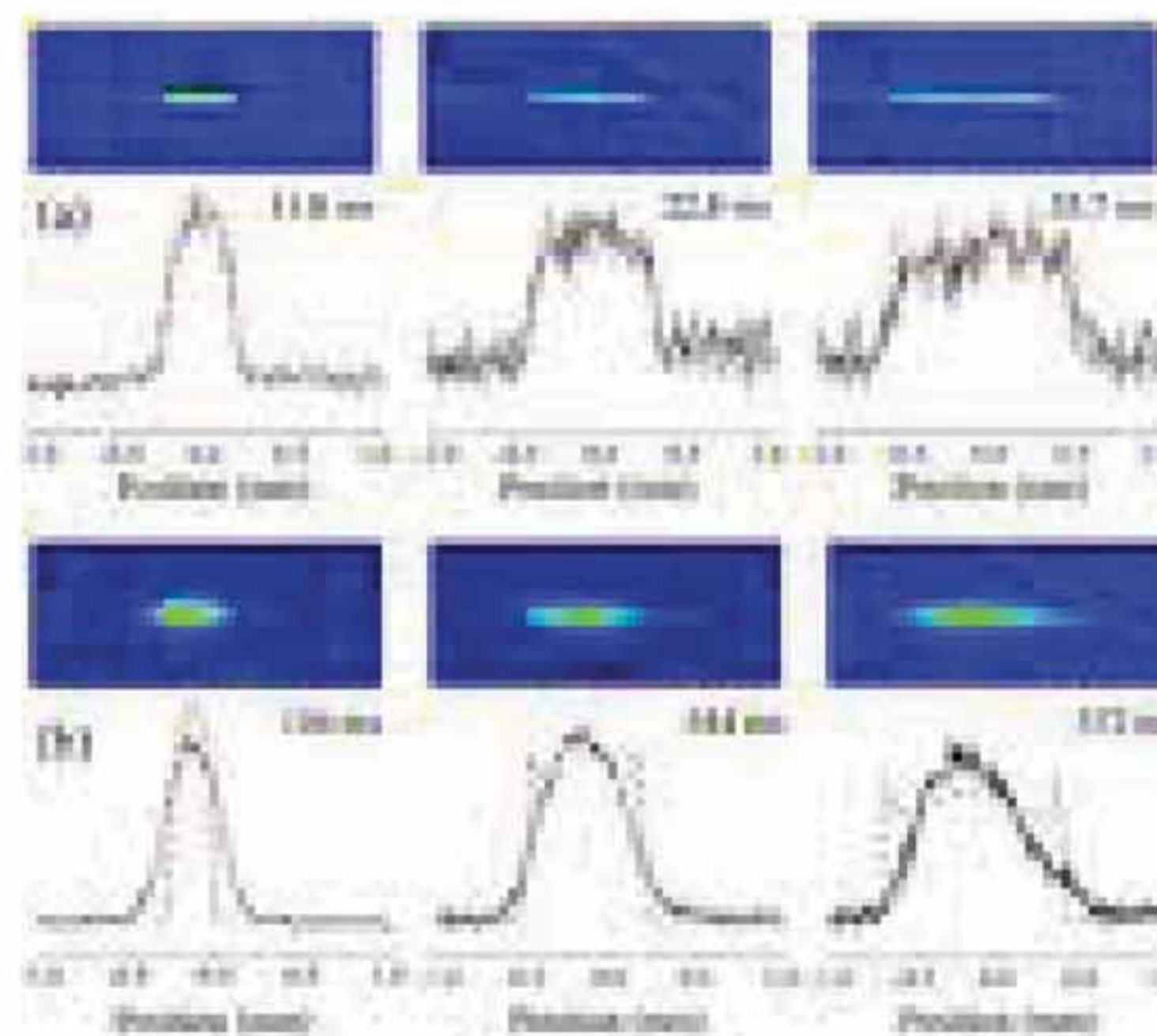
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Introduction

The Group conducts theoretical work in quantum physics at a significant level of quality and quantity. The group provides for local physicists (faculty, researchers, and students) the means to improve their contribution to physics through national and international collaborations on issues of current interest. Currently, the Group is concentrating on analytic solutions of kinematical wave equations and highly accurate evaluation of the dynamics of quantum mechanical systems including scattering problems both in the relativistic as well as non-relativistic domains. New members of the group are interested in nonlinear physical phenomena. Students (males and females) are especially at an advantage and stand to benefit from the work of the Group. Visits are organized by the Group for “external” and “associate” members to visit the Group in Dhahran and for “local” active members to visit centers of excellence in physics inside and outside the Kingdom. One-day mini workshops (each known as “Theoretical Physics Day”) are frequently organized by the Group centered on the contribution(s) of visiting scholar(s). However, one of the major Group contributions to physics in the Kingdom is the establishment of the “Saudi Center for Theoretical Physics (SCTP)”.

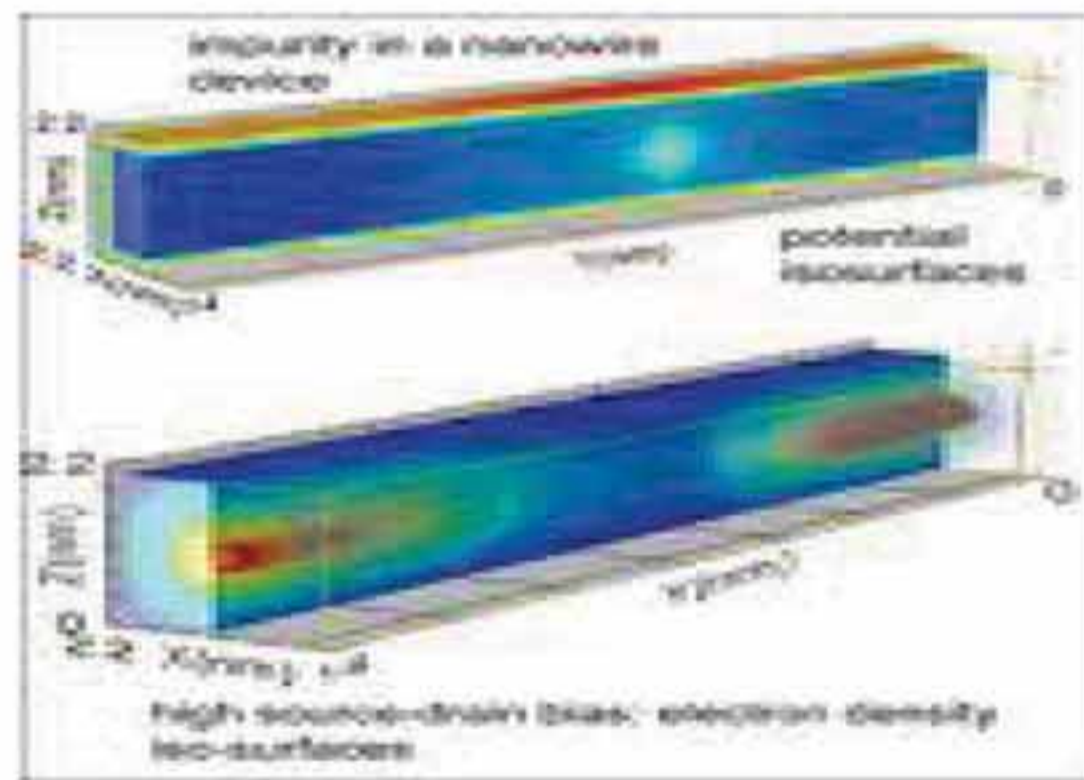


Vision

To provide a stimulating environment that empowers theoretical physicists at KFUPM to achieve leadership in theoretical physics research within the Kingdom and beyond.

Mission

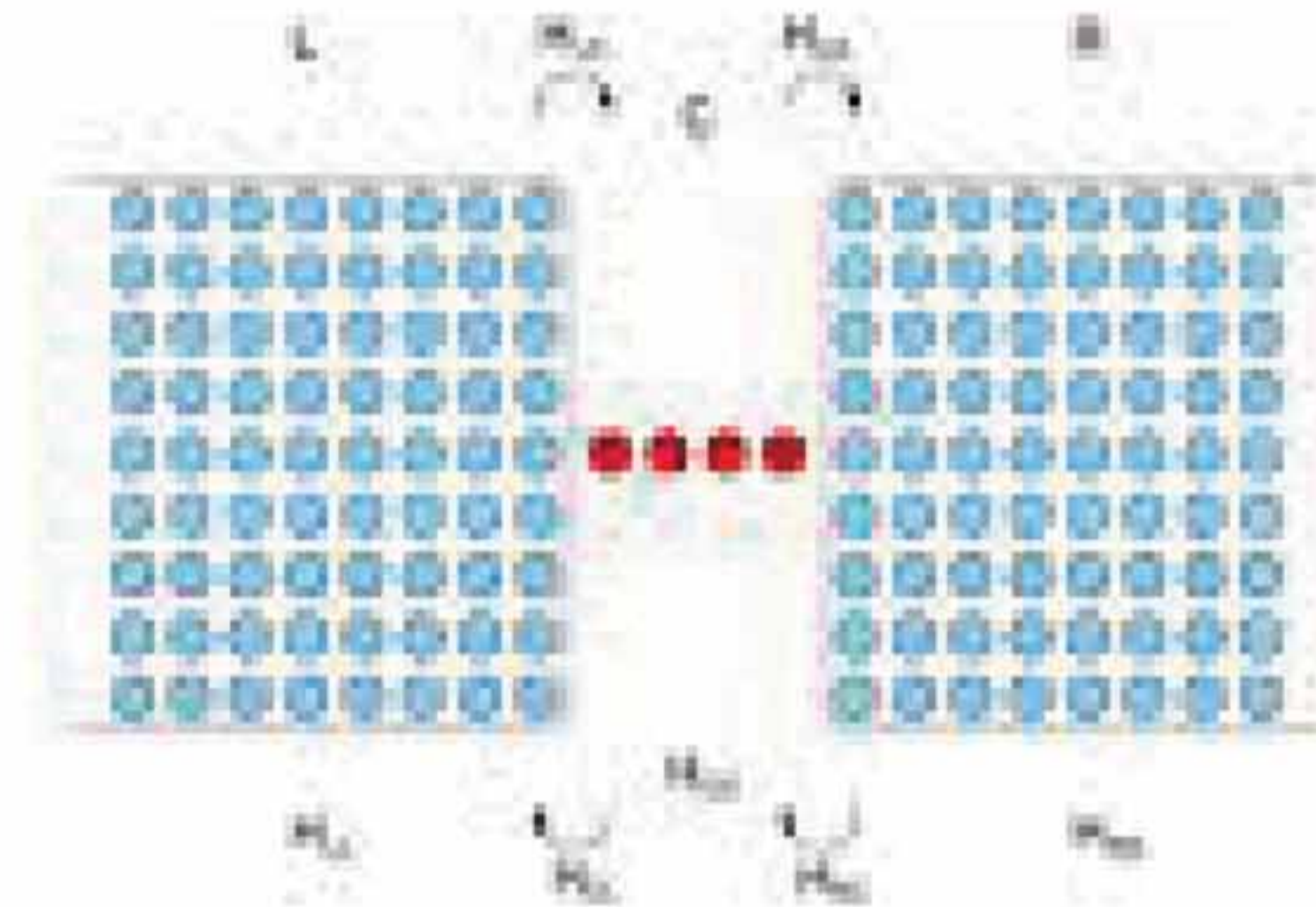
To conduct basic and interdisciplinary research in theoretical Physics, and provide a stimulating environment which will constitute an efficient, flexible, independent, and highly motivating system for promoting quality work in various fields of theoretical physics.



Objectives:

- Promote and develop high quality research in basic and applied physics.
- Publish high quality papers in prestigious ISI physics journals and conferences.
- Establish and grow highly focused research programs that will generate novel concepts or methods of analysis.
- Promote collaboration and cooperation with renowned national and international research groups in theoretical physics and attract leading researchers.
- Broaden undergraduate and graduate education in the areas of the Group's research concentration.

- Enhance international competitiveness of Saudi Arabia in theoretical physics.
- Teach theoretical physics courses in our undergraduate and graduate programs.



Research Areas

- Relativistic and non-relativistic quantum theory
- Nonlinear physics and its applications
- Quantum transport phenomena



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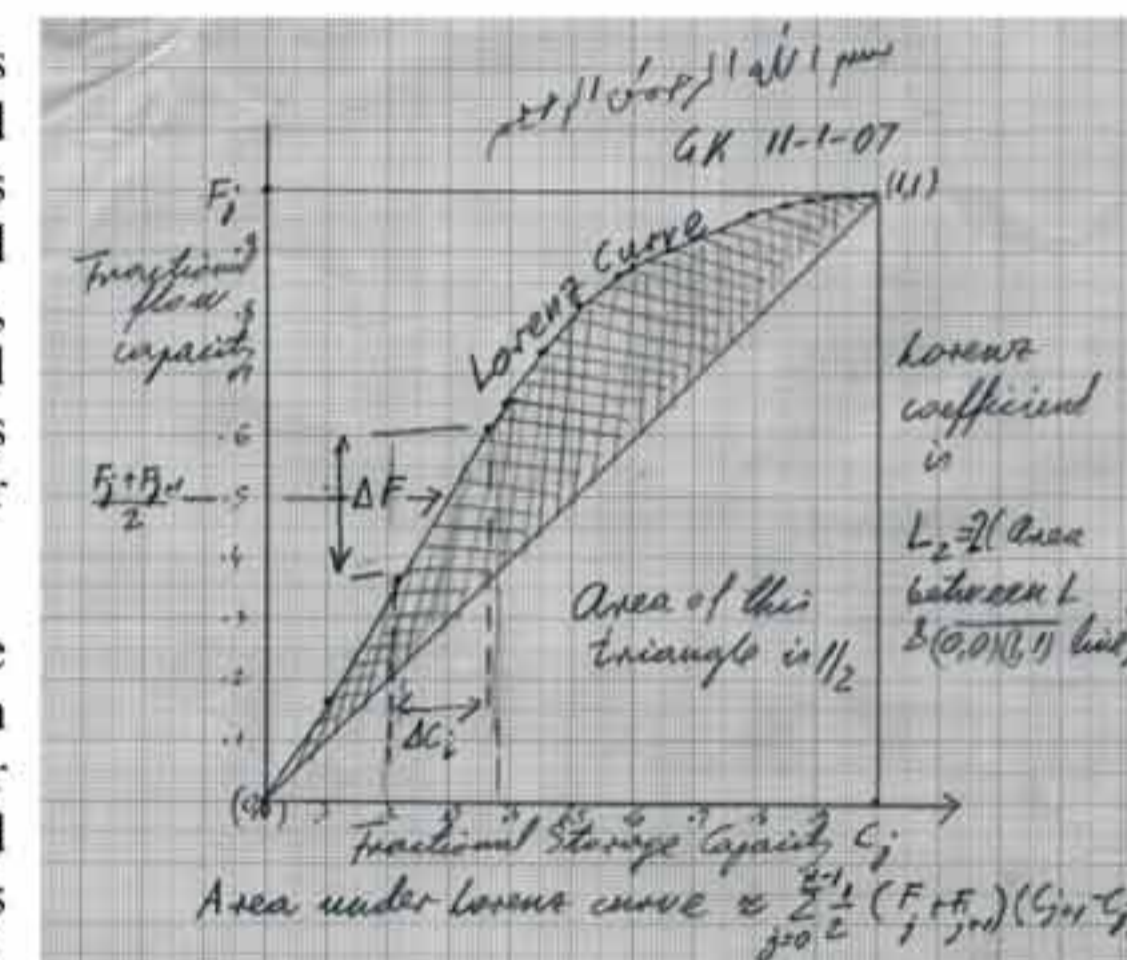
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Introduction

The Reservoir Characterization Research Group (RGRC) is a team of geologists, geophysicists and petroleum engineers working in areas related to reservoir characterization. Reservoir characterization is an integrated study of the reservoir rocks in terms of geological and geophysical macro- and microproperties for the purpose of assessing the hydrocarbon potential of the reservoir and to provide information for the optimal exploration, development, production, enhanced oil recovery and management policies. The required multidisciplinary approach is provided by this Research Group comprising of specialists from diverse fields of hydrocarbon studies (applied mathematics, geophysics, well log analysis, sedimentology, micropaleontology, clay Mineralogy, geochemistry, etc.)

The approach and methods will be a combination of field and laboratory observations on sedimentological and stratigraphic facies, petrophysical, geophysical and geostatistical analyses and mathematical and/or computer modeling.

The main purpose of the IRGRC is to plan, design and conduct internally or externally funded basic and applied research in all fields of reservoir characterization, to incorporate new ideas in teaching and directed student research, and to offer services to petroleum industry and consultancy to government institutions and companies.



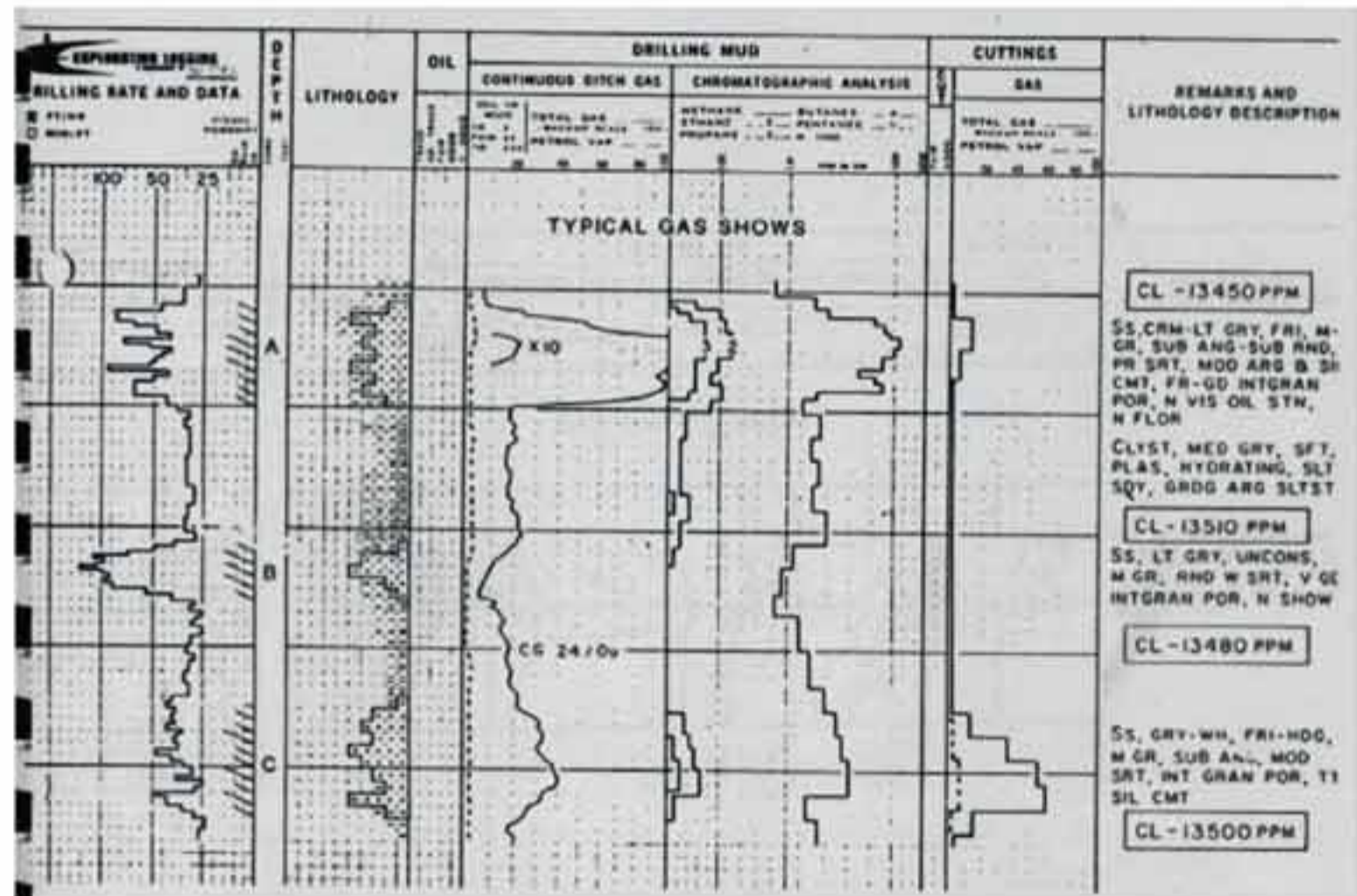
Vision

To become an internationally acknowledged and respected Research Group conducting well-documented, published and highly cited quality research in all fields of reservoir characterization.

Mission

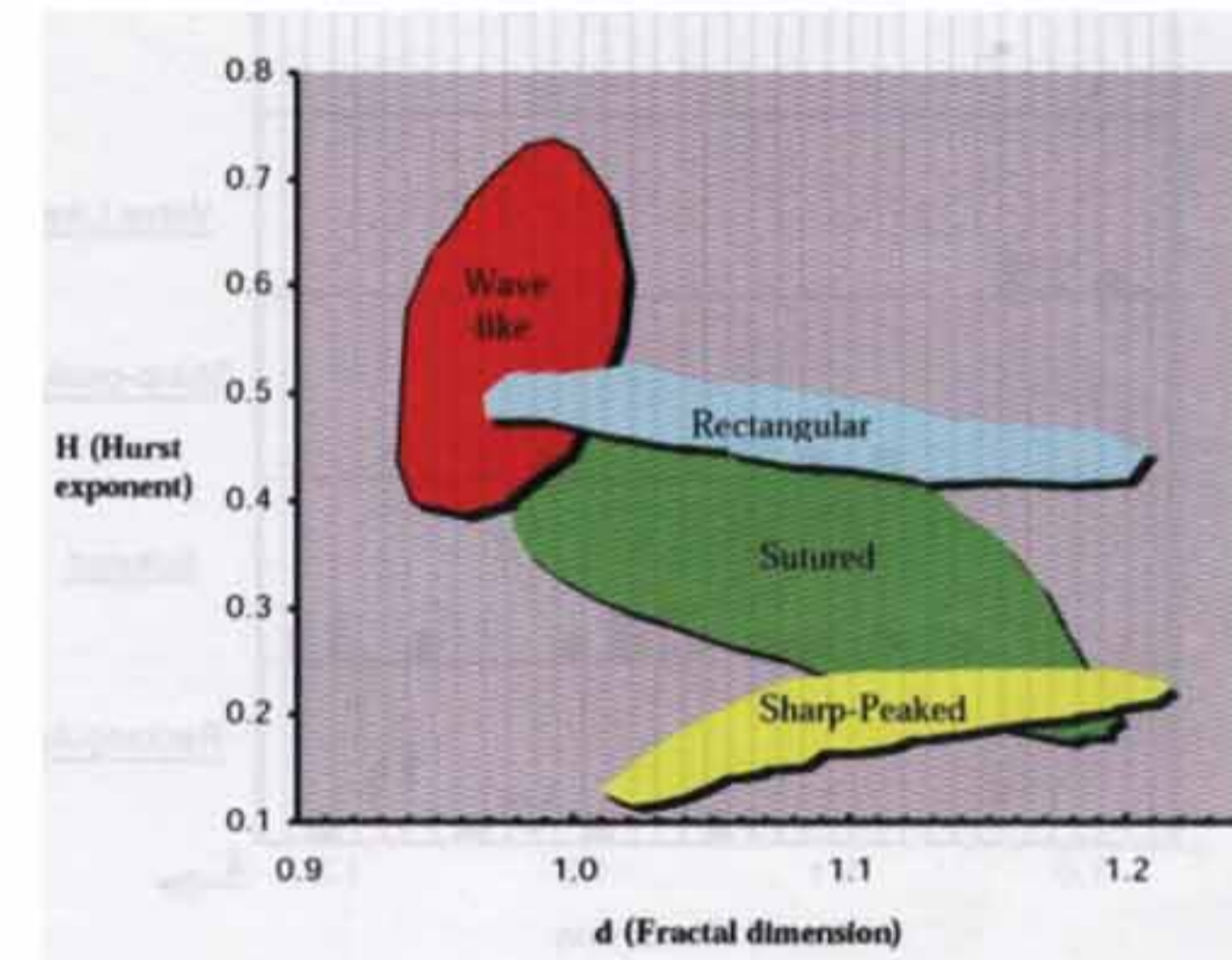
To conduct and produce interdisciplinary, original, basic and applied research in all areas of reservoir characterization that will enhance the knowledge and

understanding of reservoir heterogeneity and quality, and serve the economic development of the Kingdom. To develop the knowledge, skills and technical know-how of faculty, students and staff as well as to increase the research output of, and create new laboratory facilities in, KFUPM.



Objectives

- To conduct high quality, basic and applied research for the purpose of identifying reservoir heterogeneity and its impact on reservoir quality
- To publish research papers in prestigious peer-reviewed journals and international conferences
- To serve the scientific and economic needs of Saudi Arabia
- To provide a forum of discussions and seminars for local experts of Reservoir Characterization
- Acquire, and develop, technical laboratory facilities and computer software
- To teach students and direct their research at undergraduate and graduate levels
- To provide experts to the petroleum industry, and train their professionals
- To establish a link with interested KFUPM researchers in other departments, local experts and established centers world-wide.



Research Areas

- Reservoir quality and architecture (both clastic and carbonate)
- Geological and geostatistical modeling of reservoir properties
- Diagenesis and sequence stratigraphy
- Controls on porosity and permeability of reservoir rocks
- Development of rock models to connect porosity and permeability
- Improved well log interpretation
- Palynostratigraphy and kerogen analysis
- Seismic monitoring of reservoirs
- New geostatistical techniques to analyze and model reservoir heterogeneity
- Fractal characterization of reservoir pore space



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Introduction

Maintenance is defined as the combination of activities by which equipment, assets or systems are kept or restored to a state in which it can perform its designated function. It is an important factor in product quality and can be used as a strategy for successful competition. Maintenance plays a critical role in preserving and prolonging equipment and assets life cycle. It is emerging as an interdisciplinary field and currently knowledge is being generated in it. On the other hand over the last four decades the kingdom of Saudi Arabia has developed a huge infrastructure and an industrial base in petrochemical and petroleum industry that requires effective and efficient maintenance. The importance of maintenance has been realized in the Kingdom's developmental plans. Specifically item 10 of the second principal in the sixth developmental plan (14151420- H) emphasizes the need to include maintenance and operation as an integral part of any project and all considerations should be made at the design stage to minimize maintenance requirements as much as possible.

The maintenance research group (MRG) will focus on activities related to the broad area of maintenance. Maintenance is an interdisciplinary field of research that requires expertise in different areas. These areas include Industrial, Mechanical, Electrical Engineering, Management and others area. The research group brings together faculty and students from various fields to work on interdisciplinary research projects which focus on problems relevant to local industry needs. The group will conduct theoretical and model-based research, empirical research and detailed field-based studies of maintenance problems.

One of the prime targets of the MRG is to enrich the educational experience of undergraduate and graduate students. The MRG will enhance the educational process in a multidisciplinary environment by providing students with opportunities to conduct industrial projects to satisfy senior projects, co-op and Master thesis requirements.

The faculty members and the staff of the MRG have been actively engaged in maintenance teaching, training and research in maintenance for three decades. The faculty members within the group have authored several books and established an international Journal, The Journal of Quality in Maintenance Engineering (JQME), published by Emerald in the United Kingdom. In teaching, the faculty members have been offering undergraduate and graduate courses on maintenance planning and control for the past decade. In addition they have been conducting training courses to industry on a regular basis.

The group aims to become a focal point of knowledge generation and dissemination in the area of Maintenance Engineering and Management.

Vision

To become one of the world's leading hubs in maintenance research and education.



Mission

- Conduct and disseminate basic and applied research in the area of maintenance
- Educate and train students, engineers and staff in the area of maintenance complying with best quality standards



Objectives

- Excellence in basic and applied research
- High-quality industrial projects and training
- Effective faculty mentoring and team-working
- Enhance the educational process for students



Research Areas

- Maintenance strategies
- Maintenance planning and control
- Condition, monitoring and condition based maintenance.
- Systems reliability
- Integrating production, quality and maintenance
- E-maintenance



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