DOSSIER

of

Luai M. Al-Hadhrami
Associate Professor

Mechanical Engineering Department
King Fahd University of Petroleum and Minerals (KFUPM)
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1.0 SUMMARY OF EXPERIENCE RECORD

1.1. Personal Information

Name: **Luai M. Al-Hadhrami**
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860-2888 (O) 860-5682 (H)
E-mail: luaimalh@kfupm.edu.sa
Date of Birth: April 15, 1970
Current Position: **Associate Professor, ME Dept., KFUPM.**

1.2. University Education

- ***Ph.D. Mechanical Engineering***, *Texas A & M University, College Station, Texas, USA (May 2002).*
  Dissertation Title: "Rotating Heat Transfer in Turbine Rotor Blade Cooling Channels with Turbulence Promoters," May 2002.

- **M.S. Mechanical Engineering**, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia (June 1997).
  Thesis Title:"Analysis and Turbulent Properties in the Near Field of an Isothermal Free Jet".

- **B.S. Mechanical Engineering**, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia (1994).

1.3 Specialization

Mechanical Engineering, Thermo fluid, Fouling, Wind/Solar Energy, Heat Transfer and Thermodynamics, Multiphase flow and Energy Conservation.

1.4. Professional Employment History

2005 to present	Director, Center for Engineering Research, Research Institute, King Fahd University of Petroleum & Minerals
	Associate Professor in Mechanical Engineering Department, King Fahd University of Petroleum & Minerals
2002 to 2005	Assistant Professor in Mechanical Engineering Department, King Fahd University of Petroleum & Minerals
2008 to 2011	Director, Center of Research Excellence in Corrosion, Research Institute, King Fahd University of Petroleum & Minerals.

1.5. Consultation

- **2003** Consultant – "Consulting Service Department", Saudi Aramco, 1 Jul 2003 to 27 Aug 2003.

- **2004** Consultant – "Consulting Service Department", Saudi Aramco, 12 Jun 2004 to 18 Aug 2004.
- **2005** Consultant – "Consulting Service Department", Saudi Aramco, 18 Jun 2005 to 17 Aug 2005.
- **2007** Visiting Researcher, "Summer Assignment", School of Engineering Cranfield University, United Kingdom, 28 Jun 2007 to 31 Aug 2007.
- **2008** Visiting Researcher, "Summer Assignment", School of Engineering Cranfield University, United Kingdom, 29 Jun 2008 to 1 Aug 2008.
- **2009** Consultant – Research and Development Center", Saudi Aramco, Jan 2009 to Aug 2009.

1.6. IT Expertise

- Working Knowledge of Computational Fluid Dynamic and Heat Transfer Soft ware including: Fluent, NYSD, Wind-farmer, Homer, RetscreenandGrapher

1.7. Awards and Scholarships

- **Best Research Project Team Award:** Project # CER2371 "Improving the Load Curve in Saudi Arabia by Building Pumped Storage Power Plant" received the best research project for 2014 award from KFUPM.

- **Energy Engineer Award**: Received the Dubai Quality Group Energy Engineer Award for the year 2007 from HH Shaikh Mohamed bin Rashid Al-Maktoum, Vice President of UAE and Prime Minister and Ruler of Dubai, in a ceremony held in Dubai on September 5, 2007, for the contributions in promoting the principles in energy conservation and management.

- **Project Award for Wind Energy Research:** Project on wind energy for remote villages received the Best Energy Project Award from the Emirates Energy Awards Committee for the year 2007. I received the award on behalf of the University from H.H. Sheikh Mohammed bin Rashid Al-Maktoum, Vice President of UAE and Prime Minister and Ruler of Dubai in a Ceremony held in Dubai on September 5, 2007.

1.8. Professional Membership

- Member of American Society of Mechanical Engineers (ASME)
- Member of Society of Saudi Mechanical Engineers (SSME)

1.9. Publications

i. Journal Papers:

More than 58 journal papers were published/accepted in refereed international Journals (See Section 3.2.1for details)

ii. *ConferencePapers*:

More than 16 conference papers were published/accepted in refereed international conference proceedings(See Section 3.2.2for details)

iii. Technical Reports

Actively contributed to the preparation of more than 12 Technical Reports

1.10. Other Professional Activities

Thesis supervision:

- Served as co-advisor for 10MS students and One Ph.D. student at King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia.
- Served as a committee member and external examiner for more than 1Ph.D. student at King Fahd University of Petroleum & Minerals, Dhahran.

Professional Workshop and Training:

- Participated in several professional workshops related to teaching and research *(*See details in Section 4.4*)*

2.0 TEACHING

2.1. Courses Taught

Undergraduate Courses

Course Title	*Course Number*
Thermodynamics-I	ME 203
Thermodynamics-II	ME 204
Manufacturing Processes-I	ME 206
Materials Science and Engineering	ME 215
Fluid Mechanics	ME 311
Manufacturing Technology	ME 322
Introduction to Heat Transfer	ME 315
Senior Projects I	ME 411
Senior Projects II	ME 412

Graduate Courses

Course Title	*Course Number*
Advanced Convection Heat Transfer	ME 536

2.1.1. Student Evaluation

Student evaluation of the courses taught by me is listed below:

King Fahd University of Petroleum and Minerals

Deanship of Academic Development

Instructor Evaluation Summary Report

Refreshed Time: 24/08/2014 05:43:27 AM

Instructor's Name:	Luai Muhammad Al-Hadhrami	Department:	Mechanical Engineering
Instructor's Name:	Luai Muhammad Al-Hadhrami	Department:	Systems Engineering

Term Code	Course	Course Title	Section No	Activity Type	Total Students	Total Evaluations	Total Valid Evaluations	Overall Average	Instructor Average	Department Average		University Average	
										UG	Graduate	UG	Graduate
201320	ME-536	Convection Heat Transfer	01	LEC	12	8	4	7.98	7.98	8.47	8.81	8.57	9.06
201210	ME-311	Fluid Mechanics	06	LEC	15	11	7	7.72	7.72	8.52	9.14	8.54	8.95
201110	ME-315	Heat Transfer	02	LEC	17	11	9	7.93	7.93	8.48	8.35	8.43	8.91
201010	ME-315	Heat Transfer	01	LEC	26	25	21	7.42	7.42	8.36	8.61	8.40	8.93
200910	ME-536	Convection Heat Transfer	01	LEC	4	4	4	6.88	6.88	8.55	8.56	8.36	9.12
200810	ME-204	Thermodynamics II	01	LEC	9	8	8	7.93	7.93	8.29	9.14	8.37	9.00
200710	ME-311	Fluid Mechanics	02	LEC	26	24	23	6.56	6.56	8.39	8.45	8.38	8.95
200610	ME-536	Convection Heat Transfer	01	LEC	8	5	4	7.28	7.28	8.39	8.45	8.30	8.85
200510	ME-315	Heat Transfer	04	LEC	13	10	10	8.43	8.43	8.64	9.10	8.29	9.12
200420	ME-203	Thermodynamics I	02	LEC	9	8	8	8.00	7.64	8.63	9.08	8.40	9.08
	ME-315	Heat Transfer	04	LEC	15	14	12	7.28					
200410	ME-206	Manufacturing Processes I	04	LEC	21	21	12	6.37	6.99	8.60	9.07	8.33	9.10
	ME-315	Heat Transfer	01	LEC	14	12	9	6.42					
	SE-322	Manufacturing Technology	04	LEC	9	8	6	8.17					
200320	ME-206	Manufacturing Processes I	58	LAB	7	10	9	6.52	6.52	8.58	9.29	8.44	9.25
200310	ME-206	Manufacturing Processes I	03	LEC	15	15	12	7.66	7.66	8.62	8.75	8.41	9.24

2.2. Laboratories/ResearchCapability Development

As the Director of Center for Engineering Research (CER) at the Research Institute, I am responsible for the overall development of laboratories in the Center. Details of my contribution to development of laboratories in CER is described below:

2.2.1 Measurement Standards Laboratory (MSL).

- Established contacts with prospective clients by making presentations demonstrating MSL capabilities and the innovative methods used to serve their needs in relevant areas. These efforts has resulted in:

- Increased number of clients from 155 in 2009 to 215 in 2013 with an attendant increase in income from SR 1.72 million to SR 3.59 million per year. This amounted to 109% increase in client-funded from SR 1.72 million in 2009 to SR 3.59 million in 2013.

- Implemented the standards adopted by world renowned laboratories to deliver the most accurate results to our clients, which has led to MSL receiving the ISO/IEC-17025 accreditation from the prestigious International Standards Organization (ISO).

- Introduced Consultancy and Customized Training as a new line of business in MSL.

- Expanded the scope of MSL services by commissioning state-of-the-art Radiation Calibration System from PTW, Germany after satisfying the stringent regulations of KACST, SASO and King Abdullah City for Atomic & Renewable Energy (KACARE).

- Provided increased level of support in the area of calibration to KFUPM academic departments and various centers of the Research Institute as well as coop and summer training for undergraduate students.

- Increased community outreach and dissemination of metrologyknowledge by organizing seminars and workshops.

2.2.2 Building Materials Research Group

- Contributed to the marketing activities of the Group.
- Provided assistance to members of the Group in preparing proposals and technical memoranda.
- Developed plans for future growth by identifying the specific needs for manpower and equipment.
- Participated in project review meetings and provide solutions to the problems faced by the project teams.
- Reviewed progress and final reports of the projects.

2.2.3 Materials Characterization Laboratory (MCL)

● Initiated complete revamp and upgrade of the MCL by acquiring state-of-the-art equipment and securing the needed manpower resulting in higher revenue due to increased lab services as well as improved research outcomes.

2.2.4 Wind Energy Studies

● Participated in wind resources assessment studies.

● Designing the wind farms for grid connected applications and wind-diesel hybrid power systems for isolated grids.

●Performance evaluation of small wind turbines for off-grid applications in Saudi Arabia

Kingdom of Saudi Arabia is looking towards diversification of its energy mix supply on the national grid. Under new scenario, renewable sources of energy such as wind, solar photovoltaic, solar thermal, geothermal, biomass, etc. are expected to contribute to the future of energy mix program. Of these renewable and clean sources of energy solar and wind will contribute on a major scale. Hence, in the light of government's point of view on energy mix policy, exploitation and understanding these natural resources of energy and wind in particular has become strategically important to both the government and the scientists and engineers. Keeping in view all of the above, I have been involved on wind resources assessment using 40 m tall wind masts, designing the wind farms for grid connected applications and wind-diesel hybrid power systems for isolated grids. Studies on various aspects of wind power and wind speed characteristics like wind turbulence; wind power density; wind shear exponent; hub height optimization; wind turbine selection; variation of wind speed on annual, monthly, and hourly basis; energy yield and power plant capacity estimation; etc. have been conducted for various locations in the Kingdom.

2.2.5 High Voltage Laboratories

- Organizing and chairing the first workshop on establishing the testing laboratory in 2007. This workshop was the initiator of general interest in the project.
- Establishing the first Founding Committee, in cooperation with concerned personnel from major entities, to work toward establishing the Laboratory.
- Chairing the Founding Committee after its establishment till 2013.
- Chairing the new Committee of "Founding Counsel" for the Laboratory since 2013. This Committee was formed from members of funding entities for the laboratory.
- Active member of the project "**Feasibility Study to establish the GCC Electrical Equipment Testing Laboratory",** CER2337**,** which was conducted in cooperation with KEMA, The Netherlands, in 2010. This study was the technical and economic basis for the project.
- Very instrumental in organizing two additional workshops at KFUPM to increase awareness about the laboratory.

- Conducted working visits to international laboratories in Italy, The Netherlands, and Germany to form cooperation arrangement with international laboratories for the GCC Laboratory.
- Conducted many meetings with funding Saudi governmental organizations, such as PIF, SAGIA, SIDF, to participate in the project.

2.2.6 Multiphase Flow Facility

I designed andsupervised the construction of the followingthree multiphase flow loops at KFUPM. These were the first of their kind in the University.

- 316 Stainless Steel Multiphase Flow Loop
- Plexiglas Multiphase flow Loop
- Swing Arm Multiphase flow Loop

316 Stainless Steel Multiphase Flow Loop

- 4" diameter 316 stainless steel pipes, which allows conducting the following experiments:
  - Determine the resistance of different metals/alloys and their weldments to erosion/corrosion in different multiphase flow conditions.
  - Monitor the multiphase flow during the experiments through transparent pipeline sections

Plexiglas Multiphase Flow Loop

- 2" diameter Plexiglas pipes, which allow visualizing the multiphase flow of water/oil/air.
- Monitoring the multiphase flow during the experiment through the transparent pipelines.
- Can study the multiphase flow, which exists in oil and gas industry.
- Can study the separation process of three phase flow of water/oil/gas.

Swing Arm Multiphase flow loop

- 6.3" diameter carbon steel and 6.8" long adjustable inclined angle for 0-90degrees.
- Handle up to 13,000 barrel per day of multiphase flow (Oil/water/gas).
- Simulate the borehole conditions inan oil well.

2.2.7 Electrical Energy Systems group

- Participated in the project, "Improving the Load Curve in Saudi Arabia in Building a Pumped Storage Plant".
- Participated in the project, "Long-Term Electrification Plan of Saudi Arabia".
- Participated in the study entitled, "Load Research Data Study for Saudi Arabia".
- Contributed to the marketing activities of the Group.
- Discussed possible research topics with the Group members and assist them in the preparation of technical memoranda and proposals.

- Participated in project review meetings and provide solutions to the problems faced by the project teams.
- Planned the future growth of the group in terms of the required manpower and laboratory facilities and equipment.
- Provides administrative support in terms of buying equipment and supplies for the smooth functioning of the projects.
- Reviewed progress and final reports of the projects.
- Participated in the preparation of technical papers.

2.3. Supervising Senior Projects, Co-operative training and Summer TrainingPrograms

2.3.1. Senior Projects

- I have supervised over 28 senior design project students at KFUPM through ME411, ME412 and ME415. ME-411 is related to Senior Design Project I (Credit hours: 1). This course integrates various components of the curriculum in a comprehensive engineering experience so that basic sciences, mathematics and engineering sciences, which a student has learned in his freshmen-to-senior years of study, can be applied. It involves design of a complete project, including establishment of objectives and criteria, formation of the problem statements, preparation of specifications, considerations of alternative solutions, feasibility considerations and detailed engineering designs.

2.3.2. Summer Training

- Supervised the training of 57 students in the Center for Engineering Research from 2009-2014.

2.3.3. Co-operative Training

- Advised 21 students for their co-operative training. ME-351 is Applied Mechanical Engineering Cooperative Work (Credit hours 9). Students are supervised over a period of 28 weeks of industrial employment (in industries or firms) for Applied Mechanical Engineering work. Subsequently, they are evaluated for their performance on the job and are required to submit a formal report on their experience.

2.4. Supervision of M.S. thesis/Ph.D. dissertation

2.4.1 Main Advisor (Committee Chair)

I have served as a Main advisor, Co-advisor and Member in the examining committee for several M.S./Ph.D. students in KFUPM. The following sections summarize the supervision activities.

- **M.S. Thesis Advising**

1. Okunrinjeje, Lukman Tunde, "Characterization of Gas-Oil-Water in a Horizontal Pipeline, 2012.

2. Muhammad Nauman Zafar, "H_2S and CO_2 Corrosion of SA-543 and X65 Steels in Oil/Water Emulsion", 2014.

3. Muhammad Mudassar Imam, "Characterization of Two Phase Flow in A Horizontal and Inclined 4-Inch Pipe", 2014.

4. Mohammed Khaleel Ahmed, "Effect of outflow Orientation and Multiple Jets Orifice Plate Configurations on Heat Transfer in a Rectangular Duct", 2005.

5. Abdullah Al-Mesfer, "Effect of Fluid Hydrodynamics on Calcium Sulfate $CaSO_4$ Deposition on Aluminium Metal Surface", 2007.

6. Ali Al-Mubarak, "Experimental Heat Transfer on Inclined Surface with Array of Jet Impingement", 2007.

7. Abdullah Al-Qahtani, "Design and Operation of a Fouling Monitoring Device to Study Fouling Twisted Tubes", 2008.

8. Dhawi, A. Al-Otaibi, "Effect of Fluid Hydrodynamics on Calcium Sulfate $CaSO_4$ Deposition on Titanium and Coated Steel Surface", 2008.

2.4.2 Co-Advisor (Co-Chairman)

1. Ayman Wajeeh Mukhaimer, "Characterization of Water Flow in Horizontal Pipes", 2012.

2.4.3 Committee Member

1. Mustafa Slamah M. AlSwaiti, "Coordinated Trading of Energy Resources and Pumped Storage Systems in Electricity Markets", 2014.

Ph.D. Advising (Committee Member)

2. Azhar Mehmood Memon, "Hierarchial approach for co-design of aperiodically triggered networked control systems over IEEE 802.15.4 wireless networks".

3.0 Research Activities

3.1. Research Interests

i. Power Systems: Heat Exchanger, Gas Turbine, Renewable Energy (Solar, Wind)
ii. Failure Analysis Studies.
iii. Multiphase Flow

iv. Experimental Fluid dynamics
v. Heat Transfer and Thermodynamics

3.2. Research Projects

3.2.1. Completed Research Projects

i. Engr. Arif Abdul Majeed and Luai M. Al-Hadhrami "Improving the Load Curve in Saudi Arabia by Building Pumped Storage Power Plant" Project # CER2371 . Duration Apr 2012 to Apr 2014 for Ministry of Water & Electricity, Riyadh, KSA.

The load profile of the Saudi electrical power system is characterized by high load during the day and low load during the night time, this is more prominent during the summer months when the demand is high. To reduce this peak during the day or flatten the load and save on the thermal power plant a large amount of storage is required. Moreover, Saudi Arabia is embarking on the massive renewable energy program to diversify the generation mix. In order to attain the full potential of renewable energy there is a requirement of a large storage system.

The hydroelectric pumped storage plant (PSP) can provide a large storage for improving the electrical load curve or for the storage of the renewable energy. To meet this objectives a feasibly was conducted. Initially a survey of international practice was conducted to identify the type of system that would be utilized. The study then defined the amount of storage required for the Kingdoms electrical power system. Then a topographic scan of the Kingdom's west coast was conducted in order to find a suitable location for building sea water PSP at a height of about 800 – 1000 meters. About 27 sites were identified out of which 10 were found suitable the best site near the town of Magna in the Gulf of Aqaba region was selected as a potential site to build a PSP.

Similarly, seven existing dams in the south of Saudi Arabia were accessed for converting it into fresh water PSP. The study result indicates that the Wadi Baysh Dam near the city of Jizan can be a suitable candidate for the redevelopment of the dam to a PSP. Hydro plant design and economic analysis were also conducted. The analysis indicated that both the salt and fresh water schemes are economically viable.

ii. **Luai M. Al-Hadhrami** (Principal Investigator) and Dr. Shafiqur Rehman "Feasibility study of Using Small Wind Turbines for Small Grid Load in Saudi Arabia. A Case Study". Project # FT121005.

The study evaluated the energy output and plant capacity factor (PCF) of small wind turbines in the category of 1-3 kW, 5-10 kW and 50-80 kW rates powers. To achieve the set objectives, hourly average wind speed data measured at 10, 20, 30 and 40 m and wind direction at 30 and 40 m above ground level during July 01, 2006 Horizontal turbines HAWT-1, HAWT-2 and HAWT-6; and vertical axis wind turbines VAWT-1, VAWT-2 and VAWT-4 are recommended for various ranges of load. In general, all the turbines showed a maximum increase in energy yield for an increase of 10 m in hub height from20 to 30m and the annual mean energy yield usually followed the load pattern in the study area. Lastly the mean turbulence intensity was always less than the value recommended IEC64100-1 standard.

iii. Shafiqur Rehman and **Luai M. Al-Hadhrami**, Huseiyn Saricimen, Shamshuddin Khan, Aftab Ahmad "Development of a Web-Based National Corrosion Inventory System (NCIS), AT 97-29, KACST, Riyadh, (11^{th} Aug 2010 – 31^{st} July 2012)

The study aims to discuss these issues. Design/methodology/approach – The proposed system is designed to be divided into five major sectors namely, utilities, transportation, infrastructure, government, and production and manufacturing. The present work developed a national web-based corrosion cost inventory system for the Kingdom of Saudi Arabia which can be used by any nation with little bit of customization. Each of these major sectors is having further sub-sectors and then blown down to the industry and specific identity. The web-based application is developed using Dotnet on SQL server. The corrosion cost estimation procedures and corrosion rates in different sectors and sub-sectors have been adapted from the literature. Findings – The proposed developed system will enable end-users to provide corrosion and cost-related data through web-based online system. The input information from end-users will be authenticated by a corrosion auditor before finally entering into the database tables.

iv. Rihan Omar Rihan, **Luai M. Al-Hadhrami** "Construction of Sophisticated Flow Loop for Studying the Erosion-Corrosion of Emulsion Flow in Petroleum Pipelines". Project # **Project No: DRP-3-14 (14 - 3 ط م).**

A sophisticated novel emulsion flow loop to test the resistance of engineering materials, used in the construction of petroleum and petrochemicals equipment, to erosion-corrosion of emulsions flow and carbon dioxide (CO_2) and hydrogen sulfide (H_2S) corrosion has been designed and constructed at King Fahd University of Petroleum and Minerals (KFUPM). The construction material of the flow loop is Hastelloy C-276 since this material has high corrosion resistance to most corrosive environments especially H_2S. The operating temperature and pressure should not exceed 180^oC and 20 bar respectively. The piping of the loop is 1" nominal diameter Hastelloy C-276 pipe. The emulsion flow loop has many advantages such as; the ability to determine the resistance of different metals/alloys and their weldments to erosion-corrosion and CO_2/H_2S corrosion in different flow conditions, testing the effect of pipe diameter on the corrosion rate, allows researchers to reproduce the erosion-corrosion problem of emulsion flow in a laboratory setting and to research for an alternative operating conditions which can lead to eliminate or reduce the corrosion rate.

Based on the experimental data, SA-543 steel proved to be a promising material to be operated in H_2S and CO_2 environment and can be used for fabricating oil and gas pipelines sine it has better corrosion resistance and strength than X65 steel.

v. **Luai M. Al-Hadhrami** "Design and Operate a Fouling Monitoring Device to study in Twisted Tubes". Type of Project- SABIC, Project # SB060023.

vi. Luai M. Al-Hadhrami "Study the flow induced Vibration due to 60-Branch to Header Connection to Piping System", Type of Project-SABIC, Project # SB060024.

vii. Luai M. Al-Hadhrami "Oil water flow in a horizontal pipe", DSR Project # IN090017.

3.2.2. Research Projects in Progress

i. **Luai M. Al-Hadhrami** (Project Manager) "Development of a Downhole Multiphase Flow Metering System". Project No. CER2386 Consultant-Saudi Aramco. Start Date 01 Dec 2012.

ii. Al-Sarkhi, **Luai M. Al-Hadhrami,** "Influence of Drag Reducing Polymers on Pressure Drop and Flow Patterns in Oil-Water-Gas Multiphase Flow", KACST Project.

iii. **Luai M. Al-Hadhrami** (Principal Investigator), Dr. P. Gandhidasan, Dr. Shafiqur Rehman, Mr. Aftab Ahmad, Mr. Syed M. Shaahid "Development of a Solar Thermal Based Air-Conditioning System". Project # 10-ENE1372-04, NSTIP Project.

iv. **Luai M.Al-Hadhrami**(Principal Investigator). "Experimental and Analytical Investigation of Flow Accelerated Corrosion under Multi-phase". Project # IN090038, DSR Project.

v. Hani M. Tawancy and **Luai M. Al-Hadhrami** "Development of a Novel Two-Layer Bond Coat for their Barrier Coating System used in Gas Turbine Blade Applications". Project # 12-ADV2398-04. Start Date 2013, NSTIP Project.

3.3. Publications

3.3.1. Refereed Journals

3.3.1.1 Refereed Journal papers (Outcome of Ph.D. research)

J1. Griffith, T.S., **Al-Hadhrami, L.,** Han, J.-C. "Heat transfer in rotating rectangular cooling channels (AR=4) with angled ribs". **Journal of Heat Transfer**, Volume 124, Issue 4, Pages 617-625, (2002).

J2. **Al-Hadhrami, L.,** Griffith, T., Han, J.-C. "Effect of rotation on heat transfer in two-pass square channels with five different orientations of 45^0 angled rib turbulators". **International Journal of Heat and Mass Transfer**, Volume 46, Issue 4, February 2003, Pages 653-669, (2003).

J3. **Al-Hadhrami, L.,** Griffith, T., Han, J.-C. "Heat transfer in two-pass rotating rectangular channels (AR=2) with five different orientations of 45 deg v-shaped rib turbulators". **Journal of Heat Transfer**, Volume 125, Issue 2, April 2003, Pages 232-242 (2003).

J4. Griffith, T.S., **Al-Hadhrami, L.,** Han, J.-C. "Heat transfer in rotating rectangular cooling channels (AR=4) with dimples". **Journal of Turbomachinery**, Volume 125, Issue 3, July 2003, Pages 555-563 (2003).

3.3.1.2 Refereed Journal papers (Considered for promotion to the rank of Associate Professor)

J5. Ben-Mansour, R. and **Al-Hadhrami, L.M**., "Effect of Reynolds number and property variation on fluid flow and heat transfer in the entrance region of a turbine blade inter-cooling channel" International Journal of Rotating Machinery, 36-44 (2005).

J6. Tawancy, H.M. and **Al-Hadhrami, L.M**., "Application of microstructural characterization and computational modeling in damage analysis of a turbine blade exposed to service conditions in a power plant", Engineering Failure Analysis Journal, 15, 1027-1034 (2008).

J7. Tawancy, H.M., **Al-Hadhrami, L.M.** "Degradation of turbine blades and vanes by overheating in a power station". **Engineering Failure Analysis**, 16, 810-815, 2009.

J8. Tawancy, H.M., **Al-Hadhrami, L.M**. "Failure analysis of a welded outlet manifold pipe in aprimary steam reformer by improper selection of materials". **Engineering Failure analysis**, 16, 810-815 (2009).

J9. Tawancy, H.M. and **Al-Hadhrami, L.M.** "Failure of refurbished turbine blades in a power overheating in a power station", Engineering Failure analysis Journal, 16, 810-815 (2009).

J10. **Al-Hadhrami, L.M.**, Ahmad, A. "Assessment of thermal performance of different types of masonry bricks used in Saudi Arabia". **Applied Thermal Engineering**, 29, 1123-1130, 2009.

3.3.1.2 Refereed Journal Papers published (Published after promotion to the rank of Associate Professor)

J11. Quddus, A., **Al-Hadhrami, L.M.** "Hydrodynamically deposited $CaCO_3$ and $CaSO_4$ scales". **Desalination**, Volume 246, Issue 1-3, 30 September 2009, Pages 526-533.

J12. Basha, M., **Al-Hadhrami, L.M.** "Numerical fluid flow and heat transfer Prediction of rotating tapered channel". **Journal of Enhanced Heat Transfer**, Volume 16, Issue 4, 2009, Pages 351-366.

J13. Ahmad, A., **Al-Hadhrami, L.M.** "Thermal performance and economic assessment of masonry bricks". **Thermal Science**, Volume 13, Issue 4, 2009, Pages 221-232.

J14. Rehman, S., Ahmad, A., El-Amin, I. **Al-Hadhrami, L.M.,** "Assessment of wind power, wind exponent, local air density and air turbulence intensity for an isolated site". **International Journal of Sustainable Energy**, Volume 28, Issue 4, 2009, Pages 217-230.

J15. Tawancy, H.M., **Al-Hadhrami**, L.M. “Role of platinum in thermal barrier coatings used in gas turbine blade applications” (2010). **Journal of Engineering for Gas Turbines and Power**, 132 (2), art. no. 022103.

J16. **Al-Hadhrami, L.M.**“Studyof heat transfer distribution in a channel with inclined target surface cooled by a single array of staggered impinging jets”, (2010). **Heat Transfer Engineering,** Volume 31, Issue 3, March 2010, Pages 234-242.

J17. **Al-Hadhrami**, L.M., Ahmad, A., Al-Qahtani, A. “Performance analysis of heat exchangers of an existing naphtha hydrotreating plant: A case study” (2010).**Applied Thermal Engineering**, 30 (8-9), pp. 1029-1033

J18. Rehman, S., Ahmad, A., **Al-Hadhrami**, L.M. “Detailed analysis of a 550-MW installed capacity wind farm in Saudi Arabia” (2010) **International Journal of Green Energy**, 7 (4), pp. 410-421.

J19. **Al-Hadhrami**, L.M., Quddus, A. “Role of solution hydrodynamics on the deposition of CaSo4 scale on copper substrate” (2010) **Desalination and Water Treatment**, 21 (1-3), pp. 238-246.

J20. Shaahid, S.M., El-Amin, I., Rehman, S., Al-Shehri, A., Ahmad, F., Bakashwain, J., **Al-Hadhrami**, L.M. “Techno-economic potential of retrofitting diesel power systems with hybrid wind-photovoltaic-diesel systems for off-grid electrification of remote villages of Saudi Arabia” (2010).**International Journal of Green Energy**, 7 (6), pp. 632-646.

J21. Rehman, S., **Al-Hadhrami**, L.M. “Study of a solar PV-diesel-battery hybrid power system for a remotely located population near Rafha, Saudi Arabia” (2010).**Energy**, 35 (12), pp. 4986-4995.

J22. Ul-Hamid, A., Quddus, A., Al-Yousef, F.K., Mohammed, A.I., Saricimen, H., **Al-Hadhrami**, L.M. “Microstructure and surface mechanical properties of electrodeposited Ni coating on Al 2014 alloy” (2010).**Surface and Coatings Technology**, 205 (7), pp. 2023-2030.

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3.3.2. Refereed International Conferences

3.3.2.1 Refereed Conference paper (Considered for promotion to the rank of Associate Professor)

C1. **Al-Hadhrami, L.M.,** Griffih, T.S., Han, J.C. "Heat transfer in two-pass rotating rectangular channels (AR=2) with parallel and crossed 45^0 v-shaped rib turbulators". 40^{th} AIAA Aerospace Sciences Meeting and Exhibit,2002

C2. Griffith, T.S., **Al-Hadhrami, L**., Han, J.-C. "Heat Transfer in rotating rectangular cooling channels (AR=4) with dimples". American Society of Mechanical Engineers, International Gas Turbine Institute, Turbo Expo IGTI, 2002

C3. **Al-Hadhrami, L.M.,** "Effect of feed channel width on Heat Transfer in a Rectangular duct with an array of Off-set Jets" ASME 51^{st} Turbo Expo; Barcelona, Spain; 6 May 2006.

C4. 2nd International Conference on Thermal Engineering Theory and Applications held in Al-Ain, UAE from Jan. 3-6, 2006

C5. ASME Turbo Expo 2006 Power for Land, Sea, and Air, May 8-11, 2006, Barelona, Spain

C6. **Al-Hadhrami, L.M**., Shaahid, S.M., Al-Mubarak, A.A. "Heat Transfer in a channel with inclined target surface cooled by Single Array of Impinging Jets". ASME Turbo Expo; Montreal, Que.; Canada, Volume 4 PART A, Pages 35-42,2007.

C7. Tawancy, H.M., **Al-Hadhrami, L.M**. "Applications of Microstructural Characterization and computational Modeling in Damage Analysis of a Turbine Blade Exposed to service conditions in a Power Plant", ASME Turbo Expo; Montreal Que; Canada; Volume 5, Pages 1-6, 2007.

C8. Al-Mubarak, A.A., Shaahid, S.M., **Al-Hadhrami, L.M.** "Effect of Orifice Jet Configuration on Heat Transfer in a Channel with inclined target surface cooled by Single Array of Impinging Jets with Outflow in Both Directions" Proceedings of the ASME Micro/Nanoscale Heat Transfer International Conference, Volume Part B, Pages 825-834, 2008.

3.3.2.2 Refereed conference papers published "(Published after promotion to the rank of Associate Professor

C9. Basha, M., **Al-Hadhrami, L.M.** "Fluid Flow and Heat Transfer Prediction of a Rotating Tapered inclined Channel" ASME International Mechanical Engineering Congress and Exposition, Proceedings, Volume 10, Issue Part B, Pages 1085-1092, 2009.

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C15. Rehman, S., **Al-Hadhrami**, L.M., Ahmad, A., Khan, S., Saricimen, H., Khan, A.U.H. "Development of a web-based corrosion cost inventory system for Saudi Arabia" (2012).**NACE - International Corrosion Conference Series**, 1, 10-20.

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3.3.2.3 Patents (After promotion to the rank of Associate Professor)

1. **Luai M. Al-Hadhrami** (2013). "Shell and Tube Heat Exchanger", US Patent No. 8365812 B2. **Issued**, 5 Feb 2013.

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3. **Luai M. Al-Hadhrami**, Shafiqur Rehman and Aftab Ahmad (2012). "Mult-phase flow metering system", Serial No. 13/544671, Status **Issued 2014.**

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7. Aftab Ahmad and **Luai M. Al-Hadhrami** (2012). "System for Measuring Thermal Conductance, Serial No. 13/681327. Status Filed, Nov 2012.

3.4. List of selected seven publications (With contribution)

1. Al-Hadhrami, L.M. (2014). "Performance evaluation of small wind turbines for off-grid applications in Saudi Arabia". **Energy Conversion and Management**, Volume 81, May 2014, Pages 19-29.

   This is a recent paper and a new contribution to the literature. Itexplains in detail the energy output and plant capacity factor (PCF) of small wind turbines in the category of 1-3 kW, 5-10 kW and 50-80 kW rates powers. Furthermore, the effect of hub height on energy output and the PCF has been studied to recommend suitable hub height for different types of applications and load requirements.

   Contribution: I was responsible for the project design, data collection and analysis and writing of the paper.

2. Al-Hadhrami, L.M. (2013). "Comprehensive review of cooling and heating degree days characteristics over Kingdom of Saudi Arabia". **Renewable and Sustainable Energy Reviews**, Volume 27, 2013, Pages 305-314.

   The annual and seasonal cooling (CDD) and heating (HDD) degree day values over Saudi Arabia were assessed by utilizing the long-term daily average temperatures from 38 meterological stations. The values of CDDs and HDDs have been calculated for a base temperature of 18.3°C. The maximum annual mean CDDs of 7549 were observed at Makkah while the minimum of 3132 at Abha.

   Contribution: I was responsible for the project design, data collection and analysis and writing of the paper.

3. Rehman, S., Al-Hadhrami, L.M., "Study of a Solar PV-diesel-battery hybrid power system for a remotely located population near Rafha, Saudi Arabia, 35 (12), pp.4986-4995, 2010.

This study presents a PV-diesel hybrid power system with a battery backup for a village being fed with diesel generated electricity to displace part of the diesel by solar. The hourly solar radiation data measured at the site along with PV modules mounted on fixed foundations, four generators of different rated powers, diesel prices of 0.2e1.2US$/l, different sizes of batteries and converters were used to find an optimal power system for the village. It was found that a PV array of 2000 kW and four generators of 1250, 750, 2250 and 250 kW; operating at a load factor of 70% required to run for 3317 h/yr, 4242 h/yr, 2820 h/yr and 3150 h/yr, respectively; to produce a mix of 17,640 MWh of electricity annually and 48.33 MWh per day.

Contribution: I was partly responsible for the project design, data collection and analysis and contributed to the writing of the paper.

4. Ahmad, A., **Al-Hadhrami, L.M.** "Thermal performance and economic assessment of masonry bricks". **Thermal Science**, Volume 13, Issue 4, 2009, Pages 221-232.

   The thermal performance and economic assessment of different types of clay and concrete masonry brick wall samples used in building construction was evaluated. Eighteen types of clay bricks and two types of concrete bricks were analyzed for thermal performance. The bricks were classified and grouped based on the brick configuration, material, and size. The analysis of the results shows that the equivalent thermal conductivity does not depend only on the brick material and configuration but also on the brick thickness. The bricks with similar configuration and size, the equivalent thermal conductivity variation was large depending on the type of material used, especially for concrete brick. In general, the brick with lesser thickness has lower conductivity as compared to those having higher thickness. However, the effect of brick length on equivalent thermal conductivity is insignificant. The economic analysis showed that the insulated clay brick type 16 is the most economical brick among the types of brick studied. Moreover, it is worthwhile to note that the net present value of normal concrete brick (type 19) is reduced by about 45% by making the concrete brick lightweight (type 20).

   Contribution: I was partly responsible for the project design, data collection and analysis and contributed to the writing of the paper.

5. Rehman, S., Al-Hadhrami, L.M. and Alam, M.M. (2015). Pumped hydro energy storage system: A technological review, **Renewable and Sustainable Energy Reviews**, pp. 586-598.

   A review of the existing capacity of global pumped hydro energy storage system (PHES), its technological development, and other hybrid systems (wind-hydro, solar pv-hydro, and wind-pv-hydro) was carried out with the aim of recommending the best possible options. It was found that PHES is the most suitable technology for small autonomous island grids and massive energy storage, where the energy efficiency of PHES varies in practice between 70% and 80% with some claiming up to 87%. Around the world,

PHES size mostly nestles in the range of 1000–1500 MW, being as large as 2000–3000 MW. On the other hand, photovoltaic based pumped storage systems have been used for very small scale (load of few houses) only.

Contribution: Literature review and paper preparation.

6. **Al-Hadhrami**, L.M., Quddus, A., Al-Otaibi, D.A. "Calcium sulfate scale deposition on coated carbon steel and titanium" (2013) **Desalination and Water Treatment**, 51 (13-15), pp. 2521-2528.

   An experimental study was undertaken using rotating cylinder electrode equipment to assess the performance of a polymer (SAKAPHEN Si57E) coating applied on carbon steel with regard to $CaSO_4$ scaling on coated steel and titanium metal. The scale was obtained at 60 °C, atmospheric pressure and at various rotational speeds ranging from 100 to 2,000 rpm on both the materials. It was noted that the growth of calcium sulfate scale on bare titanium metal increased significantly while it remained almost invariant on the coated carbon steel surface, with increasing rotational speeds. The anomalous behavior of coated steel samples was attributed to the competing effect between scale deposition and scale removal process due to the fluid flow and to the coating's antifouling characteristics, which resulted in less scale adhesion on coated steel compared to bare titanium metal surface. The field performance and economic appraisal of the selected coating were also evaluated.

   Contribution: I was responsible for the project design, data collection and analysis and preparation of the paper.

7. **Al-Hadhrami, L.M.**"Studyof heat transfer distribution in a channel with inclined target surface cooled by a single array of staggered impinging jets", (2010). **Heat Transfer Engineering,** Volume 31, Issue 3, March 2010, Pages 234-242.

   The heat transfer characteristics in a channel with a heated target surface inclined at an angle, cooled by a single array of staggered impinging jets was studied. The variables studied were three feed channel aspect ratios (5, 7, 9) and three exit outflow orientations (coincident with the entry flow, opposed to the entry flow, and both), and three Reynolds numbers (9400, 14,400, 18,800) on heat transfer. It was noted that increasing the Reynolds number increases the heat transfer on the inclined target surface. The outflow orientations affect significantly the local heat transfer characteristics, through influencing the jet flow together with the cross flow in the impingement channel. The outflow orientation coincident with the entry flow and the outflow from both sides show better averaged Nusselt number values compared to outflow orientation opposed to the entry flow. The inclined surface affects the local Nusselt number distribution especially for the outflow orientation opposing the entry flow at the narrow region of the impingement channel. In general, the feed channel aspect ratio does not affect the Nusselt number distribution, except for outflow coincident with the entry flow. The local Nusselt number for aspect ratio 9 has been found to be greater than the Nusselt number for aspect ratio 5

by 11%. Additionally, for a given jet-orifice plate with staggered holes, the heat transfer is almost the same throughout the target surface for the outflow exiting in both directions.

Contribution: I was responsible for the project design, conducting the experimental work, data collection and analysis and preparation of the paper.

3.5. Citations

The total number of citations for my publications are **490**; excluding self-citations; (http://www.scopus.com/cto2/main.url?stateKey=CTOF_563845761&authors=21741820000&origin=AuthorNamesList). **h-index: 10**. The overview of the citations as it appears on Scopus is shown in the table below. More details can be found in Appendix B.

Paper #	Document title	Authors	Total citations
J1	Heat transfer in rotating rectangular cooling channels (AR=4) with angled ribs	Griffith T.S., Al-Hadhrami L., Han J.-C.	37
J2	Effect of rotation on heat transfer in two-pass square channels with five different orientations of 45° angled rib turbulators	Al-Hadhrami L., Han J.-C	45
J3	Heat transfer in two-pass rotating rectangular channels (AR=2) with five different orientations of 45 deg v-shaped rib turbulators	Al-Hadhrami L., Griffith T., Han J.-C.	16
J4	Heat transfer in rotating rectangular cooling channels (AR = 4) with dimples	Griffith T.S., Al-Hadhrami L., Han J.-C.	59
J7	Degradation of turbine blades and vanes by overheating in a power station	Tawancy H.M., Al-Hadhrami L.M.	7
J10	Assessment of thermal performance of different types of masonry bricks used in Saudi Arabia	Al-Hadhrami L.M., Ahmad A.	17
J11	Hydro-dynamically deposited $CaCO_3$ and $CaSO_4$ scales	Quddus A., Al-Hadhrami L.M.	5
J13	Thermal performance and economic assessment of masonry bricks	Ahmad A., Al-Hadhrami L.M.	2
J14	Assessment of wind power, wind exponent, local air density and air turbulence intensity for an isolated site	Rehman S., Ahmad A., El-Amin I., Al-Hadhrami L.M.	4
J15	Role of platinum in thermal barrier coatings used in gas turbine blade applications	Tawancy H.M., Al-Hadhrami L.M.	1
J16	Study of heat transfer distribution in a channel with inclined target surface cooled by a single array of staggered impinging jets	Al-Hadhrami L.M.	2
J17	Performance analysis of heat exchangers of an existing naphtha hydrotreating plant: A case study	Al-Hadhrami L.M., Ahmad A., Al-Qahtani A.	2
J18	Detailed analysis of a 550-MW installed capacity wind farm in Saudi Arabia	Rehman S., Ahmad A., Al-Hadhrami L.M.	4

Paper #	Document title	Authors	Total citations
J19	Techno-economic potential of retrofitting diesel power systems with hybrid wind-photovoltaic-diesel systems for off-grid electrification of remote villages of Saudi Arabia	Shaahid S.M., El-Amin I., Rehman S., Al-Shehri A.Ahmad F., Bakashwain J., Al-Hadhrami L.M.	15
J20	Role of solution hydrodynamics on the deposition of $CaSO_4$ scale on copper substrate	Al-Hadhrami L.M., Quddus A.	3
J21	Study of a solar PV-diesel-battery hybrid power system for a remotely located population near Rafha, Saudi Arabia	Rehman S., Al-Hadhrami L.M.	53
J22	Microstructure and surface mechanical properties of electrodeposited Ni coating on Al 2014 alloy	Ul-Hamid A., Quddus A., Al-Yousef F.K., Mohammed A.I., Saricimen H., Al-Hadhrami L.M.	4
J23	Development and economic assessment of a grid connected 20 MW installed capacity wind farm	Rehman, S., Ahmad A., Al-Hadhrami L.M.	8
J24	Influence of titanium in nickel-base superalloys on the performance of thermal barrier coatings utilizing γ- γ′ platinum bond coats	Tawancy H.M., Al-Hadhrami L.M.	4
J25	Annual and seasonal trends of cooling, heating, and industrial degree-days in coastal regions of Saudi Arabia	Rehman S., Al-Hadhrami L.M., Khan S.	2
J26	Weibull parameters estimation using four different methods and most energy-carrying wind speed analysis	Bagiorgas H.S., Giouli M., Rehman S., Al-Hadhrami L.M.	6
J27	Microstructure and surface mechanical properties of pulse electrodeposited nickel	Ul-Hamid A., Dafalla H., Quddus A., Saricimen H., Al-Hadhrami L.M.	3
J28	Review of 600-2500 kW sized wind turbines and optimization of hub height for maximum wind energy yield realization	Alam M.M., Rehman S., Meyer J.P., Al-Hadhrami L.M.	9
J30	Comparative performance of a thermal barrier coating system utilizing platinum aluminide bond coat on alloys CMSX-4® and MAR M® 002DS1	Tawancy H.M., Al-Hadhrami L.M.	3
J31	Wind power potential assessment for seven buoys data collection stations in Aegean Sea using Weibull distribution function	Bagiorgas H.S., Mihalakakou G., Rehman S., Al-Hadhrami L.M.	4
J32	Feasibility study of a wind-pv-diesel hybrid power system for a village	Rehman S., Mahbub Alam M., Meyer J.P., Al-Hadhrami	29
J33	Electrochemical deposition of Ni on an Al-Cu alloy	Ul-Hamid A., Quddus A., Dafalla H., Saricimen H., Al-Hadhrami L.	1
J34	Impact of fuels on performance and efficiency of gas turbine power plants	Basha M., Shaahid S.M., Al-Hadhrami L.	1
J36	Offshore wind speed and wind power characteristics for ten locations in Aegean and Ionian Seas	Bagiorgas H.S., Mihalakakou G.,	1

Paper #	Document title	Authors	Total citations
		Rehman S., Al-Hadhrami L.M.	
J39	Experimental study of fouling resistance in twisted tube heat exchanger	Al-Hadhrami L.M., Ahmad, A., Al-Qahtani A.	1
J40	Wind speed characteristics and resource assessment using weibull parameters	Rehman S., Mahbub Alam A.M., Meyer J.P., Al-Hadhrami L.M.	3
J42	Analysis of corroded elbow section of carbon steel piping system of an oil-gas separator vessel	Tawancy H.M., Al-Hadhrami L.M., Al-Yousef F.K.	2
J43	Economic feasibility of development of wind power plants in coastal locations of Saudi Arabia - A review	Shaahid S.M., Al-Hadhrami L.M., Rahman M.K.	6
J44	Calcium sulfate scale deposition on coated carbon steel and titanium	Al-Hadhrami L.M., Quddus A., Al-Otaibi D.A.	J44
J48	Captive power generation in Saudi Arabia-overview and recommendations on policies	Abdul-Majeed M.A., Al-Hadhrami L.M., Al-Soufi K.Y., Ahmad F., Rehman S.	1
J50	Heat transfer in a channel with inclined target surface cooled by single array of impinging jets	Al-Hadhrami L.M., Shaahid S.M., Al-Mubarak A.A.	2
J56	Review of economic assessment of hybrid photovoltaic-diesel-battery power systems for residential loads for different provinces of Saudi Arabia	Shaahid S.M., Al-Hadhrami L.M., Rahman M.K.	2
J57	Performance evaluation of small wind turbines for off grid applications in Saudi Arabia	Al-Hadhrami L.M.	3

4.0 Professional Development and Public Service Activities

4.1. Conference/ Workshop/Meeting Organization

Organized the following conferences/workshops/meetings.

- Workshop on 3rd Annual Technical Exchange Meeting of Rotating Equipment during 9-10 April, 2014 at KFUPM.
- 3rd Concrete workshop on “Concrete Deterioration and Its Prevention: on 7 Feb 2009 at KFUPM.
- 4th Concrete workshop on “Concrete Deterioration and Its Prevention” on 27 Oct 2010 at KFUPM.
- 5th Concrete workshop on “Concrete Deterioration and Its Prevention” on 26 Oct 2011 at KFUPM.
- 6th Concrete workshop on “Concrete Deterioration and Its Prevention” on 20 Mar 2013 at KFUPM.

- International workshop on "Applications of X-Ray Diffraction and Fluorescence in Industry and Research" at KFUPM during 9-10 Nov 2008.
- Workshop on the "Future of Clean Energy", 18-19 May, 2008 at KFUPM.
- Saudi-Japanese Workshop on "Energy Conservation in Buildings and Industries" on 30th Jan 2008.
- Workshop on "Application of Wind Power Technology in Saudi Arabia" during 16-17 May, 2009 at KFUPM.
- Workshop on 1st Annual Technical Exchange Meeting of Rotating Equipment during 28-29 March 2012 at KFUPM.
- Workshop on 2nd Annual Technical Exchange Meeting of Rotating Equipment during 2-3 April, 2013 at KFUPM.Workshop Program "Saudi-French workshop" during 26-27 Mar 2007 at KFUPM.
- 1st Concrete workshop on "Concrete Deterioration and Its Prevention" on 28 Feb 2007 at KFUPM.
- 2nd Concrete workshop on "Concrete Deterioration and Its Prevention" on 7 Nov 2007 at KFUPM.

4.2. Conference Attendance and Presentations

Attended the following conference and/or made presentations.

Conference Attendance with Presentation

- International Conference on Power engineering (ICOPE-09), Kobe, Japan, on November 16-20, 2009.
- 14th International Conference on Multiphase Production Technology, Cannes, France: 17th – 19th June 2009.
- Turbo Expo 2010: Power for Land, See and Air, June 14-18, 2010, Scotland.
- International Gas Turbine Congress 2011 Osaka (IGTC'11), Osaka, Japan, on November 13-18, 2011.
- World Renewable Energy Congress-Sweden, Linkoping 8-13, Sweden.
- ASME TURBO EXPO, AMSE Premier turbine technical congress and exposition, set for June 6-10, 2011, in Vancouver, Canada, at the Vancouver Convention & Exhibition Center
- International Gas Turbine Congress 2011 Osaka (IGTC'11), Osaka, Japan, on November 13-18, 2011.
- ASME Turbo Expo 2012, June 11-15, 2012, Copenhangen, Denmark
- ASME 2012 International Mechanical Engineering Congress & Exposition, Nov 9-15, 2012, Houston, Texas.
- International Conference & Exhibition on Clean Energy, 2012.
- Symposium is Protective Coatings and Thin films (SPRING 13 S), May 11-15, Lille.
- Beyond Nickel-Based Superalloys, 13-17 May 2013, Germany.
- International Conferences on Marine Pollution and Ecotoxicology, 17-21 June 2013, Hongkong.
- ASME 2014 International mechanical Engineering Congress & Exposition, Nov 14-20, Montreal, Canada.
- ASME Turbo Expo 2014, June 16-20, 2014, Dusseldorf, Germany.

4.3. Review of Technical Papers, Proposal and Reports

Reviewed several research proposals and papers submitted for a variety of local and international entities.

- Research Proposal Review for King Abdulaziz city for Science and Technology (KACST), Saudi Arabia.
- Reviewed papers submitted to about 15 journals published by ASME and Elsevier Science.

4.4. Teaching and Research Workshop Attendance

- Attended a "Technical Exchange Meeting on Boilers", SABIC Technology Center, Jubail, 11-12 May 2004.
- 3rd Technical Exchange Meeting for Saudi Society of Mechanical Engineers (SSME), 3-4 April, 2014.
- Seminar on Multiphase Flow Metering System by Prof. Djamel Lakehal from Switzerland, 18 March, 2013.
- DEKRA and KFUPM joint Seminar in KFUPM, 13 November, 2013.
- Seminar on Nano-scale Characterization by Dr. M. Sakhawat Hussain in KFUPM, 26 November, 2013.
- Seminar on Nano Test Voltage by Dr. M. Sakhawat Hussain in KFUPM, 26 November, 2013.
- 4th Concrete Workshop on Concrete Deterioration and Its Prevention, 27 October, 2010.
- 5th Concrete Workshop on Concrete Deterioration and Its Prevention, 26 October, 2011.\
- 6th Concrete Workshop on: "Concrete Deterioration and Its Prevention", KFUPM, 20 March, 2013.
- Workshop on: "Solid Particle Erosion Sand Monitoring and Transport & Corrosion in Multiphase Flow", KFUPM, 24-26 May 2010.
- Workshop on student motivation: an effective approach for enhancing student learning, KFUPM, 21-Mar-2010.
- Workshop on: "Research Team Leadership", Foundation of Leadership in Higher Education, Al-Khobar, Nov. 15-16, 2009.
- Workshop on: "Strategies for Success in Grant Proposal Writing", DSR, KFUPM, May 11-12, 2009.
- Workshop on: "Developing Academic Leadership", DAD, KFUPM, May 5-6, 2009.
- Workshop on: "Innovation and Technology Licensing", KFUPM, April 21, 2009.
- Workshop on: "Measuring Research Performance", DSR, KFUPM, March 8-9, 2009.

4.5. University, Department and Public Service

4.5.1. Administrative/Management Positions

- **2005 to present**

Director, Center for Engineering Research, Research Institute, King Fahd University of Petroleum & Minerals

- **2008 to 2011**

Director, Center of Research Excellence in Corrosion, Research Institute, King Fahd University of Petroleum & Minerals.

4.5.2. Universities Committees

- Member, Research Institute Personnel Committee
- Member, Communication Panel
- Member, Policy and Planning Committee
- Member, RI Council Committee
- Chairman Ad-hoc committee for Compensation to RI Researchers in KACST Projects and Teaching activities.
- Chairman, Ad-hoc committee to review KFUPM capabilities for Corrosion Research.
- Member, Advisory Board for Advanced MaterialsResearch, KACST, Riyadh
- Member, Committee to look for Blue Vine Ventures Proposal
- Member, Bids & Tenders Committee
- Member, Lab Services Committee
- Member,Committee to assess eligibility of an applicant for promotion to the rank of Associate Professor

4.5.3. Volunteer Activities and Community Service

- Participated at the IBTIKAR-2013 exhibition held in Riyadh from December 1-5, 2013 and exhibited the patented innovation entitled, “Hybrid Solar Air-Conditioning System”, United States Patent US 8,141,379 B2; March 27, 2012.

5. Statement highlighting my contribution to Teaching, Research and Department, University and Public Service

5.1. Contribution to Teaching

I have taught a wide range of undergraduate and graduate courses. The courses that I have taught at KFUPM include ME 203, ME 204, ME 206, ME 311, ME 315, ME 316, ME 322, and ME 536.

I motivated and encouraged my students to study independently in their courses which I consider as an important role of an instructor. I have tried several approaches with both undergraduate and graduate students. For example, introducing practical problems in the class room has helped me to motivate the students to learn more about the courses that I teach. I have exposed the students to design-type, open-ended problems where they can bring the fundamental knowledge to tackle design-oriented

engineering problems. In this regard, I introduced the use of MathCad and MATLAB software to tackle many open-ended thermal-fluid problems.

My philosophy of teaching graduate courses was to go far beyond what is covered in the standard text books. I found it very successful to motivate students to conduct independent research through the critical review papers and term projects. The use of technology in teaching has also helped to motivate the students

5.2 Research Contribution

I have participated in several client-funded and sponsored projects. The second group of projects was funded by either KFUPM or King Abdulaziz City for Science and Technology (KACST). As stated earlier, I have also contributed to the facility development at the Center for Engineering Research as its Director. In this capacity, I have been actively engaged in motivating the various specialties, such as civil, mechanical, electrical engineering, materials science and metrology standards that are part of the Center of Engineering Research (CER). As Director of CER, I had the opportunity to work on multi-disciplinary areas and enrich my knowledge and experience. Several client-funded and sponsored project proposals were formulated by the staff at CER under my supervision and active participation.

During my academic career, I have published 57 **international Journal papers** and 16**papers in the proceedings of international conferences**. The details of these papers are given in the enclosed dossier. Since joining KFUPM in 2002, I have participated in 10 M.S.thesis and one Ph.Ddissertation committees as advisor/co-advisor/member. I worked in many applied research projects, some of them were internally funded by the university, while others were funded by KACST and ARAMCO. The number of citations for my published papers is 450 (excluding self citations).

5.3. Services to KFUPM and Community

I have contributed to several Adhoc andstanding committees of the University. I have actively participated in most of the university activities such that first and second annual research day. I have participated in many of the university workshops and events.I have given several public lectures at KFUPM.I was also a member in several committees in the University.

APPENDICES

APPENDIX A
DETAILS OF CITATIONS

APPENDIX A: DETAILED CITATIONS (*Excluding myself citations)*

(Source:www.scopus.com)

Paper	Cited by
J1. Griffith, T.S., **Al-Hadhrami, L.,** Han, J.-C. "Heat transfer in rotating rectangular cooling channels (AR=4) with angled ribs". Journal of Heat Transfer, 2002	1. Sivakumar, K., Natarajan, E., Kulasekharan, N. (2014). Influence of rib height on heat transfer augmentation – Application to aircraft turbines. International Journal of turbo and Jet Engines, Volume 31, Issue 1, 1 March 2014, Pages 87-95. 2. Sivakumar, K., Natarajan, E., Kulasekharan, N. (2014). Heat transfer and pressure drop comparison between smooth and different sized rib-roughened rectangular divergent ducts. International Journal of engineering and Technology, 6(1), pp.263-272, 3. Qiu, L., Deng, H., Tao, Z. (2013). Effect of channel orientation in a rotating smooth wedge shaped cooling channel with lateral ejection. Proceedings of the ASME Turbo Expo, Volume 3, 2013. 4. Huang, S.-C, Liu, Y,-H. (2013). High rotation number effect on heat transfer in a leading edge cooling channel of gas turbine blades with three channel orientations. Journal of Thermal Science and Engineering Applications. Volume 5, Issue 4, 27 September 2013, Article number 041003. 5. A numerical study of flow structure and heat transfer in a square channel with ribs combined downstream half-size or same size ribs. Applied Thermal Engineering, Volume 61, Issue 2, 2013, Pages 289-300. 6. Ligrani, P. (2013). Heat transfer augmentation technologies for internal cooling of turbine components of gas turbine engines. International Journal of Rotating Machinery, Volume 2013, 2013, Article number 275653. 7. Sivakumar, K., Natarajan, E., Kulasekharan, N. (2013). CFD Simulation and experimental investigation of convection heat transfer in a rectangular convergent channel with staggered ribs. International Review of Mechanical Engineering, Volume 7, Issue 3, March 2013, Pages 541-548. 8. Mkielewicz, D., Stasiek, A., Jewartowski, M., Stasiek, J. (2012). Measurements of heat transfer enhanced by the use of transverse vortex generators. Applied Thermal Engineering, Volume 49, 31 December 2012, Pages 61-72. 9. Elston, C.A., Wright, L.M. (2012). Leading EDGE JET impingement under high rotation numbers. ASME International Mechanical Engineering Congress and Exposition, Proceedigns, Volume 7, Issue PARTS A, B, C, D, 2012, Pages 1963-1976. 10. Qiu, L., Deng, H., Tao, Z. (2012). Effect of channel orientation in a rotating wedge-shaped cooling channel with pin fins and ribs. Proceedings of the

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APPENDIX B

IMPACT FACTOR OF JOURNALS

APPENDIX B
IMPACT FACTOR OF JOURNALS

#	Serial number as in Section 3.3.1.2	Journal status	Current Impact Factor
1	J1	ISI	2.32
2	J2	ISI	2.32
3	J3	ISI	0.94
4	J4	ISI	0.77
5	J5	ISI	0.92
6	J6	ISI	0.89
7	J7	ISI	0.94
8	J8	ISI	0.94
9	J9	ISI	0.94
10	J10	ISI	2.68
11	J11	ISI	2.03
12	J12	ISI	0.40
13	J13	ISI	0.40
14	J14	ISI	1.44
15	J15	ISI	0.47
16	J16	ISI	0.69
17	J17	ISI	5.63
18	J18	ISI	2.27
19	J19	ISI	0.85
20	J20	ISI	2.07
21	J21	ISI	3.57
22	J22	ISI	1.94
23	J23	ISI	5.63
24	J24	ISI	0.68
25	J25	ISI	1.76
26	J26	ISI	2.07
27	J27	ISI	2.11
28	J28	ISI	6.02
29	J29	ISI	0.74
30	J30	ISI	0.81
31	J31	ISI	2.11
32	J32	ISI	2.99
33	J33	ISI	0.92
34	J34	ISI	2.00
35	J35	ISI	0.95
36	J36	ISI	0.39

37	**J37**	**ISI**	**0.92**
38	**J38**	**ISI**	**1.36**
39	**J39**	**ISI**	**0.89**
40	**J40**	**ISI**	**2.07**
41	**J41**	**ISI**	**0.85**
42	**J42**	**ISI**	**1.13**
43	**J43**	**ISI**	**5.51**
44	**J44**	**ISI**	**0.85**
45	**J45**	**ISI**	**2.68**
46	**J46**	**ISI**	**5.0**
47	**J47**	**ISI**	**5.5**
48	**J48**	**ISI**	**2.70**
49	**J49**	**ISI**	**2.50**
50	**J50**	**ISI**	**0.34**
51	**J51**	**ISI**	**3.07**
52	**J52**	**ISI**	**2.36**
53	**J53**	**ISI**	**1.93**
54	**J54**	**ISI**	**1.22**
55	**J55**	**ISI**	**5.63**
56	**J56**	**ISI**	**5.63**
57	**J57**	**ISI**	**2.78**
58	**J58**	**ISI**	**1.13**