جامعة الفيصل
Alfaisal University

Annual Report

Office of Research & Graduation Studies

2017 - 2018

Office of Research & Graduate Studies

Results

Research

Research Funding

Type of Funding	2014 (SAR)	2015 (SAR)	2016 (SAR)	2017 (SAR)
External	12,665,550	16,219,394	12,732,358	9,446,595
Internal	3,372,591	3,495,106	1,675,875	0
TOTAL (SAR)	**16,038,141**	**19,714,500**	**14,408,233**	**9,446,595**

Research Output (Alfaisal University affiliation from Scopus)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017est
Publications/Year	2	27	55	64	141	164	184	222	273	330
Cum Total Publ	4	31	86	150	291	455	639	861	1,134	1,464
Citations/ Yr	0	7	114	263	619	1,830	3,457	4,603	5,224	9,000
Cum Total Citations	2	9	123	386	1005	2,835	6,292	10,895	16,119	25,119
Publ/FT Fac/Yr (est)	0.1	1.0	1.2	1.0	1.3	1.3	1.1	1.5	1.8	2.1
Total Cit/Total Publ	0.5	0.3	1.4	2.6	3.5	6.2	9.8	12.7	14.2	17.2

Intellectual Property & Commercialization of Research

Year	<2013	2013	2014	2015	2016	2017	2018*est*
Patents Granted/yr	-	1	0	1	1	0	3
Cum Total Patents Granted	-	1	1	2	3	3	6
New Companies	1	0	0	0	1	1	1
Cum Total New Companies	1	1	1	1	2	3	4

Performance Indicators

Times Higher Education World University Rankings 2016	Alfaisal ranked in top 4 in Kingdom. Had **highest *International Outlook* score**
Times Higher Education Young University Rankings 2017	Alfaisal University recognized as **One of World's Top 200 Institutions under 50 Years Old** & **One of Top 18 for Millennials**
Times Higher Education World University Rankings 2018	Alfaisal received ranking in **Top 501-600 globally**. For Kingdom ranked 2nd overall & for Arab region 5th. For ***Clinical, Pre-clinical, & Health* subject rankings Alfaisal was in Top 301-400** of world universities; **Medicine ranked 5th overall in Arab Region & 5th in Kingdom**; ***Life Sciences* ranked 251-300 worldwide** in addition to 2nd overall in Kingdom & in Arab Region. In *THE* Asia University rankings **Alfaisal placed 68th amongst Asian countries** including China and Japan

Equipment & Laboratories

JSEC 2018 (5 million SAR in Equipment) **w/COE; Joint Smart Grids & Electric Vehicles Research & Development Centre (JSEC), A Saudi-Polish Collaboration;** The AGH University of Science and Technology, Krakow, Poland

Graduate Studies

Number of Enrolled & Graduated Students from 2013 to 2018

Current Masters Programs	Number of Enrolled & Graduated Students										
	2013-14		2014-15		2015-16		2016-17		2017-18		Total
	Enr	Grad	Enr	Grad	Enr	Grad	Enr	Grad	Enr	Grad	Grad
Biomed Sci (MBS)	13	2	6	4	13	8	12	12	5	2	**28**
Bus Admin (MBA)	169	88	142	55	169	88	68	21	61	-	**252**
Eng & Syst Mgmnt (MEM)		-	-	-		-	13	-	9	-	**-**
Gen Counselling (MGC)	-	-	-	-	-	-	8	4	9	-	**4**
Nanosci & Nanotech (MNT)	-	-	-	-	-	-	8	5	8	-	**5**
Public Health (MPH)	-	-	-	-	-	-	5	-	-	-	**-**
Rad & Imag Sci (MRIS)	32	-	-	30	32	30	12	30	-	-	**90**
Total/Yr	**214**	**90**	**148**	**89**	**214**	**126**	**126**	**72**	**92**	**2**	**379**
Cum Total Graduated	**-**	**90**	**-**	**179**	**-**	**305**	**-**	**377**	**-**	**-**	**379**

Achievements by Faculty and Students

CONTENTS

Executive Summary

The total external research funding awarded in 2017 was 9,446,595 SAR which was a substantial achievement and works out to 68,000 SAR per faculty member per year. Over the past four years, 75% of funding awarded came from external sources. Over 1 million SAR was also awarded to 22 faculty members in 2018 through an *Internal Research Grant (IRG*) competition. Faculty were allowed to apply for conference grants again.

As part of the GDRG program, a total of 177,129 SAR was awarded to five graduate students doing thesis research in MNT and MBS. Alfaisal University also responded to the *KACST Support Initiative for Public & Private Universities aimed at Industrial Development & Commercialization in Saudi Arabia*.

The College of Business continued its success with SAGIA with 4.5 million SAR in contract funding for two projects in 2017. Three Saudi Aramco Contracts totalling 2 million SAR were also signed with an Alfaisal Faculty member in the College of Science & General Studies in 2017

Boeing funded two undergraduate research and design projects in 2016-2017 with the College of Engineering. The aim of the first project was the design of an efficient and reliable solar powered vehicle capable of competing in international competitions. The team aims to participate in the *Formula Sun Grand Prix 2018* competition in the USA. The second project is the design & development of a Solar Powered Multi-rotor UAV. Alfaisal University's participating team at the 2017 *Formula Student Competition* in Silverstone received the *RaceTechmag Spirit of FS Award*.

BAE Systems & the College of Business awarded the winners of the *2nd Project Management Student Competition* at a ceremony held at Alfaisal University. Seventeen students received certificates & cash prizes. A group of students from the College of Business also participated in the first *STEAM* (Science, Technology, Engineering, Arts and Mathematics) held in Riyadh. The *STEAM Innovation Challenge* offers an opportunity to engage and display Saudi students-led innovation.

The Alfaisal University *8th Annual Research Day Student Poster Competition* was held on 13 April 2017. A total of 130 applications were received in four specific categories: Business & Management, Engineering & Technology, Medicine & Health Sciences, and Science and Humanities; 34 posters received awards. Winning students are honoured at a *Research Awards Ceremony* held annually.

In 2017 Alfaisal University obtained shares in MEDAD Company located in Singapore. The result of this collaboration is the ADC Desalination and Cooling Pilot Plant located at the Solar Village. Research output and Intellectual Property (IP) generation by Alfaisal Faculty has shown a significant increase over the past few years. For example, in 2017, 330 publications were produced with an Alfaisal University affiliation, and the total number of citations for the year reached 9000. The cumulative total number of publications and citations were 1,464 and 25,119 respectively at the end of 2017.

Alfaisal University was recognized as one of the World's Top 200 Institutions under 50 Years Old by *Times Higher Education Young University Rankings 2017*. Furthermore, Alfaisal received a ranking in the Top 501-600 globally by *Times Higher Education World University Rankings 201*8. For the Kingdom the University ranked 2nd overall & for Arab region 5th. For Clinical, Pre-clinical, & Health subject rankings Alfaisal was in Top 301-400 in the world; Medicine ranked 5th overall in Arab Region & 5th in Kingdom; Life Sciences ranked 251-300 worldwide in addition to 2nd overall in both the Kingdom & in the Arab Region

The *Alfaisal Centre for Research and Consultancy Studies* continues to act as an effective umbrella organization for channelling research, educational training and contract projects as well as consulting studies between external organizations, both public and private, and Alfaisal faculty members. For the sixth consecutive year, the College of Business has won the confidence of the *Saudi Arabian General Investment Authority (SAGIA)* to prepare an annual report for the *World Economic Forum in Davos (WEF)*. Furthermore, a CGI (Corporate Governance Index) project which is a partnership between Alfaisal University and Saudi Arabian Investment Authority (SAGIA) aims to establish CGI assessment criteria for listed Saudi companies. Additionally, in a major achievement, specialized courses will be provided for employees in the Air Force (37 million SAR contract) and STC Training Services & Contract Functional Training (2 million SAR) for 3 years.

Currently there are seven active master programs at Alfaisal University; Business Administration (MBA), Biomedical Sciences (MBS), Radiological & Imaging Sciences (MRS), Genetic Counselling (MGC), Public Health (MPH), Nanoscience and Nanotechnology (MNT), and Engineering & Systems Management (MEM). Almost 400 students have so far graduated from the Master's Programs over the past 5 years. Graduate enrolment has fluctuated between 150-200 students per year. A proposal was approved by the University for Internal Graduate Scholarships that would partially offset tuition fees. Graduate students with such a scholarship would work part time as Teaching or Research Assistants.

1. Research

The total external research funding awarded in 2017 was 9,446,595 SAR compared with 12,732,358 SAR the previous year (Table 1). While this was a 25% decrease over the previous year, it was still a substantial achievement for Alfaisal University faculty members, as well as for the Office of Research & Graduate Studies. Assuming that we have 140 full time faculty members this works out to 68,000 SAR per faculty member per year. Although no internal research grants (IRG) were awarded in 2017, over 1 million SAR was awarded to 22 faculty members in 2018 (data not shown). Faculty were also allowed to apply for conference grants again as part of the IRG (internal research grant) competition.

Over the past four years, (i.e. 2014-2017) 75% of funding awarded came from external sources such as MAARIFAH and GDRG from KACST as well as other external sources including SAUDI ARAMCO, BOEING, ABB, ARABIO, ALANOUD FOUNDATION, SAGIA, SHELL, ALJOMEH, MOE, NG, IZON, & QNRF. This is a promising development in that it shows that faculty members are going after a wider range of external funding sources.

Table 1. Total Research Funding Awarded from 2014 to 2017 from External & Internal Sources

Type of Funding	**2014** (SAR)	**2015** (SAR)	**2016** (SAR)	**2017** (SAR)
External	12,665,550	16,219,394	12,732,358	9,446,595
Internal	3,372,591	3,495,106	1,675,875	0
TOTAL (SAR)	**16,038,141**	**19,714,500**	**14,408,233**	**9,446,595**

1.1. External Research Funding & Activities

1.1.1. GDRG Grants submitted to KACST for funding in 2017

Twenty three (23) projects for the amount of 12,874,807 SAR were submitted by Alfaisal faculty members to the General Directorate for Research Grants (GDRG) offered through King Abdulaziz City for Science and Technology (KACST) (Table 2). Three grants types included basic research, applied research and graduate student research.

Table 2. GDRG Grants submitted to KACST by Alfaisal Faculty for funding in 2017

Program Type	**Number of Grants Submitted**	**Amount Requested (SAR)**
Basic Research	10	9,683,553
Applied Research	4	2,761,254
Graduate Student	9	430,000
Total	**23**	**12,874,807**

1.1.2. KACST Graduate Student Thesis Research Grants Awarded in 2017

As part of the GDRG program, a total of 177,129 SAR was awarded to five graduate students doing thesis research in MNT and MBS (Table 3).

Table 3 KACST Graduate Student Thesis Research Grants Awarded in 2017

#	Amount SAR	Project Title	Master Area	Year Awarded	PI
1	35,000	Develop and produce a short series of DNA dedicated to dabigatran drug	MNT	2017	Maher Aljohani
2	30,000	Electrochemical Immunosensors for the Rapid Screening of Cystic Fibrosis and Duchenne Muscular Dystrophy	MNT	2017	Nawal Al Shehri
3	35,000	holey Reduced Graphene oxide (Hrgo) Based Polymer Nanocomposite for Energy Storage Application	MNT	2017	Yazeed Al Dossari
4	55,120	PD-L1 expression on Breast Cancer Stem Cell and its associated mechanisms as a tool for its eradication	MBS-MCB	2017	Fatimah Abbas
5	22,000	Factors Associated with Latent Tuberculosis Infection among Health Care Workers in Abha, Saudi Arabia	MBS-IC	2017	Naif AlShahrani

1.1.3. KACST Industrial Development & Commercialization in Saudi Arabia

Alfaisal University responded in December 2017 to the *KACST Support Initiative for Public & Private Universities aimed at Industrial Development & Commercialization in Saudi Arabia* with 10 submitted projects each worth up to 2 Million SAR (Table 4). Faculty from four colleges (i.e. Business, Engineering, Pharmacy & Science) submitted proposals that have good commercial potential.

Table 4. Alfaisal Faculty Response to KACST Support Initiative for Public & Private Universities aimed at Industrial Development & Commercialization in Saudi Arabia

#	Project Title	College	Inventors
1	Polymer nanocomposite containing graphene oxide with silver nanoparticles having antimicrobial properties	Science	1) Edreese Housni Alsharaeh (Alfaisal University) 2) Mohammad Ateeq Aldosari (Alfaisal University) 3) Ali Abdel-Rahman Mohammad Othman (Alfaisal University) 4) Mohammed Faour Qasem Al-Hindawi (Alfaisal University) 5) Khaled Bin Bandar Alsaud (Alfaisal University)
2	Rapid paper-based diagnostic platform for bacteria detection	Science	1) Mohammed Zourob (Alfaisal University) 2) Khaled Abu Salah (KAIMARC) 3) Atef Shibel (Alfaisal University)
3	Rapid diagnostic tool for viral detection	Science	1) Raja Chinnappan (Alfaisal University) 2) Fatemha Alhamlan (KFSHRC) 3) Saddam Muthana (Alfaisal University)
4	Automatic Surgical Stitching Device	Engineering	Abdel Naser Daoud (Alfaisal University)
5	Low-cost biosensors for biomedical, environmental and food applications	Science	Mohammed Zourob (Alfaisal University)
6	Development of an online CO leak detection device for road vehicles	Engineering	1) Mamoun M. Bader, PI, Alfaisal University 2) Wan Wardatul-Amani Wan Salim, Co-PI, International Islamic University, Malaysia
7	Optical tags: An alternative to indoor RFID tags.	Engineering	1) Muhammad Anan (Alfaisal University) 2) Abdallah Khreishah (Alfaisal University)
8	Potential Uses of Biomass from Palm Date Trees in KSA	Business	1) Mamoun M. Bader (Alfaisal University) 2) Necati Aydin (Alfaisal University)
9	Design and Synthesis of Oxadiazole- and Thiazol-Derived H3 antagonist/Reversed Antagonist: Therapeutic Candidates for Alzheimer's Disease	Pharmacy	1) Mohammad A. Khanfar (Alfaisal University) 2) Holger Stark (Dusseldorf University, Germany)
10	Modified Drag Based Wind Turbine Design with Sails, US patent no. us9217421 b1	Engineering	Hassan Zohair Hassan Ahmed (Alfaisal University)

1.1.4. Other External Research Grants Awarded

A total of 9,269,475 SAR were awarded in 2017 through other external sponsoring agencies & companies (i.e. aside from KACST). These included Saudi Aramco, AGH University of Science & Technology/ NET New Energy Transfer in Poland, SAGIA and STC. The College of Business continues its success with SAGIA with 4.5 million SAR in contract funding for two projects in 2017 (Table 5).

Table 5. Other External Research Grants Awarded

#	Amount SAR	Company/Agency/Foundation/ Project Title	College	Year Awarded	PI
1	712,500	**ARAMCO**/ High Temperature High Pressure Rechargeable Battery Development	COSGS	2017	Edreese Al Sharaeh
2	710,600	**ARAMCO**/ High Temperature High Pressure Water Shutoff Chemical System Based on Nanocomposite	COSGS	2017	Edreese Al Sharaeh
3	534,375	**ARAMCO**/ Saudi Sand Coating System Based on Surface Polymerization and Nanocomposites	COSGS	2017	Edreese Al Sharaeh
4	2,000,000	**AGH University of Science & Technology/ NET New Energy Transfer** Smart-Grid Systems Research and Development Center	COE	2017	--
5	3,024,000	**SAGIA/**CGI Project	COB	2017	Bajis Dodin
6	1,488,000	**SAGIA/**Executive Opinion Survey (EOS)	COB	2017	Mohammed Kafaji
7	800,000	**STC**/ Training Services Contract Functional Training	P. Sultan College Jed.	2017	--

1.1.5. Saudi Aramco Contracts

Three Saudi Aramco Contracts totalling 2 million SAR were signed with an Alfaisal Faculty member in the College of Science & General Studies in 2017.

High Temperature High Pressure Rechargeable Battery Development: The objective of this project is to design, fabricate, test, and deliver full-scale prototypes of the batteries that can work reliably for a long period in a High Temperature High Pressure (HTHP) downhole environment. The research program centres on discovering novel electrodes and electrolytes to enhance the high temperature stability of the rechargeable batteries for oil and gas and other industries with high temperature applications.

High Temperature High Pressure Water Shutoff Chemical System Based Nanocomposite: The aim is to develop in house chemical treatments for water shut off application that are applicable for Saudi Aramco field conditions so as to reduce workover costs. The concept is to introduce nanotechnology to enhance the properties of polymer gels that can enhance the thermal stability and mechanical properties for harsh conditions.

Saudi Sand Coating System Based on Surface Polymerization and Nanocomposites: The goal of the project is to develop in house resin/copolymer coated frac sands that are applicable for Saudi Aramco field conditions in order to reduce workover costs.

1.1.6. Boeing Solar Car & Quadcopter Projects

Boeing funded two undergraduate research and design projects in 2016-2017 with the College of Engineering. The aim of the first project was the design of an efficient and reliable solar powered vehicle capable of competing in international competitions. This is a state of the art challenge involving a multidisciplinary team of electrical, mechanical, software and industrial engineering students. Currently in its third year the project continues to develop the skills of the students in research, simulation, experimental design and prototyping, teamwork, and logistics amongst other HQP skills, and it helps them improve their understanding and grades in their courses. The team aims to participate in the *Formula Sun Grand Prix 2018* competition in the USA (Figure 1).

The second project is the design & development of a *Solar Powered Multi-rotor UAV* (Figure 2). Thirteen engineering students participated in the past two years. Course enrichment / lab equipment for the project include high-end solar panel for power, 3D Printer for printing final frame design, motors of various powers, microcontrollers, and test frames.

Figure 1. TOP: Boeing Solar Car Project. Project Supervisor: Dr. Ahmed Oteafy, Co-Supervisor: Dr. Samer Mansour & Current Student Team Leader: Habib Farooq with Boeing & University Executives; BOTTOM LHS Cr Ahmed Oteafy with his students. BOTTOM RHS Solar Car Design

Figure 2. LHS. Dr Abd-Elhamid Taha presenting the results of the design & development of the Solar Powered Multi-rotor UAV (RHS) to Boeing Management

1.1.7. Formula Student Competition

Alfaisal University's participating team at the *2017 Formula Student Competition* in Silverstone received the ***RaceTechmag Spirit of FS Award*** (Figure 3). The Formula judges and chief designers were impressed with the level of proficiency, dedication, and spirit of the Alfaisal Haizum team. The Formula Student Competition attracts students from around the globe and provides an ideal opportunity for them to test, demonstrate and improve capabilities to deliver a complex and integrated product in the demanding environment of the motorsport industry. Alfaisal University intends to provide the best opportunities for its students by encouraging them to participate in global environmental projects and educational programs and services that benefit the Kingdom of Saudi Arabia, the region and the world.

Students from the Mechanical Engineering Department at Alfaisal University became the first Saudi team to participate in the Formula Student competition. The project

was supervised by Dr Abdel Naser Daoud and sponsored by SABIC. The team of 55 students spent months of research, hard work and put their aerodynamic, mechanical design and suspension knowledge to work in designing and building a car to compete in this motor sport competition.

Dr. Muhammad Anan, Acting Dean of Engineering said: "The Formula Student competition is a unique opportunity for our engineering students to gain hands-on experience and apply their engineering knowledge through the construction of an ultra-effective vehicle. The College of Engineering is proud of Alfaisal Haizum's team, the faculty advisor, and their achievement this year. We are very thankful to our leadership and their continuous support." Additionally, representatives from Alfaisal Haizum noted that their goal was to represent the Kingdom of Saudi Arabia in the world of motor sport and to show the full potential of the knowledge applied by young engineers. Their aim was to apply their knowledge and skills to build a world-class racing car that is efficient in energy but also great in performance".

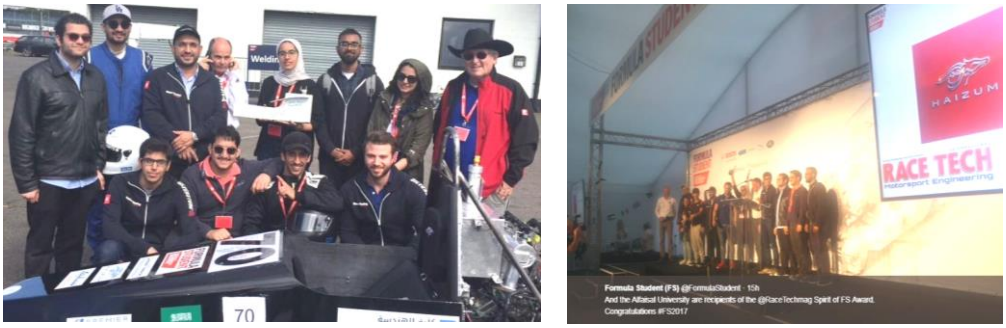

Figure 3. Alfaisal University's participating team at the *2017 Formula Student Competition* in Silverstone receiving the ***RaceTechmag Spirit of FS Award.*** The project was supervised by Dr Abdel Naser Daoud and sponsored by SABIC.

1.1.8. BAE System Awards *to Business Students*

BAE Systems & the College of Business awarded the winners of the *2nd Project Management Student Competition* at a ceremony held at Alfaisal University in December 2017 (Figure 4). Seventeen students received certificates & cash prizes. There were seven awards. The winners were:

- **1st Prize:** *The demand for public hospitals in the Kingdom of Saudi Arabia* by Faisal Alswailem, Fahad Alkridis, Mohammad Alqahtany and Saud Alomair
- **2nd Prize:** *The Car Consulting Company* by Sultan Al Shathri
- **3rd Prize:** *Body and Beauty Care* by Ibrahim Al Sultan, Faisal Al Munajem, Nawaf Alfayadh and Abdulaziz Al-Angari
- **4th Prize:** *Fawasel* by Abdulmalik Almazyad
- **5th Prize:** *Emergency Wristband* by Naif AlHanaki and Sara Almutawa
- **5th Prize:** *E-wash* by Fahad Al Nhait, Sager Al Sager and Ibraheem Al Bader
- **5th Prize:** *Time management App.* by Nawaf Ramadan

Figure 4. Students from College of Business receiving BAE Systems Awards..

1.1.9. Business Students Participation in STEAM Challenge

A group of students from the College of Business have participated in the first STEAM (Science, Technology, Engineering, Arts and Mathematics) which was held in Riyadh from Friday the 20th of October to Saturday the 21st of October 2017. The *STEAM Innovation Challenges* are unique, intensive, experiential ideation events for Saudi university students (Figure 5). The program was created, designed and delivered by KAUST Entrepreneurship Center. The *STEAM Innovation Challenge* offers an opportunity to engage and display Saudi students-led innovation. Over 500 students from Saudi universities have participated in STEAM Innovation.

Students learned a lot over a weekend and some of them were winners of SAR 22,500 in prize money given by the sponsor SABB. A joint team including some of CoB students won the second and third prizes (SAR 7250 and SAR 5000 respectively). The second team was headed by Mr. Omar Alhudaithi, and the third team was headed by Mr. Turki Alghamdi. Students were accompanied by Dr. Mario Ferrer and Dr. Bajis Dodin.

Figure 5. Student accompanied by Dr. Mario Ferrer and Dr. Bajis Dodin receiving prize money at STEAM Innovation Challenge.

1.2. Internal Research Funding

1.2.1. Internal Research Grants (IRG 2018)

One million SAR was awarded for 25 projects for the IRG2018 competition. This was a competitive grant competition with applications being reviewed by the College Research Committees and then a final review by the Office of Research & Graduate Studies (Table 6).

Table 6. Winners of the Internal Research Grants Competition 2018 at Alfaisal University

Name of PI	College	Project Title
Thomas Aichner	Business	The Impact of Creativity and Novelty on Advertising and Promotion Success Amongst Young Saudi Consumers
Haitham Al Zoubi	Business	A Closed Form Bond Option Pricing Model with Integrated Unit Root Component
Abdelmonim Shaltoni	Business	Examining Luxury Consumption in The Saudi Context: A Cultural Prespective
Mohamed Attar	Engineering	Utilizing Model Transformation to Reduce Off-Shore Development Costs for Saudi Arabian Software Development Companies
Mohammed Anan	Engineering	Context – Aware Living Building
Nidal Nasser	Engineering	Developing A Cloud-Based Framework for Smart Cities' Services
Sobhi Majjoueli	Engineering	Life Cycle Cost Optimization for Energy Retrofitting Strategies in Commercial Buildings
Sughair Guizani	Engineering	iSolar – UAV Solar Powering System
Safia Yasmeen	Engineering	Monitoring Commercial Greenhouse by using Wireless Sensor Technology
Mai Ali	Engineering	Autonomous Wearable Bio-Signals Monitoring E-Health Platform
Moni Nader	Medicine	Role of SLMAP in regulating cardiac hypertrophy
Abdullah Al Shawaf	Medicine	Characterization of Autism spectrum disorders induced pluripotent stem cells derived cortical neurons
Hanaa Hajeer	Medicine	Study of the association of Vascular Endothelial Growth Factor gene polymorphisms with hypertension.
Manal Al Alam	Medicine	Xanthine oxidase inhibition for the prevention of myocardial ischemia reperfusion injury
Amna Siddiqui	Medicine	To determine the role of DNA methylation at RASSF1, TP73, WIF1, E2F1, ERBB2, HIC1 loci as biomarkers to detect bladder cancer in serum of cancer patients
Faisal Ikram	Medicine	Comparison of pathological process of human AD and AlCl3 and D-Galactose treated human neuronal 3D cell culture
Mohammad Khanfar	Medicine	Design and synthesis of Oxadiazole and Thiazol-Derived H3 antagonist/ Reversed Antagonist: Therapeutic Candidates for Alzheimer's disease
Omar Ameer	Medicine	Characterization of aortic functional and structural changes in diabetic rat model
Souraya Goumri	Science	Nanostructures and nanodevices modeling and simulation of electronic and transport properties for photovoltaic applications
Mohammed Kanoun	Science	Assessing the use of organic-inorganic hybrid halide perovskite for photovoltaic application: From First principle calculation to macroscopic simulation
Shimaa Eissa	Science	Truncation of aptamers for total and glycated hemoglobin and their integration in a graphene oxide-based fluorescence biosensor for high-throughput for diabetes
Mateen Khan	Science	Mechanism of Activator eIF4F Binding to Iron Responsive Element (IRE)0mRNA: A step towards Developing New Methods for Therapeutic Intervention in Iron Related Diseases
Mamoun Bder	Science	Design of Low Band Gap Oligomers and polymers for solar cell applications
Abdulrahman Soliman	Science	Fabrication, Characterization and Electrochemical performance of 2D hybrid photocatalysts for water splitting
Raja Chinnappan	Science	Anti-VCAM-1 aptamer as potential breast cancer apoptosis and therapy

1.3. Faculty & Student Achievements

1.3.1. Faculty Awards for Research Excellence

Faculty Awards for Research Excellence are given to recognize, encourage, and reward those individuals whose research or creative endeavours have been particularly successful and are so recognized locally, regionally, and nationally. The recipients of the *Faculty Awards for Research Excellence 2017* were :

- Robert Zacca, Assist Prof of Entrepreneurship, College of Business
- Muhammad Anan, Assoc Prof of Software Eng, College of Engineering
- Moni Nader, (shared) Assist Prof of Physiological Sci, College of Med
- Muhammad Zafar, (shared) Assoc Prof of Anatomy, College of Medicine

There may be one award in each college/school of the University annually. The awards for excellence in research and scholarship may be shared where the achievements being recognized result from joint efforts. Our warmest congratulations to this year's winners, we wish them continued success at Alfaisal University (Figure 6 Bottom Photo).

1.3.2. Faculty Promotions

Two faculty members were promoted during 2017.

- **Dr Necati Aydin** in the College of Business was promoted to Full Professor of Economics
- **Dr Sghaier Guizani** in the College of Engineering was promoted to Associate Professor of Electrical Engineering.

All candidates were evaluated on the basis of tripartite performance, relative to the faculty member's assigned workload as distributed among: Teaching (i.e., quality, teaching development, and pedagogy); Research (i.e., scholarship, publications and/or creative work, and grant and contract awards); and Service (i.e., University service and/or public service, including professional activity or service). The appraisal process will include peer review assessments both internal and external to the University. Special congratulations to all three candidates.

1.3.3. Annual Research Day Student Poster Competition

The *Alfaisal University 8th Annual Research Day Student Poster Competition* was held on 13 April 2017. A total of 130 applications were received in four specific categories: *Business & Management, Engineering & Technology, Medicine & Health Sciences, and Science and Humanities*. A total of 34 posters received awards (Table 7). Winning students are honoured at an *Research Awards Ceremony* held annually (Figure 6).

Table 7. Winning Posters from 8TH Annual Research Day Student Poster Competition held 13 April 2017 at Alfaisal University

PRIZE	Poster ID	PRIZE	Poster ID
Medicine & Health Sciences			
Judging Group 5		*Judging Group 6*	
1st	• UG-M09-Sarraj-2017	1st	• UG-M29-AlTinawi-2017
	• G-M20-Alsolme-2017		
2nd	• UG-M16-Alrohaimi-2017	2nd	• UG-M23-Kafaji-2017
	• G-M08-AlHarti-2017		
3rd	• UG-M03-Kim-2017	3rd	• UG-M39-Kalagi-2017
Judging Group 7		*Judging Group 8*	
1st	• UG-M51-Khan-2017	1st	• UG-M63-Kaya-2017
	• G-M55-Fitwi-2017		
2nd	• UG-M47-Altannir-2017	2nd	• UG-M64-Alkhani-2017
	• G-M57-Alekhmimi-2017		
3rd	• UG-M41-Alhussinan-2017	3rd	• UG-M67-BaHammam-2017
	• G-M54-Gumssani-2107		
Science & Humanities			
Judging Group 2			
1st	• UG-S14-Alfuhaid-2017	1st	• G-S16-Mussa-2017
2nd	• UG-S05-Alabdullah-2017	2nd	• G-S04-Aldawsari-2017
3rd	• UG-S09-Bin Gaith-2017	3rd	• G-S13-AlSaadoun-2017
	• UG-S01-Alsheikh-2017		
Engineering & Technology			
Judging Group 3		*Judging Group 4*	
1st	• UG-E05-Alshahrani-2017	1st	• UG -E20-Alturki-2017
2nd	• UG-E09-Gashgarey-2017	2nd	• UG -E23-Farooq-2017
3rd	• UG-E11-Alabbasi-2017	3rd	• UG -E25-Farooq-2017
Business & Management			
Judging Group 1			
1st	• UG-B12-AlSudairy-2017		
2nd	• UG-B03-Alsemari-2017		
3rd	• UG-B05-Tahir-2017		
	• G-B06-AlHammadi-2017		


A


B


C

D

E


F

Figure 6. Research Awards Ceremonies (2017 photos A-C; 2018 photo F) & Student Poster Competition (2017 photo D & E)

1.4. Intellectual Property & Commercialization of Research

Over the past five years over four patents have been granted to faculty members in the College of Science & General Studies and College of Engineering (Table 8). In addition, in 2017 Alfaisal University obtained shares in MEDAD Company located in Singapore. MEDAD is developing its business activity in Saudi Arabia and cooperates with King Abdulaziz City for Science and Technology (KACST) and with the Office of Research & Graduate Studies at Alfaisal University. The result of this collaboration is the ADC Desalination and Cooling Pilot Plant located at the Solar Village. This is the world's largest ADC Pilot Plant.

Table 8. Intellectual Property & Commercialization of Research

Year	<2013	2013	2014	2015	2016	2017	2018*est*
Patents Granted/yr	-	1	0	1	1	0	3
Cum Total Patents Granted	-	1	1	2	3	3	6
New Companies	1	0	0	0	1	1	1
Cum Total New Comp	1	1	1	1	2	3	4

1.4.1. Patents

Shimaa Eissa and Mohammed Zourob were awarded a **US Patent No. 9863962** on 9 January 2018. The patent entitled *Aptamer- Based Label-Free Electrochemical Microarray Biosensing Platform for The Detection of Total and Glycated Hemoglobin in Human Whole Blood (CHECK WITH MZ)*, describes the selection, identification and characterization of new specific DNA aptamers against HbA1c- and total hemoglobin (tHb) and their integration into an electrochemical microarray sensing platform. Novel features include the use of aptamers as recognition receptors as alternative to the commercially available antibodies and the integration of the new aptamers in a microarray electrochemical biosensor platform. The platform offers several advantage over current technologies: the low cost of the aptamers and the micrroarray screen printed electrodes reduce the overall cost of the device, the long term stability of the biosensor due to the use of the DNA aptamers, only microlitters of blood samples can be used for analysis, electrochemical transducers are easy to use and can be easily miniaturized, and the label-free detection format reduces the cost of the assay and maintain the affinity of the aptamers.

This new HbA1c microarray platform will facilitate the usage of this test by both patients and healthcare professionals at home or small clinics and can be further developed for point-of-care (POC) diagnostics. The HbA1c POC diagnostic device will allow a broader screening of diabetes and will help in the early diagnosis and management.

1.5 Equipment & Laboratories

1.5.1 Joint Smart Grids & Electrical Vehicles R&D Centre (JSEC)

A *Joint Smart Grids & Electric Vehicles Research & Development Centre (JSEC)* has been established as part of a Saudi-Polish Collaboration involving *The AGH University of Science and Technology*, Krakow, Poland and the College of Engineering at Alfaisal University. A total of 5 million SAR in equipment has been allocated to the Centre which will be located at Alfaisal University.

1.6 Analysis of Research Output & Research Performance Indicators

Research output and Intellectual Property (IP) generation by Alfaisal Faculty has shown a significant increase over the past few years (Tables 9 & 10). For example, in 2017, 330 publications were produced with an Alfaisal University affiliation, and the total number of citations for the year reached 5000. The cumulative total number of publications and citations were 1,464 and 14,259 respectively at the end of 2017. Alfaisal University was recognized as **one of the World's Top 200 Institutions under 50 Years Old** by *Times Higher Education Young University Rankings 2017* (Table 11)

Table 9. Research Output (Alfaisal University affiliation from Scopus)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017est
Publ/Yr	2	27	55	64	141	164	184	222	273	330
Cum Tot Publ	4	31	86	150	291	455	639	861	1,134	1,464
Citations/ Yr	0	7	114	263	619	1,830	3,457	4,603	5,224	9,000
Cum Total Citations	2	9	123	386	1005	2,835	6,292	10,895	16,119	25,119
Publ/FT Fac/Yr (est)	0.1	1.0	1.2	1.0	1.3	1.3	1.1	1.5	1.8	2.1
Total Cit/Tot Publ	0.5	0.3	1.4	2.6	3.5	6.2	9.8	12.7	14.2	17.2

Table 10. Intellectual Property & Commercialization of Research

Year	<2013	2013	2014	2015	2016	2017	2018*est*
Patents Granted/yr	-	1	0	1	1	0	3
Cum Total Patents Granted	-	1	1	2	3	3	6
New Companies	1	0	0	0	1	1	1
Cum Total New Companies	1	1	1	1	2	3	4

Table 11. Performance Indicators

Times Higher Education World University Rankings 2016	Alfaisal ranked in top 4 in Kingdom. Had **highest *International Outlook* score**
Times Higher Education Young University Rankings 2017	Alfaisal University recognized as **One of World's Top 200 Institutions under 50 Years Old** & **One of Top 18 for Millennials**
Times Higher Education World University Rankings 2018	Alfaisal received ranking in **Top 501-600 globally**. For Kingdom ranked 2nd overall & for Arab region 5th. For ***Clinical, Pre-clinical, & Health* subject rankings Alfaisal was in Top 301-400** of world universities; **Medicine ranked 5th overall in Arab Region & 5th in Kingdom**; ***Life Sciences* ranked 251-300 worldwide** in addition to 2nd overall in Kingdom & in Arab Region

1.6.1 Times Higher Education World University Rankings

1.6.1.1 Alfaisal University Recognized as One of World's Top 200 Institutions under 50 Years Old

Alfaisal University, established in 2002 by the King Faisal Foundation in Riyadh, Saudi Arabia, and which first admitted students in 2008, has been ranked in the world's top 200 of the best young universities under 50 years old by *Times*

Higher Education (THE) Young University Rankings 2017 (https://www.timeshighereducation.com/world-university-rankings/2017/young-university-rankings#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/scores). Only one other institution in the Kingdom was able to achieve a place on this list. In addition, Alfaisal University was also ranked number 18 among *Millennial institutions* in a THE editorial supplement that was based on an analysis that compared a narrower class of institutions of a similar age. This is very good news. To be included in the *Young University Rankings* as well as being recognized as a *Millennial university* is a significant achievement. The world's youngest universities outperformed their older counterparts when it came to attracting overseas students and publishing international research, according to data used in the *2017 Times Higher Education Young University Rankings*. THE data showed that young universities excelled when it came to internationalisation. Institutions that were founded from 2000 to the present day ("Millennials") produced the highest proportion of internationally co-authored research, when compared with universities founded earlier.

In the Millennials group, it was noted, that the University of Luxembourg (founded in 2003) and Saudi Arabia's Alfaisal University (2002) achieved the highest scores for internationalisation, which encompasses metrics on the proportion of international students, staff and research. The data also showed that Generation X universities (founded 1967 to 1985) and the Millennials achieved the greatest scores for average citation impact. The same performance indicators were employed in the *Young University Rankings* as in the *THE World University Rankings* by providing comprehensive and balanced comparisons, which are trusted by students, academics, university leaders, industry and even governments. The performance indicators were grouped into five areas: *Teaching* (the learning environment; 30%), *Research* (volume, income and reputation; 30%), *Citations* (research influence; 30%), *International outlook* (staff, students, research; 7.5%) and *Industry income* (innovation; 2.5%).

"We are extremely proud of this momentous accomplishment for such a young institution" said HE Dr Mohammed Alhayaza, President of Alfaisal University. Adding, "It is a culmination of the vision and contributions of our Founders as well as the hard work and input of our talented faculty, students and collaborators".

1.6.1.2 Times Higher Education World University Rankings 2018

Alfaisal received a ranking in Top 501-600 globally from the *Times Higher Education World University Rankings 2018*. For Kingdom Alfaisal ranked 2nd overall & for Arab region 5th. For Clinical, Pre-clinical, & Health subject rankings Alfaisal was in Top 301-400 of world universities; Medicine ranked 5th overall in Arab Region & 5th in Kingdom; Life Sciences ranked 251-300 worldwide in addition to 2nd overall in Kingdom & in Arab Region. In *THE* Asia University rankings Alfaisal placed 68th amongst Asian countries including China and Japan (Figure 7).

Figure 7. Time Higher Education World & Subject Rankings 2018 for Alfaisal University.

1.7 Projects under Alfaisal Centre for Research & Consultancy Studies

Alfaisal Centre for Research and Consultancy Studies acts as an umbrella organization for channelling research, educational training and contract projects as well as consulting studies between external organizations, both public and private, and Alfaisal faculty members.

1.7.1 SAGIA

1.7.1.1 Collaboration with World Economic Forum (WEF)

For the sixth consecutive year, the College of Business has won the confidence of the Saudi Arabian General Investment Authority (SAGIA) to prepare an annual report for the World Economic Forum in Davos (WEF). The partnership aims to assess the competitiveness landscape of the Saudi economy compared with 137 countries world-wide by providing insight into the drivers that enhance productivity and prosperity. The result from the 1.5 million SAR project is a report that is used by the policymakers and businesses to accelerate the competitiveness agenda and advance the economy. Aligned with the formal WEF's methodology a systematic approach was applied by the College of Business to gather and analyse required survey data using the WEF surveying tools. Based on this approach, the data was gathered on various business management environments related to business investment and operations.

1.7.1.2 Corporate Governance Index (CGI)

The CGI project is a partnership between Alfaisal University and Saudi Arabian Investment Authority (SAGIA) and its objective is to establish CGI assessment criteria for the listed Saudi companies. The CGI project is to assess the corporate governance practices of these companies and rank them based on their CGI scores. The (CGI) Project objectives for the first year (2017) have been accomplished and the final report has been submitted to SAGIA. Currently the project is in its second phase (year 2, 2018).

1.7.2 Centre for Executive Education

Foundation training courses were run to allow attendees to obtain professional certification. A total of 87 students attended. The courses included PMP, CMA, CFA and CAPM. During 2017 these courses were also launched at Prince Sultan College of Business in Jeddah.

1.7.3 Prince Sultan College of Business in Jeddah

In major achievements, specialized courses will be provided for employees in the Air Force (37 million SAR contract) and STC Training Services & Contract Functional Training (2 million SAR) for 3 years. iClick Professional Diploma Project in Digital Marketing will also be started.

2 Graduate Studies

2.5 Graduate Programs

Currently there are seven active graduate programs at Alfaisal University (Table 12). The oldest program is the Master of Business Administration (MBA), which has already graduated 252 students (Table 13). The second oldest is the Masters of Biomedical Sciences (MBS) which is a thesis option program. It has five tracks: *Analytical Biochemistry, Biotechnology, Clinical Embryology & Reproductive Biology, Infection Control and Molecular & Cell Biology*. There is also the Masters of Radiological & Imaging Sciences (MRS) which is a courses-only option and helps to train instructors and managers. The Masters of Genetic Counselling (MGC), which is a courses-only option, will help to fill a critical need for counsellors in the Kingdom and the region. The Master of Public Health (MPH) is thesis as well as a courses-only option and has tracks in *Mass Gatherings (Hajj and Umrah), Biostatistics & Epidemiology and Health Policy & Management*. The Masters of Nanoscience and Nanotechnology (MNT) is a thesis option program. The Master of Engineering & Systems Management (MEM) (Thesis & Courses) has three tracks *Decision Analysis & Data Analysis, Manufacturing & Supply Chain Management*, and *Development of Cyber-Physical Systems.*

Almost 400 students have so far graduated from the Master's Programs at Alfaisal University over the past 5 years (Table 13). Graduate enrolment has fluctuated between 150-200 students per year. A proposal was submitted to the University for Internal Graduate Scholarships that would partially offset tuition fees. Graduate students with such a scholarship would work part time as a Teaching or Research Assistant.

Table 12. Current Graduate Programs

Current
Master of Biomedical Sciences (MBS) (Thesis) o *Analytical Biochemistry* o *Biotechnology* o *Clinical Embryology & Reprod Biology (SCFHS certified)* o *Infection Control (SCFHS certified)* o *Molecular & Cell Biology (SCFHS certified)*
Master of Business Administration (MBA) (Courses) o *General* o *Finance* o *Healthcare Management (submitted to SCFHS)*
Master of Engineering & Systems Management (MEM) (Thesis & Courses) o *Decision Analysis & Data Analysis* o *Manufacturing & Supply Chain Management* o *Development of Cyber-Physical Systems*
Master of Genetic Counselling (MGC) (Courses) o Certified by Saudi Com for Health Specialties *(SCFHS)*
Master of Nanoscience & Nanotech (MNT) (Thesis) o *Nanomaterials for Energy & Environmental Applic* o *Nanomedicine & Nanodiagnostics*
Master of Public Health (MPH) (Thesis & Courses) *(SCFHS certified)* o *Mass Gatherings (Hajj and Umrah)* o *Biostatistics & Epidemiology* o *Health Policy & Management.*
Master of Radiological & Imaging Sci (MRS) (Courses) o *Radiological & Imaging Sci (SCHS certified)* o *Ultrasound (SCFHS certified))*

Table 13. Number of Enrolled & Graduated Students from 2013 to 2018

Current Masters Programs	Number of Enrolled & Graduated Students										
	2013-14		2014-15		2015-16		2016-17		2017-18		Total
	Enr	Grad	Enr	Grad	Enr	Grad	Enr	Grad	Enr	Grad	Grad
Biomed Sci (MBS)	13	2	6	4	13	8	12	12	5	2	**28**
Bus Admin (MBA)	169	88	142	55	169	88	68	21	61	-	**252**
Eng & Syst Mgmnt (MEM)		-	-	-		-	13	-	9	-	**-**
Gen Counselling (MGC)	-	-	-	-	-	-	8	4	9	-	**4**
Nanosci & Nanotech (MNT)	-	-	-	-	-	-	8	5	8	-	**5**
Public Health (MPH)	-	-	-	-	-	-	5	-	-	-	**-**
Rad & Imag Sci (MRIS)	32	-	-	30	32	30	12	30	-	-	**90**
Total/Yr	**214**	**90**	**148**	**89**	**214**	**126**	**126**	**72**	**92**	**2**	**379**
Cum Total Graduated	**-**	**90**	**-**	**179**	**-**	**305**	**-**	**377**	**-**	**-**	**379**