

September 3, 2024

Jackie Mildner, Partner and Courtney Cabansag, Associate Isaacson, Miller Washington, DC

#### Reference: Search for the Associate Dean for Research of the College of Engineering at Wichita State University

Dear Search Committee Members:

I would like to be considered for the recently advertised position of the Associate Dean for Research of the College of Engineering at Wichita State University. Currently serving as the Chair and Professor of the Mechanical Engineering Department at Northern Illinois University (NIU), my academic background and administrative expertise closely match the specified qualifications for this position.

Before joining NIU, my professional journey included roles as a faculty member with diverse administrative responsibilities at the University of Michigan-Flint and Dearborn campuses, as well as the Masdar Institute of Science and Technology (MIST) in Abu Dhabi. MIST, a research-driven graduate-level institution established in collaboration with the Massachusetts Institute of Technology (MIT), provided a unique perspective on global academic collaborations. Additionally, I held visiting faculty appointments at MIT, National University of Singapore, American University of Sharjah, Oak Ridge National Lab, and Ford Motor Company.

I possess a robust background in research, teaching, and administration, with a focused expertise in the expansive realm of energy and sustainability. My research endeavors have resulted in publications in numerous esteemed international journals and inclusion in the Stanford University's World's Top 2% Scientists List. I have also successfully secured external funding exceeding US \$6 million from prestigious entities, including the National Science Foundation, US Department of Defense, US Department of Energy, National Labs, the Government of Abu Dhabi, and major stakeholders in the aerospace and automotive industries.

My academic credentials include a Ph.D. in mechanical engineering and a master's in aerospace engineering from the University of Michigan - Ann Arbor. Additionally, I hold a second master's in mechanical engineering from the University of Windsor, Canada, and a bachelor's degree in mechanical engineering from the N.E.D. University, Karachi. This diverse educational background, coupled with my international affiliations, has equipped me with a deep understanding of various educational systems and a capacity for innovative curriculum development to cater to diverse student needs.

I am very interested in continuing an academic career, and have greatly enjoyed my academic career. Your advertisement attracted my attention as this position and the Wichita State University offer me a perfect opportunity to achieve my goal of moving up to a higher academic leadership position. I believe I have the necessary experience, vision and enthusiasm, which will serve me well

in the position of the Associate Dean for Research. In my current and past positions, I have gained a wide range of leadership experiences, including more than nine years of being the department chair/head. The experience also includes working in an academic collective bargaining environment. I have also been involved with the establishment and supervision of interdisciplinary academic programs (PhD program head at the Masdar Institute). I am also very familiar with accreditation processes for both undergraduate and graduate programs. In my capacity as the elected Chair of Faculty Senate at the University of Michigan-Dearborn for two terms, I was intimately involved with the strategic planning, budgeting and faculty governance at the University level. I also have valuable experience in developing and nurturing outreach and fundraising activities with various stakeholders. Through my experiences in different institutions, I have gained a good understanding of different budget and resource allocation processes.

In addition to my experience in research and academic leadership, I have a good ability to cocreate and implement strategic research initiatives that align with institutional goals. At Northern Illinois University, I spearheaded several strategic initiatives that increased both the quantity and quality of research outputs. My experience in leading interdisciplinary research projects, particularly in the fields of clean and sustainable energy, has allowed me to cultivate a collaborative research environment. I have consistently encouraged cross-departmental collaboration, which resulted in securing significant extramural funding and elevated the research profile of the institutions where I have served.

Building and sustaining research infrastructure is another area where I have made substantial contributions. During my tenure as the founding head of the mechanical engineering program at the Masdar Institute, I oversaw the establishment of state-of-the-art research facilities, ensuring that faculty and students had access to cutting-edge resources. I also assisted with the expansion of engineering building at the University of Michigan-Flint. My hands-on experience in developing research facilities, coupled with my understanding of the needs of both faculty and students, positions me well to lead efforts at Wichita State University in enhancing its research infrastructure and ensuring it remains competitive on a national and international scale.

I also recognize the importance of external partnerships in advancing the research agenda of a university. My experience in developing and nurturing relationships with industry, government agencies, and academic institutions has been pivotal in creating applied learning opportunities and securing funding. The strategic location of Wichita State University, coupled with my background in building productive partnerships, presents an exciting opportunity to further elevate the university's research profile and contribute to its goal of achieving R1 status.

I am a firm believer in the value of diversity, equity, and inclusion in educational institutions. I believe that a diverse and inclusive community of students, faculty, and staff enhances the learning environment by providing different perspectives and promoting mutual understanding. Throughout my career, I have been a passionate advocate for diversity, equity, and inclusion, and have worked hard to promote these values in my academic and professional endeavors.

I maintain an active presence in professional organizations, both as a member and a leader. I am honored to be a fellow of both the American Society of Mechanical Engineers (ASME) and International Engineering and Technology Institute (IETI), and to have received the Society of Automotive Engineers (SAE) Ralph R. Teetor Award in recognition of my contributions to the field. Currently, I serve as a Subject Editor for a leading energy journal (Applied Energy; impact factor of 11.2) and as an Associate Editor for an ASME journal (Thermal Science and Engineering Applications). Additionally, I am involved in organizing committees for various professional organizations. As a licensed Professional Engineer registered in the state of Michigan, I am committed to upholding the highest standards of ethics and professionalism in my work.

In conclusion, my extensive leadership experience, vision for the engineering discipline, experience of building successful partnership with industry and community, and dedication to student success align well with the qualifications sought for the Associate Dean for Research of the College



of Engineering at Wichita State University. I am enclosing a copy of my curriculum vitae for your consideration. Should you need any additional information, please feel free to contact me at the or by e-mail at the transmission of the possibility of discussing how I can contribute to the future of Wichita State University.

Sincerely,

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Enclosure

Tariq Shamim

# TARIQ SHAMIM, PH.D., P.E.

Professor and Chair of Mechanical Engineering Northern Illinois University



#### SUMMARY

Over 27 years of higher education experience in academic and administrative settings in various institutions. Excellent experience in research and budget management, curriculum, establishment and supervision of interdisciplinary academic programs, strategic planning, student success, government/industry relations and fundraising, diversity and inclusion, accreditation, national and international recruitment, and stakeholder engagement with faculty, staff, alumni, and community. Strong academic with extensive publication and research experience

# **RESEARCH INTERESTS**

- Carbon Capture & Storage
- Combustion and Advanced Renewable Energy Systems (In Cylinder Combustion Modeling; Flamelet Modeling; Fuel Cell Modeling; Renewable Energy; Thermal Spray)
- Thermochemical Energy Storage
- Emission Control Techniques for Gasoline, Diesel and Alternative Fuel-Powered Vehicles
- Computational Heat Transfer and Fluid Flow (CFD)

# **EDUCATION**

**Ph.D.**, in Mechanical Engineering, The University of Michigan, Ann Arbor, MI (1993–97) Dissertation: *A Study of Transient Counterflow Diffusion Flames with Radiation* Dissertation Committee: A. Atreya (chair), M. Chen, G. M. Faeth, M. Sichel

M.S.E., in Aerospace Engineering, The University of Michigan, Ann Arbor, MI (Simultaneously pursued with Ph.D., 1995–96) Emphasis: Advanced Combustion Processes, Experimental Techniques in High Temperature Gas Dynamics, Computational Fluid Dynamics

M.A.Sc., in Mechanical Engineering, University of Windsor, Ontario, Canada (1991–92) Thesis: *An Experimental Study of Heat Transfer through Liquid Foams* Thesis Committee: T. W. McDonald (chair), W. P. North, C. St. Pierre, N. W. Wilson

**B.Eng.**, in Mechanical Engineering, N.E.D. University of Engineering & Technology, Karachi, Pakistan (1982–88) Thesis: *Analysis of a Wrecker Structure using Finite Element Method* Thesis Advisor: W. A. Mir

**Post Graduate Diploma**, in Production & Operations Management, Institute of Management Sciences, Karachi, Pakistan (1985–86)

#### LEADERSHIP AND ADMINISTRATIVE APPOINTMENT

**Chair,** Mechanical Engineering Department, Northern Illinois University, DeKalb, IL (Jul '19 – present)

Head of Engineering Programs / Associate Chair of Computer Science, Engineering and Physics, College of Arts and Sciences, University of Michigan-Flint (Sep '17 – Jun '19)

**Director of Graduate Program,** Mechanical Engineering Program, University of Michigan-Flint (Sep '17 – Jun '19)

**Founding Program Head**, Mechanical Engineering Program, Masdar Institute of Science & Technology (in collaboration with MIT), Abu Dhabi, UAE (Sep '10 – July '13)

**Interdisciplinary PhD Program Coordinator (Head),** Masdar Institute of Science & Technology (in collaboration with MIT), Abu Dhabi, UAE (Mar '14 – Mar '16)

Chair Faculty Senate, University of Michigan-Dearborn (Sep '08 – Aug '09; Sep '06 – Aug '07)

**Chair Faculty Senate Council (Executive and Leadership Body for the Senate),** University of Michigan-Dearborn (Sep '08 – Aug '09; Sep '06 – Aug '07)

Vice Chair Faculty Senate, University of Michigan-Dearborn (Sep '05 – Aug '06)

**Chair of Graduate Program,** Department of Mechanical Engineering, University of Michigan-Dearborn (Sep '05 – Sep '06)

**Chair Institute Faculty Promotion Committee,** Masdar Institute of Science & Technology, Abu Dhabi, UAE (Nov '15 – Sep '16)

**Chair University Promotion & Tenure Committee,** University of Michigan-Dearborn (Sep '05 – Aug '06)

# **POSITIONS HELD**

**Chair and Professor,** Mechanical Engineering, Northern Illinois University, DeKalb, IL (Jul '19 – present)

Northern Illinois University (NIU) is a public research university and its mission is to empower students through educational excellence and experiential learning. The university is classified by Carnegie as a doctoral institution with High Research Activity. It currently serves the needs of about 16200 students (45% of student population is from underrepresented groups). With an enrollment of over 600 students, mechanical engineering is the largest department in the college. The department has 16 full-time faculty, 5 instructors and 2 full-time staff members. In addition, there are a few temporary employees. Both staff and faculty members are covered by collective bargaining agreements. In my role as the chair, I am responsible for all aspects of the department's administration, including faculty hiring/mentoring, student admissions, student success, program quality, assessment, accreditation, curriculum development, budget, strategic planning, etc. Some of my achievements include:

- Launched the newly approved PhD in Mechanical Engineering program. Organized and managed the development of policies and procedures for PhD programs including admissions, qualifying, candidacy and dissertation defense and other completion steps.
- Increased the enrollment of students from underrepresented group by 9 percentage point (an increase of 33%).
- Increased the enrollment of female students by 2 percentage point (an increase of 20%).

- Enhanced faculty development and mentoring, introducing a tenure-track faculty course reduction award, and additional funding for faculty development support.
- Increased the department's sponsored research funding significantly, including CAREER and other NSF grants.
- Leading the efforts on enhancing Diversity, Equity and Inclusion (DEI) in the department.
- Leading the program's assessment activities for Higher Learning Commissions and ABET accreditation. Led the program in achieving a 6-year reaccreditation in 2022. Enhanced the faculty's participation/involvement in all assessment activities.
- Conducted a SWOT (strengths, weaknesses, opportunities and threats) analysis to guide the department's strategic direction.
- Contributed to the development of the College's 5-year strategic plan.
- Facilitated the review of our 4-year study plan for BSME, which resulted in some minor revisions of the plan and better sequencing of courses.
- Planned and implemented transition to remote working environment for the department's staff to ensure safety while sustaining work flow, communications and morale.
- Contributed to the development of summer bridge programs for incoming students.
- Contributed to the establishment and nurturing of outreach and fundraising activities with the industries and alumni (examples include funding for diversity initiative, student scholarships and senior design projects).
- Worked on developing joint degree programs with national and international universities.
- Delivered a focused master's program in mechanical engineering to our industrial partner, Navistar. The program was offered at the Navistar site in Lisle, IL.

# **Head of Engineering Programs and Professor,** University of Michigan-Flint, Flint, MI (Sep '17 – Jun '19)

University of Michigan-Flint is one of the three campuses of the University of Michigan operating under the policies of the Board of Regents. The campus is a comprehensive university offering four-year degree programs in liberal arts, sciences, health, engineering and management and graduate programs. The engineering program is housed within the College of Arts and Sciences, which is one of the five academic units of the campus and has the largest enrollment of undergraduate students. The engineering program has approximately 360 undergraduate students pursuing degrees in mechanical engineering and general engineering. The general engineering and engineering management. The engineering program had 10 faculty and 2 full-time staff members. As the head of engineering, I was responsible for all aspects of the program's administration, including faculty hiring/mentoring, student admissions, student success, program quality, assessment, accreditation, curriculum development, budget, strategic planning, etc. Some of my achievements include:

- Managed and led the program's assessment activities for Higher Learning Commissions and ABET visit.
- Revamped the program's advisory board by bringing new members and enhanced the members' engagement with the program.
- Conducted a SWOT analysis to guide the department's strategic direction.
- Launched the newly approved Master's program in Mechanical Engineering.
- Assisted in streamlining the transfer program with the University of Michigan, Ann Arbor.
- Assisted in the development of data-driven recruitment efforts for both undergraduate and graduate programs.

• Contributed to the establishment and nurturing of outreach and fundraising activities with industries and alumni (examples include funding for engineering building expansion and senior design projects).

#### Professor, Founding Mechanical Engineering Head and PhD Program Coordinator,

Mechanical Engineering, Masdar Institute of Science & Technology (in collaboration with MIT), Abu Dhabi, UAE (Jul '10–Aug '17)

Masdar Institute of Science and Technology, Abu Dhabi. was a research-driven graduate-level university, which was established in collaboration with the Massachusetts Institute of Technology (MIT). The research and teaching focus of the Institute was on advanced energy, sustainable technologies, and entrepreneurship. The Institute also contributed to the development of Masdar City - world's first zero carbon city. There was a close collaboration with MIT on all aspects of the Institute's administration, research and teaching activities. The Institute was recently merged with two other institutions to establish a comprehensive research University called Khalifa University. I served as the founding head of the Mechanical Engineering program and the head of the interdisciplinary PhD program. In my capacity, I was responsible for all aspects of the program's administration, including faculty hiring/mentoring, student admissions, program quality, assessment, accreditation, curriculum development, budget, strategic planning, and liaising with MIT. I built the mechanical engineering program from the very start. By devising a good hiring strategy, I was able to hire seven new faculty members who provided a good foundation of the program. I also assisted the chemical engineering program in the hiring of their first four faculty members. I have also served in various faculty search committees (as chair and as member), which has provided me with an excellent experience of hiring qualified faculty.

**Faculty Affiliate,** University of Michigan Energy Institute, The University of Michigan, Ann Arbor, MI (Dec '07 – Mar '15)

**Research Affiliate**, Technology Development Program, Massachusetts Institute of Technology (MIT), Cambridge, MA (Aug '10 – Jun '12)

Associate Professor, Department of Mechanical Engineering, The University of Michigan-Dearborn, Dearborn, MI (Sep '03 – Jun '12; leave of absence: 2010-2012)

Assistant Professor, Department of Mechanical Engineering, The University of Michigan-Dearborn, Dearborn, MI (Sep '97 – Aug '03)

**Visiting Scholar,** Engineering Technology Program, Massachusetts Institute of Technology (MIT), Cambridge, MA (Jul '10 – Aug '10)

**Summer Faculty Fellow,** Oak Ridge National Laboratory, The US Department of Energy (DOE), Oak Ridge, TN (Jun '08 – Aug '08; Jul '03 – Aug '03)

**Visiting Associate Professor,** Department of Mechanical Engineering, American University of Sharjah, U.A.E. (Aug '09 – Jun '10; sabbatical leave from Univ. of Michigan)

**Visiting Professor,** Department of Automotive Engineering, N.E.D University of Engineering & Technology, Karachi, Pakistan (Dec '08 – Jan '09; Dec '05 – Jan '06)

**Visiting Professor,** Department of Mechanical Engineering, National University of Singapore, Singapore (Jul '04 – Dec '04; sabbatical leave from Univ. of Michigan)

**Consultant,** Oak Ridge National Laboratory, The US Department of Energy (DOE), Oak Ridge, TN (Aug '99 – July '01)

Faculty Intern, Engine Simulations Group, Ford Scientific Research Laboratory, Ford Motor

Company, Dearborn, MI (Jun '00 – Aug '00)

**Graduate Student Research Assistant and Instructor,** Department of Mechanical Eng & Applied Mechanics, The University of Michigan, Ann Arbor, MI (Jan '93 – Aug '97)

**Graduate Teaching Assistant,** Dept of Mechanical Engineering, Michigan State University, East Lansing, MI (Sep '92 – Dec '92)

**Graduate Research and Teaching Assistant,** Dept of Mechanical Engineering, University of Windsor, Windsor, ON, Canada (Jan '91 – Aug '92)

**Graduate Research and Teaching Assistant,** Dept of Mechanical Engineering, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia (Sep '89 – Nov '90)

Project Engineer, Fauji Fertilizer Co. Ltd, Rawalpindi, Pakistan (Apr '89 – Aug '89)

Trainee Engineer, Siemens Engineering Co. Ltd, Karachi, Pakistan (Apr '88 – Apr '89)

# TEACHING

#### **Courses Taught**

- ME 230 Thermodynamics (sophomore level)
- ME 325 Thermal Fluid Sciences I (junior level)
- ME 330 Applied Thermodynamics (junior level)
- ME 371 Heat Transfer (junior/senior level)
- ME 375 Thermal Fluid Sciences II (junior/senior level)
- ME 378/379 Thermal Fluids Laboratory (junior/senior level)
- ME 425 Thermal Systems Design (senior level)
- ME 452 Sustainable Energy and Environment (senior level)
- ME 490 Directed Design Project (senior level)
- ME 491/492 Guided Study in Mechanical Engineering (senior level)
- MCE 49405 Fundamentals of Fuel Cells (senior level)
- FDN 457 Thermal Sciences I
- FDN 458 Thermal Science II
- EGR 300 Renewable Energy
- EGR 451/551 Computational Fluid Dynamics (undergraduate/graduate level)
- EGR 453 Thermal Systems (senior level)
- MEG 506 Combustion Theory and Applications (graduate level)
- MEG 507 Advanced Heat Transfer (graduate level)
- MEG 510 Advanced Thermodynamics (graduate level)
- MEG 515 Fuel Cell Systems (graduate level)
- ME 532 Combustion (graduate level)
- ME 571 Conduction Heat Transfer (graduate level)
- ME 598 Engine Emissions (graduate level)
- ME 600 Study or Research in Selected Mechanical Engineering Topics (graduate level)
- ME 602 Guided Study in Mechanical Engineering (graduate level)
- MEE 697 Independent Study in Mechanical Engineering (graduate level)

# **Courses Developed / Proposed**

- Thermal Fluids Laboratory (ME 378/379)
- Undergraduate course on Sustainable Energy and Environment (ME 452)
- Undergraduate course on Fundamentals of Fuel Cells (MCE 49405)
- Bridge course for graduate students on Thermal Sciences (FDN 457)
- Graduate course on Engine Emissions (ME 598)
- Graduate course on Computational Fluid Mechanics & Heat Transfer (ME 525)
- Graduate course on Fuel Cell Systems (MEG 515)

# **Research Scholar Supervised**

- 1. Dr. Gul, E., "Modeling of Renewable Energy Systems," (2022 2023)
- 2. Dr. Farooqui, A., "Investigation of Hydrogen Production with CO2 Capture using Chemical Looping Reforming", (2021 2022)
- 3. Dr. Zaidani, M., "Aging Effects in an Anode Baking Furnace for Aluminum Production," (2015 2017, co-supervisor)
- 4. Dr. Kurnia, J. C., "Modeling of Trickling Bed Reactors," (2013 2014) (currently a faculty member at Curtin University Malaysia)
- 5. Dr. Sasmito, A. P., "Modeling of PEM Fuel Cells and Electrolyzers," (2012 2013) (currently a tenured faculty member at McGill University)
- 6. Dr. Harichandan, A. B., "CFD Analysis of Chemical Looping Combustion," (2012 2013) (currently a tenured faculty member in India)
- 7. Dr. Ramadan, K., "CO2 Capture using Chemical Looping Combustion," (2011 2011)
- 8. Dr. Xia, C., "Modeling of Thermal Spraying Processes," (2003 2004)
- 9. Dr. Shen, H., "Modeling of Catalytic Converters," (1997-2000).

# **Graduate Students Supervised**

- 1. Gaustad, M., "A Numerical Study of the Effects of Radiation Losses on Diffusion Flames," M.S. thesis (Jan '00 Aug '01).
- 2. Gaustad, M., "Dynamic Control Methodologies for NOx and Soot Reduction in Diffusion Flames," Ph.D. dissertation at Ann Arbor Campus (co-advisor) (Sep '01 Apr '03).
- 3. Medisetty, V., "Dynamic Behavior of Automotive Catalytic Converters," M.S. thesis (Jan '00 Dec '02).
- 4. Yang, X., "A Computational Model for NOx Control Systems in Diesel Engines," M.S. project at Ann Arbor Campus (Sep '01 Apr '03).
- 5. Khan, M. R. S., "Modeling of Diesel Particulate Filters," M.S. thesis (Jan '02 Jun '04).
- 6. Rose, L., "Developing a Systems Level Model for Fuel Cells," Project (Jan'03 Apr'04).
- Ruiz, W., "A Computational Model for Thermal and Water Management of Fuel Cells," M.S. thesis (co-advisor) (Sep '03 – Aug '04).
- 8. Smith, T., "Vehicle Level Thermal and Water Management of Fuel Cells," M.S. project (co-advisor) (Sep '03 –Aug '05).
- 9. Kadam, V., "Design of New compact Fuel Supply Module (FSM) for Harley Davidson Motorcycles with Fuel Level Sensor," M.S. project (Jan '05 – Dec '06).
- Defever, M., and Halsall, S., "Aerodynamic Design of Land Speed Racing Motorcycle," M.S. Project (Jan '07 – Sep '07).
- Kapas, N., "Modeling of SCR System for Lean Burn Diesel Engines," M.S. thesis (Sep '06 – Jul '09).

- 12. Noorani, S., "Modeling of Dynamic Performance of Proton Exchange Membrane Fuel Cell (PEMFC)," M.S. thesis (Sep '07 Aug '11).
- Sivan, A. S. J., "Modeling and Simulation of Urea Solution Injection for SCR Systems," M.S. thesis (Jan '08 – Jul '09).
- 14. El-Nachar, A., "Integration of CO2 Capture by using Chemical Looping Combustion Technology with Power Cycles," M.S. thesis (Sep '10 –May '11).
- 15. Hassan, B., "Thermodynamic Analysis of Carbon Capture using Chemical Looping Combustion," M.S. thesis (Sep '10 May '12).
- 16. Raj, A., "Investigation of Water and Thermal Transport Mechanisms of Proton Exchange Membrane Fuel Cell (PEMFC)," M.S. thesis (Sep '10 May '12).
- 17. Khan, M. N., "Modeling of Combustion Assisted Thermal Spray Coatings for Aerospace Applications," M.S. thesis (Sep '11 May '13) Received **Best Mechanical Engineering Master's Thesis Award**.
- 18. Zafar, A. F., "Study of the Effect of Nitrogen on the Performance of Proton Exchange Membrane Fuel Cell (PEMFC)," Ph.D. dissertation at N.E.D. University (external co-advisor) (Jan '06 Dec '10).
- 19. Al Marzouqi, M., "Experimental Study of CO2 Capture by using Chemical Looping Combustion Technology," M.S. thesis (Mar '12 Aug '14).
- 20. Gomez, A. G., "Investigation of Dynamic Behavior of Fuel Cells," M.S. thesis (Sep '12 May '14).
- 21. Ruiz, D. B. H., "Investigation on Hydrogen Production by Electrolysis as a Renewable Energy Technology Storage," M.S. thesis (Sep '12 May '14).
- 22. Ogidiama, O. V., "Modeling and Optimization of Selective Catalytic Reduction (SCR) Systems for Post-Combustion NOx Control," M.S. thesis (Sep '12 May '14).
- 23. Nadeem, H., "Visualization and Modeling of Trickling Bed Reactors," M.S. thesis (coadvisor) (Sep '12 – May '14).
- 24. Akhter, S., "Modeling of Turbulent Combustion including the Interactions of Turbulence and Chemistry," M.S. thesis (Sep '13 Aug '15; Currently at McGill University, Canada).
- 25. Crespo, A., "Investigation of Sand Particles as Heat Collector, Heat Transfer and Thermal Energy Storage Media," M.S. thesis (co-advisor) (Sep '13 May '15).
- 26. Soopee, A., "Experimental and Computational Investigation of Purging Effects on PEM Fuel Cells," M.S. thesis (Sep '14 Aug '16).
- 27. Raj, A., "Modeling of Solid Oxide Electrolyzer Cells," Ph.D. dissertation (Jul '12 May '13. Currently at University of Waterloo, Canada).
- Khan, M. N., "Investigation of Hydrogen Production using Chemical Looping Combustion," Ph.D. dissertation (Jul '13 – Aug '17. Currently at Norwegian University of Science and Technology).
- 29. Muthusamy, J. P., "Modeling of Thermochemical Storage Systems applied to Concentrated Solar Power," Ph.D. dissertation (co-advisor) (Sep '13 – Aug '14. Currently at Texas A& M University, College Station).
- 30. Ogidiama, O. V., "Investigation of CO2 Capture using Chemical Looping Combustion for Enhanced Oil Recovery Applications," Ph.D. dissertation (Sep '14 May '18).
- 31. Lahlou, R., "Model-based Design of a Solar Collector for Concentrated Solar Power Applications," Ph.D. dissertation (Jan '15 Aug '17).
- 32. Tajik, A., "Modeling of Anode Baking Processes for Aluminum Production," Ph.D. dissertation (Sep '15 May '19).
- Qureshi, Z. A., "Investigation of Aging Effects in an Anode Baking Furnace for Aluminum Production," M.S. thesis (co-advisor) (Sep '16 – Jun '18).
- 34. Mohammed, I. A., "Modeling of Thermochemical Energy Storage for Concentrated Solar

Power (CSP) Plants," M.S. thesis (Aug '20 – Aug '22)

#### **Undergraduate Projects Supervised**

- 1. Hernandez, L., Sanz, D., and Connor, A., "CNC Tool Environmental Impacts," 2022-2023.
- 2. Callahan, L., Larson, C., and McCleery, T., "Design of a Sustainable Refrigeration System using Thermo-Acoustics," 2021-2022. (Won **3<sup>rd</sup> Best Project** prize in the College).
- 3. Keith, C., Nyholm, S., and Batchkarov, S., "Proton Improvement Plan II (PIP-II) Cryomodule Mockup at Fermilab," 2021-2022.
- 4. Hogshead, I., Aden, N., and Callahan, K., "Thermochemical Energy Storage using Ammonia Looping for Concentrated Solar Power Plants," 2019-2020.
- 5. Hoyos, A. M., Horihan, R., and Smialek, C., "Low Cost Thermophotovoltaic Cell," 2019-2020.
- 6. Alhumaidi, S., Omar, K., Shahrouri, D., and Zdanio, S., "Solar Powered Active Ventilation System," Winter 2009.
- 7. Dear, J. W., Hansma, J., Nastovski, J., and Patzcsh, G., "The Wind Assisted Battery Powered Car," Fall 2008.
- 8. Estereicher, I., Stiem, P., Secorski, J., and Virk, A., "Measurement of Volumetric Flow Devices using Primary Electrical Device," Fall 2007.
- 9. Joines, P., Perry, M., Weston, J., and Yoseph, S., "CO<sub>2</sub> Powered Boat," Fall 2006.
- 10. Gill, R., King, G., Patel, B., and Patel, K., "Pulse Jet Engine," Summer 2006.
- 11. Darkangelo, J., Klug, E., Marzolf, L., and VanHollebeke, H., "Heated and Cooled Steering Wheel," Winter 2006.
- 12. Cho, H., Almachy, R., Nguyen, H., and Kim, P., "Temperature Variance Water Pump," Fall 2005.
- 13. Deans, M. C., "Investigation of Regeneration Characteristics of Diesel Particulate Filters," Summer 2005.
- 14. Batterson, J., "Performance Analysis of PEM Fuel Cells," Summer 2004.
- 15. Fricker, Z., "Comparison of Traditional and Hybrid Powertrain Architectures Using PSAT," Summer 2004.
- 16. Grajek, A., "Performance Analysis of Catalytic Converters," Summer 2003.
- 17. Simpson, A., "The Effect of Geometric Parameters on Regeneration Characteristics of Diesel Particulate Filters," Summer 2003.
- 18. Amodeo, C., Kurtz, P., Noel, J., and Sapian, R., "Automobile Paint Curing Oven Design," Winter, 1999.
- 19. Rose, L., "Design Optimization of Catalytic Converters," Summer 1998.
- 20. Turner, J. D., "Design of a Hydraulic Dampener," Winter-Summer 1998.
- 21. Jordan, A., Mullins, J., and Seto, L., "A Numerical Model for Automotive Radiator," Summer 1998.
- 22. Thomas, G., Serdenkovski, G., and Thomas, M., "Emission Reduction from Catalytic Converters," Winter 1998.
- 23. Johnson, L., "A Study of Automotive Engine Emissions," Winter 1998.

# RESEARCH

#### **Journal Publications**

1. Mehta, S. K., Mondal, P. K., Wongwises, S., and <u>Shamim, T.</u>, 2024, "Effects of Salinity Gradient Modulations on Energy Generation in A Nanochannel," *Applied Energy* 

(under review).

- 2. Shahsavar, A., Moradi, M. H., Arici, M., and <u>Shamim, T.</u>, 2024, "An In-Depth Study of the Effect of Ultrasonic Field on the Melting Characteristics of Pure and Nano-Enhanced PCMs using Thermal and Digital Imagery," *Journal of Energy Storage*, 78: 110054.1-110054.14.
- 3. Ogidiama, O. V., and <u>Shamim, T.,</u> 2023, "Numerical Analysis of a Solar Assisted Chemical Looping Combustion Combined Power and Sea Water Desalination Plant," *Case Studies in Thermal Engineering*, 45:102957.1-102957.12.
- 4. Gao, Y., Luo, J., Fang, F., Xu, M., Mohit, M., <u>Shamim, T.</u>, and Sasmito, A. P., 2023, "Effect of Impinging Stream Phase-Change Cycle on the Stability, Thermal Conductivity and Viscosity of Aqueous Al2O3 Nanofluid," *Case Studies in Thermal Engineering*, 52:103725.1-103725.13.
- 5. Gul, E., Baldinelli, G., Bartocci, P., <u>Shamim, T.</u>, Domenighini, P., Cotana, F., Wang, J., Fantozzi, F., and Bianchi, F., 2023 "Transition Toward Net Zero Emissions - Integration and Optimization of Renewable Energy Sources: Solar, Hydro, and Biomass with the Local Grid Station in Central Italy," *Renewable Energy*, 207C:672-686.
- 6. Gul, E., Baldinelli, G., Farooqui, A., Bartocci, P., and <u>Shamim, T.</u>, 2023 "AEM-Electrolyzer based Hydrogen Integrated Renewable Energy System Optimization Model for Distributed Communities," *Energy Conversion and Management*, 285:117025.1-117025.17.
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Non-Refereed Conference Proceedings

- 1. Tajik, A., <u>Shamim, T.</u>, Ghoniem, A. F., and Al-Rub, R. K. A. 2019, "Investigating Pulse Combustion Effects on the Anode Baking Furnace Energy Consumption and Emissions Characteristics," *Proceedings of the 11<sup>th</sup> U. S. National Combustion Meeting* of *the Combustion Institute*, Pasadena, CA, Mar 24 27.
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- 3. Khan, M. N., and <u>Shamim, T.,</u> 2017, "Hydrogen Generation using Chemical Looping Reforming Concept," *UAE GSRC 2017*, Abu Dhabi, UAE, Mar 20 21.
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Production in a Three Reactor Chemical Looping Reforming Process," 4<sup>th</sup> International Workshop on Oxy-fuel FBC Technology, Nanjing, China, November 5 – 7.

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- 13. Khan, M. N., and <u>Shamim, T.</u>, 2013, "Effect of Operating Parameters on a Dual-Stage Combustion-Assisted Thermal Spray System," *3<sup>rd</sup> Annual Meeting of the Saudi Arabian Section of the Combustion Institute,* Dhahran, Saudi Arabia, Apr 29.
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# **Invited and Other Presentations**

- 1. Gul, E., and <u>Shamim, T.,</u> "Data Driven Optimization Model for Power Tower CSP Systems with Thermal Energy Storage," *ASME 2024 International Mechanical Engineering Congress & Exposition IMECE2024*, Portland, OR, ASME2024-150602, November 17 – November 21, 2024.
- "Hydrogen and Fuel Cells and their Applications," National Workshop on Green Hydrogen Production, Storage and Transportation: A Green Energy Perspective, Sponsored by Science and Engineering Research Board of the Government of India, Vellore Institute of Technology, Vellore, Tamil Nadu, India (virtual), March 14 – 15, 2024.
- Mohammed, I. A., and <u>Shamim, T.,</u> "An Investigation of Thermochemical Energy Storage using Chemical Looping for Concentrated Solar Power Plants," *ASME 2023 International Mechanical Engineering Congress & Exposition IMECE2023*, New Orleans, LA, ASME2023-113463, October 29 – November 2, 2023.
- 4. "Hydrogen Production using the Membrane Electrolyzer Technology via Solar Systems," 26<sup>th</sup> Symposium of Pakistan Academy of Engineering, Karachi, Pakistan (virtual), December 17, 2022.
- 5. "Hydrogen Production with CO<sub>2</sub> Capture Using Chemical Looping Reforming," *Faculty Development Program on Clean Energy Technologies for Sustainable Growth – Current Research and Development,* Vellore Institute of Technology, Vellore, Tamil Nadu, India

(virtual), December 14 – 18, 2020.

- 6. "Research on Emissions Control and Clean Combustion," *Navistar*, Lisle, IL, October 18, 2019.
- 7. "CO<sub>2</sub>-Neutral Hydrogen Production using Chemical Looping Reforming," *Khalifa University*, Abu Dhabi, UAE, April 23, 2019.
- 8. "Hydrogen Production with CO<sub>2</sub> Capture using Chemical Looping Reforming," *Central Michigan University*, Mount Pleasant, MI, April 12, 2019.
- 9. "Investigation of Hydrogen Production using Chemical Looping Reforming," Keynote Talk, *International Conference on Innovative Applied Energy*, Oxford, UK, March 14 15, 2019.
- 10. "Hydrogen Production with CO<sub>2</sub> Capture using Chemical Looping Reforming," *Northern Illinois University*, DeKalb, IL, March 5, 2019.
- 11. "Chemical Looping Combustion: An Efficient CO<sub>2</sub> Capture Method," *Cleveland State University*, Cleveland, OH, December 5, 2018.
- 12. "Hydrogen Production with CO<sub>2</sub> Capture using Chemical Looping Reforming," *University* of Michigan-Dearborn, Dearborn, MI, October 24, 2018.
- 13. "Development of an Efficient CO<sub>2</sub> Capture Method by using Chemical Looping Combustion," *University of Michigan-Flint*, Flint, MI, April 6, 2017.
- 14. "CO<sub>2</sub> Capture by using Chemical Looping Combustion," *Iowa State University*, Ames, IA, March 2, 2017.
- 15. "Investigation of Hydrogen Production using Chemical Looping Reforming," Keynote Talk, *10th International Conference on Thermal Engineering: Theory and Applications*, Muscat, Oman, February 26 28, 2017.
- "Effect of Purging on the Performance of a PEM Fuel Cell Stack with a Dead-End Anode," Keynote Talk, *International Conference on Battery and Fuel Cell Technology*, Dubai, UAE, December 8 – 9, 2016.
- 17. "Vision for the Discipline and Department of Engineering," *St. Mary's University*, San Antonio, TX, February 18, 2016.
- 18. "Investigation of Hydrogen Generation in a Three Reactor Chemical Looping Reforming Process," *6th TRC-JCCP / Idemitsu Workshop*, Abu Dhabi, UAE, February 11, 2016.
- 19. "Hydrogen Production using Chemical Looping Reforming," Keynote Talk, 5th TRC-JCCP / Idemitsu Workshop, Abu Dhabi, UAE, February 12, 2015.
- 20. "Development of an Efficient CO<sub>2</sub> Capture Method by using Chemical Looping Combustion," *University of Wisconsin Milwaukee*, Milwaukee, WI, May 7, 2014.
- 21. "Development of an Efficient CO<sub>2</sub> Capture Method by using Chemical Looping Combustion," *King Abdullah University of Science and Technology*, Thuwal, Saudi Arabia, February 23, 2014.
- 22. "Development of an Efficient CO<sub>2</sub> Capture Method by using Chemical Looping Combustion," *AlHosn University*, Abu Dhabi, UAE, November 27, 2013.
- 23. "Catalyst-based Aftertreatment Systems for Diesel Engine Emission Control," 9<sup>th</sup> International Conference and Exhibition on Chemistry in Industry (ChemIndix 2013), Bahrain, November 5, 2013.
- 24. "CFD Simulations of Fuel Reactor for a Chemical Looping Combustion Process," *Professor Revankar's Group at the Division of Advanced Nuclear Engineering at Pohang University of Science & Technology (POSTECH)*, Pohang, Korea, May22, 2013.
- 25. "CO<sub>2</sub> Capture by using Chemical Looping Combustion," *King Fahd University of Petroleum & Minerals*, Dhahran, Saudi Arabia, April 28, 2013.
- 26. "Research on Carbon Capture and Clean Mobility," *South East University*, Nanjing, China, July 5, 2012.

- 27. "Role of Catalyst-based Aftertreatment Systems in the Development of Eco-friendly Mobility," *Masdar Institute of Science & Technology*, Abu Dhabi, UAE, May 15, 2012.
- 28. "Research on Clean and Sustainable Mobility," *AlHosn University*, Abu Dhabi, UAE, May 14, 2012.
- 29. "Integration of CO<sub>2</sub> Capture using Chemical Looping Combustion with Power Plants," *Pakistan's Energy Options: Availability and Affordability, and the Role of Regional Grids,* Islamabad, Pakistan, March 29, 2012.
- 30. "CO<sub>2</sub> Capture by using Chemical Looping Combustion," *National University of Science & Technology*, Islamabad, Pakistan, March 28, 2012
- 31. "CO<sub>2</sub> Capture by using Chemical Looping Combustion," *Masdar Institute & University of Sydney Workshop*, Abu Dhabi, UAE, April 24, 2011.
- 32. "Research on Clean and Sustainable Mobility," *New York University High Performance Computing (HPC) Conference,* Abu Dhabi, UAE, January 9–10, 2011.
- 33. "CO<sub>2</sub> Capture by using Chemical Looping," *EU-GCC Clean Energy Network Meeting*, Dubai, UAE, November 30 December 1, 2010.
- 34. "Research on Sustainable Mobility and the Vision for the Interdisciplinary Institute of Sustainability," GIS Institute for Sustainability, *Rochester Institute of Technology*, Rochester, NY, March 22, 2010.
- 35. "Modeling of Polymer Electrolyte Membrane (PEM) Fuel Cells," *Masdar Institute of Science & Technology*, Abu Dhabi, UAE, March 16, 2010.
- "Dynamic Behavior of Polymer Electrolyte Membrane (PEM) Fuel Cells," Department of Mechanical Engineering, *American University of Sharjah*, Sharjah, UAE, February 22, 2010,
- 37. "Dynamic Behavior of Polymer Electrolyte Membrane (PEM) Fuel Cells," Department of Mechanical Engineering, *Polytechnic Institute of New York University*, Brooklyn, NY, April 16, 2009.
- 38. "Dynamic Behavior of Polymer Electrolyte Membrane (PEM) Fuel Cells," Department of Mechanical Engineering, *Catholic University of America*, Washington, DC, March 11, 2009.
- 39. "Emission Reduction Technologies for Gasoline and Diesel Engines," Department of Mechanical Engineering, *University of Alberta*, Edmonton, AL, Canada, Nov 24, 2008.
- "Modeling of Catalyst-based Aftertreatment Systems for Engine Emission Control," Department of Mechanical Engineering, *City College of New York*, New York, NY, April 3, 2008.
- 41. "Research on Fuel Cell and Emission Control," *Technology Review with Sustainable Mobility Technology and Hybrid Vehicle Programs of Ford Motor Company*, Dearborn, MI, February 8, 2008.
- 42. "Control of Engine Exhaust Emissions," Department of Mechanical & Industrial Engineering, *Northeastern University*, Boston, MA, March 15, 2007.
- 43. "Control of Engine Exhaust Emissions," Department of Mechanical Engineering, *NC State University*, Raleigh, NC, September 12, 2006.
- 44. "Powertrain Research Focus," *Technology Review with BorgWarner*, Dearborn, MI, April 10, 2006.
- 45. "Automotive Catalyst Research," *Toyota Motor Company*, Ann Arbor, MI, Jan' 20, 2006.
- 46. "Electrochemistry and Thermodynamics of Fuel Cells," *NED University*, Karachi, Pakistan, January 4, 2006.
- 47. "Combustion Assisted Thermal Spray Coatings," *NED University*, Karachi, Pakistan, January 7, 2006.
- 48. "Powertrain & Emissions," Technology Review with Mexican Delegation, Dearborn, MI,

November 30, 2005.

- 49. "Diesel Emissions Control," *Technology Review with ArvinMeritor*, Dearborn, MI, November 9, 2005.
- 50. "Effect of Transient Exhaust Condition on Thermal Regeneration of Diesel Particulate Filters," *Seventh DOE Crosscut Workshop on Lean Emissions Reduction Simulation*, Detroit Diesel Corporation, Detroit, MI, Jun 16-17, 2004.
- 51. "Modeling of Automotive Catalytic Converters," *DaimlerChrysler Corporation*, Chrysler Technical Center, Auburn Hills, MI, May 23, 2003.
- 52. "Automotive Borne Air Pollution and Control Measures," *NED University,* Karachi, Pakistan, January 8, 2003.
- 53. "Performance Analysis of Catalytic Converters under Transient Conditions," *Twenty-sixth AMSE Annual Conference,* Dearborn, MI, October 26-28, 2001.
- 54. "Modeling and Simulation of Three-Way Catalysts," *First DOE Crosscut Workshop on Lean Emissions Reduction Simulation*, National Transportation Research Center, Knoxville, TN, May 7-8, 2001.
- 55. "Abatement of Engine Exhaust Emissions through Catalytic Converters: Modeling and Simulation," *Eighth Biennial APSENA Conference*, Pakistan Academy of Sciences, Islamabad, Pakistan, January 3-4, 2001.
- 56. "Transient Modeling of Automotive Catalytic Converters," *SIAM Eighth International Conference on Numerical Combustion (Mini Symposium on Catalysts),* Amelia Island, FL, March 5-8, 2000.
- 57. "Effects of Radiative Losses, Changes in Global Stoichiometric Conditions and Partial Premixing on Unsteady, Strained Diffusion Flames," Department of Mechanical Engineering, *Vanderbilt University*, Nashville, TN, April 26, 1999.

# Grants

- "Thermochemical Energy Storage for Concentrated Solar Power (CSP) Plants," Sponsor: Northern Illinois GreatJourney Assistantship, Dates: Aug '20 – May '21, Amount: \$16,747.
- "Investigation of Hydrogen Production with CO2 Capture using Chemical Looping Reforming," Sponsor: Northern Illinois University, Dates: Jul '19 – Jun '22, Amount: \$194,000.
- "Developing Thermochemical Energy Storage for Concentrated Solar Power (CSP) Plants," Sponsor: Office of Research and Sponsored Programs, The University of Michigan-Flint, Dates: Jan '18 – Dec '20, Amount: \$20,000.
- 4. "Develop a Baking Kiln Model to Improve Kiln Design and Performance," Sponsor: Emirates Global Aluminum (EGA), Dates: Oct '15 – Sep '17, Amount: \$299,562.
- 5. "7<sup>th</sup> International Conference for Applied Energy," Sponsor: Abu Dhabi Education Council (ADEC), Dates: Oct '14 Sep '15, Amount: \$ 95,109.
- 6. "7<sup>th</sup> International Conference for Applied Energy," Sponsor: Abu Dhabi Convention Bureau (ADCB), Dates: Oct '14 – Sep '15, Amount: \$ 20,380.
- 7. "7<sup>th</sup> International Conference for Applied Energy," Sponsor: Applied Energy Innovation Institute, Dates: Oct '14 – Sep '15, Amount: \$ 20,000.
- 8. "Advanced Thermal Energy Storage System Directly Charged by Concentrated Solar Power," Sponsor: Masdar/MIT Flagship Project Funds, Dates: Jul '14 – Jun '17, Amount: \$ 3,000,000 (co-PI) (Masdar team share: \$ 1,400,000).
- 9. "Experimental and Computational Investigation of the Pressure Buildup due to Fines Deposition in Trickle-Bed Reactor," Takreer Research Center, Dates: Jun '13 – May '16,

Amount: \$570,000 (CoPI) (Shamim's share: \$285,000).

- 10. "CO<sub>2</sub> Capture by using Chemical Looping Combustion (CLC)", Sponsor: Masdar Institute, Dates: Apr '14 Dec '14, Amount: \$40,000.
- 11. "Modeling and Optimization of Combustion Assisted Thermal Spray Processes", Dates: Jul '12 Jun '13, Mubadala Aerospace, Amount: \$82,000.
- "Investigation of Hydrogen Production by Solid Oxide Steam Electrolyzer as a Renewable Energy Storage Technology", Dates: Jan '12 – Dec '12, Masdar Institute, Amount: \$100,000.
- 13. "Wind Energy: Resources Assessment in Abu Dhabi and Low to High Fidelity Model Development", Dates: Jan '12 Dec '12, Masdar Institute, Amount: \$100,000 (Co PI).
- "CO<sub>2</sub> Capture by using Chemical Looping Combustion (CLC)", Sponsor: Masdar/MIT Collaborative Funds, Dates: Sep '10 Aug '13, Amount: \$700,000 (Shamim's share: \$300,000).
- 15. "Investigation of Water and Thermal Transports in the PEM Fuel Cell during Transient Conditions", Dates: Dec '10 Dec '12, Sponsor: Masdar Institute, Amount: \$99,977.
- "Novel Method for Coproduction of CH<sub>4</sub> and Syngas from Municipal Solid Waste", Dates: Dec '10 – Dec '11, Sponsor: Masdar Institute, Amount: \$99,977 (Co PI).
- 17. "Modeling of Integrated SCR-DPF System for Lean Burn Diesel Engines," Sponsor: Ford Motor Company, Dates: Jan '06 Jan '10, Amount: \$120,000.
- 18. "Modeling of Integrated SCR-DPF Systems," Sponsor: HP Center for Engineering Education & Practice (HP-CEEP), Dates: Sep '07 Aug '09, Amount: \$60,000.
- "Development of a Technology Map of Emission Reduction Technologies for Gasoline Engines," Sponsor: Nissan Motor Company, Dates: Dec '05 May '06, Amount: \$52,575.
- 20. "Development of Thermal Spray Technology and Tools for Rapid Prototyping, Part Refurbishing and Reengineering," Sponsor: US Department of Defense (Army), Dates: Oct '03 – Oct '07, Amount: \$1,528,800 (Co PI).
- 21. "Research in Combustion Engine and Exhaust Emissions," Sponsor: National Science Foundation (NSF), Dates: Apr '03 Mar '06, Amount: \$185,349 (Co PI).
- 22. "NUE: Nanoscience and Nanotechonology Undergraduate Education at the University of Michigan-Dearborn," Sponsor: NSF, Dates: Sep'03–Aug'05, Amount: \$100,000 (Co PI).
- 23. "MRI: Acquisition of Cluster of High Performance Workstations for Research in Thermo-Fluid Sciences," Sponsor: NSF, Dates: Sep '03 – Aug '05, Amount: \$100,000 (Co PI).
- 24. "Development of a Water Shedding Model for an Automotive Heat Exchanger," Sponsor: Visteon Corporation, Dates: Sep '05 Aug '06, Amount: \$10,000.
- 25. "Development of a Computational Model for Water and Thermal Management of PEM Fuel Cells," Sponsor: HP Center for Engineering Education & Practice (HP-CEEP), Dates: Sep '03 – Aug '06, Amount: \$60,000 (Co PI).
- 26. "Modeling of NOx Trap Systems for Diesel Engine Applications," Sponsor: University of Michigan-Ann Arbor, Dates: Jan '02 Sep '03, Amount: \$10,000.
- 27. "NOx Trap Systems for Diesel and Lean Burn Engine Applications: Modeling and Simulations," Sponsor: HP-Center for Engineering Education & Practice (HP-CEEP), Dates: Sep '01 Aug '04, Amount: \$60,000.
- 28. "Development of a Burn Model for Diesel Combustion," Sponsor: Ford Motor Company, Dates: Nov '00 Aug '01, Amount: \$25,000.
- 29. "Web-Based Thermo-Fluids Laboratory," Sponsor: Ameritech, Dates: May '01 Apr '03, Amount: \$27,150.
- 30. "High Performance Computing Initiative: Combustion Modeling," Sponsor: The University of Michigan-Dearborn, Dates: Apr '01 Mar '02, Amount: \$10,000.

- "Dynamic Response of Catalytic Converters to Changes in Temperature and Composition," Sponsor: Oak Ridge National Laboratory (DOE), Dates: Jul '00 – Sep '00, Amount: \$15,435.
- 32. "Benchmark Study of Three-dimensional Combustion Models for Engine Simulation using StarCD and KIVA," Sponsor: Ford Motor Company, Dates: Sep '99 – Aug '00, Amount: \$75,000 (Co PI).
- 33. "Computational Modeling of Catalytic Converters," Sponsor: Oak Ridge National Laboratory (DOE), Dates: Aug '99 Sep '99, Amount: \$10,559.
- 34. "Effect of Lewis Number on Radiative Extinction and Flamelet Modeling," Sponsor: Rackham Fellowships and Grants, The University of Michigan-Ann Arbor, Dates: Jan '00 – Dec '01, Amount: \$15,000.
- 35. "A Study of Time Dependent Partial Premixing and its Effects on Radiating Flamelets," Sponsor: University of Michigan-Ann Arbor, Dates: Mar '99 – Jun '00, Amount: \$8,525.
- 36. "Performance Analysis of Catalytic Converters," Sponsor: HP Center for Engineering Education & Practice (HP-CEEP), Dates: Jan '98 Aug '01, Amount: \$41,000.
  "Development of Numerical Models for Catalytic Converters," Sponsor: Ford Scientific Research Laboratory, Dates: Sep '97 Aug '99, Sponsor Amount: \$200,000 (Co PI).

# SERVICE

# Committee Assignments at the Northern Illinois University

- College of Engineering and Engineering Technology Senate (19 present)
- College of Engineering and Engineering Technology Academic Performance Committee (19 present)
- Mechanical Engineering Assessment Committee (19 present)
- College of Engineering and Engineering Technology Strategic Plan Taskforce (19 21)
- Mechanical Engineering Graduate Committee (Chair 19 19)

# Committee Assignments at the University of Michigan

- College of Arts and Sciences Council of Chairs (17 19)
- Mechanical Engineering Graduate Committee (Chair 18 19)
- College Course and Curriculum Committee (18 19)
- Faculty Senate (Chair 08–09, 06–07; Vice Chair 05–06; Member 03–09)
- Faculty Senate Council (Executive and Leadership Body for the Faculty Senate) (Chair 08–09, 06–07; Vice Chair 05–06)
- University Promotion and Tenure Committee (Chair 05–06; Member 04–09)
- *Member*, University Provost Evaluation Committee (Feb '05– Jun '05)
- *Member*, University Chancellor Evaluation Committee (Dec'08–Aug'09, Dec'03–Jun'04)
- *Member,* Campus Research Committee (03–06)
- *Member*, Campus Graduate Studies Board (06–09)
- *Member*, Task Force for Mentoring Junior Faculty (03–04)
- ME Department Faculty Search Committee (Chair Sep '07 Jul '08; Member 99–01)
- *Member*, IMSE Department Chair Search Committee (Sep '08– May '09)
- *Member*, ME Department ABET Committee (99–04)
- *Member*, ME Department Graduate Studies Committee (99–06)
- *Member*, ME Department Graduate Program Review Committee (03–05)

- *Member*, ME Department Undergraduate Studies Committee (Sep '06– Jul '09)
- *Member*, ME Department Chair Evaluation Committee (Sep '01–Oct '01)
- *Member*, Computer Committee of the College of Engineering (98–2009)
- *Member*, Lap Top Committee of the College of Engineering (Mar '02–Dec '02)
- *Member,* Thermo-Fluids Curricula Review Committee (Nov '00– Jul '09)
- *Group Leader*, Thermo-Fluids ABET Assessment Committee (Sep '01–04)
- *Member,* Thermo-Fluids Laboratory Development Committee (Sep '97–Aug '98)
- *Chair*, ME Department Graduate Program (05–06)
- *Faculty Secretary*, ME Department (98–00)
- *Advisor* of undergraduate (junior/senior) students (Sep '08–Aug '09, Sep '97– Aug '05)
- *Faculty Advisor*, Golden Key Honor Society (Sep '07–Aug '09)

# Committee Assignments at the Masdar Institute of Science & Technology

- *Chair*, Institute PhD Admissions Committee (Mar '11 Jan '13; Jan '14 Mar '16)
- *Chair*, Institute PhD Committee (Mar '14 Mar '16)
- *Chair*, Mechanical Engineering Course and Curriculum Committee (Mar '16 Aug '17)
- *Chair*, Mechanical Engineering PhD Qualifying Exam Committee (Oct '13–May '14)
- *Faculty Advisor*, ASME Student Chapter (Oct '13 Aug '17)
- *Chair*, Mechanical Engineering Faculty Search Committee (Jul '10 Jul '13)
- *Chair*, Mechanical Engineering Student Selection Committee (Jul '10 Mar '13)
- *Member*, Mechanical Engineering Program Accreditation Committee (Sep '12 Jul '13)
- *Member*, Institute Admissions Committee (Jan '12 Jul '12; Jan'14 Mar '16)
- *Member*, Chemical Engineering Faculty Search Committee (Sep '10 Mar '11)
- *Member*, Institute Graduate Committee (Oct '10 Jul '13)
- *Member,* Institute Center for Energy (iEnergy) Advisory Committee (Oct '13 Mar '16)
- *Member*, Institute Faculty Promotion Committee (Jul '11 Dec '12; May'14 Aug '17)
- *Member*, Institute Distinguished Thesis Award Committee (May '11 Jun '11)

# **Professional Organizations**

- *Subject Editor*, Applied Energy (impact factor 11.2)
- Associate Editor, ASME Journal of Thermal Science and Engineering Applications
- *Guest Editor*, Applied Energy Special Issue in 2016 (impact factor 11.2)
- Member Editorial Board, Proceedings of the Combustion Institute Volume 28
- *Member Editorial Board*, Energies
- Member Editorial Board, Universal Journal of Mechanical Sciences and Technology
- Member Editorial Board, Far East Journal of Mechanical Engineering and Physics
- *Member Editorial Board*, JP Journal of Heat and Mass Transfer (2006-2009)
- *Member Editorial Board*, The Open Fuels and Energy Science Journal
- *Fellow,* American Society of Mechanical Engineers (ASME)
- *Fellow,* International Engineering and Technology Institute
- *Member*, Board of Associates of the ASME Internal Combustion Engine Division
- Chair, ASME K-11 Committee on Combustion
- *Journal Reviewer*, Combustion & Flame, Combustion Science & Technology, Applied Catalysis, Catalysis Today, SAE Transactions, RSC Advances, Advances in Chemical Engineering, Chemical Engineering Communications, Chemical Engineering Journal, Industrial & Engineering Chemistry Research, ASME Journal of Engineering for Gas

Turbines and Power, ASME Journal of Dynamic Systems, ASME Journal of Heat Transfer, Measurement and Control, Transactions of ASABE, International Journal of Thermal Sciences, International Journal of Heat and Mass Transfer, International Journal of Hydrogen Energy, International Journal of Energy Research, Applied Energy, Applied Thermal Engineering, International Journal of Energy Engineering, Proceedings of the Combustion Institute Volumes 29-32, 34

- Book Reviewer, McGraw Hills, John Wiley, Kluwar Academic Publishers
- *Proposal Reviewer*, National Science Foundation (NSF), US Department of Energy (DOE), International Science Center for the US State Department, Natural Sciences and Engineering Research Council of Canada (NSERC), Netherlands Research Council for Chemical Sciences (CW), Ontario Center of Excellence, Qatar National Research Fund, Massachusetts Institute of Technology (MIT) Energy Initiative, University of California Energy Institute, Singapore Agency for Science, Technology and Research, American University of Sharjah
- *External Reviewer for Promotion & Tenure*, Department of Mechanical Engineering, University of Hong Kong, Indiana University-Purdue University Indianapolis, Rowan University, New Jersey, Al- Balqa'a Applied University, Al-Salt, Jordan
- *Presenting Panelist,* Workshop on "Computational Catalysis for the Automotive Industry: The Scientific Research Needs and Agenda," Sponsored by the US DOE Office of Science, Dearborn, MI, June 7-8, 1999
- *Workshop Host,* 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup> DOE Crosscut Workshops on Lean Emissions Reduction Simulation, Dearborn, MI, 2005, 2006, 2007, 2008, 2009, 2010.
- *Conference Co-Chair*, 7<sup>th</sup> International Conference on Applied Energy ICAE2015, Abu Dhabi, UAE, March 29 31, 2015.
- Organizer and Chair for two sessions, at the 2021 ASME International Mechanical Engineering Congress and Exposition, Virtual Conference, November 1 5, 2021.
- *Member Scientific Committee*, 13<sup>th</sup> International Conference on Applied Energy ICAE 2021, Bangkok, Thailand, Nov 29 Dec 2, 2021.
- *Member Technical Committee*, 14<sup>th</sup> International Conference on Thermal Engineering: Theory and Applications, Kuwait City, Kuwait, October 26-28, 2021.
- *Member Scientific Committee*, 12<sup>th</sup> International Conference on Applied Energy ICAE 2020, Virtual Conference, Dec 1 10, 2020.
- *Member Scientific Committee*, 11<sup>th</sup> International Conference on Applied Energy ICAE 2019, Västerås, Sweden, Aug 12 15, 2019.
- *Member Scientific Committee*, 10<sup>th</sup> International Conference on Applied Energy ICAE 2018, Hong Kong, Aug 22 25, 2018.
- *Member Technical Committee*, 9<sup>th</sup> International Conference on Applied Energy ICAE2016, Cardiff, UK, Aug 21 24, 2017.
- *Member Technical Committee*, 10<sup>th</sup> International Conference on Thermal Engineering: Theory and Applications, Muscat, Oman, February 26 28, 2017.
- *Member Organizing Committee,* International Conference on Battery and Fuel Cell Technology, Dubai, UAE, December 8 9, 2016.
- *Member Organizing Committee*, SolarPACES 2016 Conference, Abu Dhabi, UAE, October 11 14, 2016.
- *Session Chair,* "Heat and Mass Transfer I," at the 10<sup>th</sup> International Conference on Thermal Engineering: Theory and Applications, Muscat, Oman, February 26 28, 2017.
- Session Chair, "Energy & Fuels (Nuclear Engineering)," at the 2017 UAE Graduate Student Research Conference, Abu Dhabi, UAE, March 20-21, 2017.

- *Member Technical Committee*, 8<sup>th</sup> International Conference on Applied Energy ICAE2016, Beijing, China, Oct 8 11, 2016.
- Session Chair, "Engine and Emission Reduction" at the 8<sup>th</sup> International Conference on Applied Energy ICAE2016, Beijing, China, Oct 8 11, 2016.
- *Member Technical Committee*, 9<sup>th</sup> International Conference on Thermal Engineering: Theory and Applications, Abu Dhabi, UAE, Mar 24 26, 2016.
- *Member Technical Committee*, UAE Graduate Student Research Conference, 2015, 2016.
- *Session Chair*, "Renewable Energy," at the 9<sup>th</sup> International Conference on Thermal Engineering: Theory and Applications, Abu Dhabi, UAE, Mar 24 26, 2016.
- *Session Chair*, "Thermal Energy Systems," at the IEEE International Conference on Smart Grid Engineering, Oshawa, Canada, August 17 19, 2015.
- Session Chair, "Experimental Combustion and Fuels," at the 5<sup>th</sup> Annual Meeting of the Saudi Arabian Section of the Combustion Institute, Riyadh, Saudi Arabia, May 3-4, 2015.
- *Track Organizer and Chair,* "Renewable Energy," at the 2015 International Conference on Applied Energy ICAE2015, Abu Dhabi, UAE, March 29 31, 2015.
- Session Chair, "Energy and Petroleum," at the 2015 UAE Graduate Student Research Conference, Abu Dhabi, UAE, March 22-24, 2015.
- *Session Chair,* "Session VIII," at the 4<sup>th</sup> International Workshop on Oxy-fuel FBC Technology, Nanjing, China, November 5 7, 2014.
- *Track Organizer,* "Energy Storage" at the 2014 International Conference on Applied Energy ICAE2014, Taipei, Taiwan, May 30 June 2, 2014.
- *Chair for two sessions,* "PV Cells" at the 2014 International Conference on Applied Energy ICAE2014, Taipei, Taiwan, May 30 June 2, 2014.
- Organizer and Chair for two sessions, "Industrial Combustion, Fire, and Reacting Flows" at the 2013 International Mechanical Engineering Congress and Exposition, San Diego, California, November 15-21, 2013.
- *Session Organizer and Chair,* "Industrial Combustion, Fire, and Reacting Flows" at the 2013 Summer Heat Transfer Conference, Minneapolis, Minnesota, July 14-19, 2013.
- *Track Organizer and Session Chair,* "Fuel Cells and Hydrogen Energy" at the 2013 International Conference on Applied Energy ICAE2013, Pretoria, South Africa, July 1-4, 2013.
- Session Chair, "Heat Transfer under Extreme Conditions" at the 2012 ASME International Mechanical Engineering Congress and Exposition, Houston, Texas, November 9-15, 2012.
- Session Organizer and Chair, "Fuel Cells and Hydrogen Energy" at the 2012. International Conference on Applied Energy ICAE2012, Suzhou, China, July 5-8, 2012.
- Organizer and Chair for three sessions, "Industrial Combustion, Fire, and Reacting Flows" at the 2011 International Mechanical Engineering Congress and Exposition, Denver, Colorado, November 11-17, 2011.
- *Session Chair,* "Biogas and Biomass" at Sixth International Green Energy Conference IGEC-VI, Eskischir, Turkey, Jun 5 9, 2011.
- *Session Organizer and Chair,* "General Emissions" at the SAE International Powertrains, Fuels & Lubricants Meeting, Rio de Janeiro, Brazil, 2010.
- Session Organizer and Chair, "Fuel Cell Technologies" at the 5th International Ege Energy Symposium and Exhibition, Denizli, Turkey, 2010.
- *Track Chair,* "Combustion Technology" at the 4th International Exergy, Energy and Environment Symposium, Sharjah, UAE, 2009.
- Session Organizer and Chair, "Aftertreatment Systems Modeling and Testing" at the

ASME Internal Combustion Engine Division 2006 Spring Technical Conference, Aachen, Germany, 2006.

- Session Organizer and Chair, "Aftertreatment Technologies" at the ASME Internal Combustion Engine Division 2005 Fall Technical Conference, Ottawa, Canada, 2005.
- *Session Chair,* "Heterogeneous Combustion III" at the 4<sup>th</sup> Joint Meeting of the Combustion Institute, Philadelphia, 2005.
- Session Co-Organizer and Co-Chair, "EGR and Emission Control" at the ASME Internal Combustion Engine Division 2002 Fall Technical Conference, New Orleans, 2002.
- *Session Co-Chair,* "Internal Combustion Engines" at the 2000 Central States Combustion Institute Meeting, Indianapolis, 2000.
- *Member,* American Society of Mechanical Engineers (ASME), Society of Automotive Engineers (SAE), Combustion Institute (CI), American Society for Engineering Education (ASEE), Sigma Xi, The Scientific Research Society

# HONORS AND SPECIAL ACHIEVEMENTS

- Included in the Stanford University's World's Top 2% Scientists List (2022, 2023)
- Appointed International External Advisory Board Member for Mechanical Engineering Program at the Universiti Teknologi PETRONAS, Malaysia (2021-22, 2023-24)
- Elected as the Fellow of International Engineering and Technology Institute (2020)
- Appointed Associate Editor of ASME Journal of Thermal Science and Engineering Applications (2020-2023, 2023-2026)
- Elected as the Chair of ASME K-11 Committee (2020-2023, 2023-2024)
- Elected as the Fellow of Pakistan Academy of Engineering (2019)
- Elected as the Fellow of American Society of Mechanical Engineers (ASME) (2016)
- Inaugural Outstanding Faculty of the Masdar Institute Award (2015)
- Appointed Guest Editor of Applied Energy Special Issue (ICAE2015) (published in 2017) (impact factor 11.2)
- Appointed Subject Editor of Applied Energy (2015; reappointed 2016-2018, 2019-2021, 2022-2024) (impact factor 11.2)
- Appreciation Award from Abu Dhabi Convention Bureau for efforts in building the Abu Dhabi Business Events Industry (2014)
- Mentored a Post-doctoral Fellow for the Tenure-track Faculty Position at McGill University (2013)
- Supervised a Graduate Student who received the Best Mechanical Engineering MSc Thesis Award (2013)
- Authored a Paper which was among the Top 10 Most Downloaded Paper on ASME Fuel Cell Website in December (2012)
- Editorial Board Member of Energies (2020)
- Editorial Board Member of Universal Journal of Mechanical Sciences & Tech. (2012)
- Editorial Board Member of Far East Journal of Mechanical Eng. & Physics (2010)
- American University of Sharjah, U.A.E. Visiting Faculty Fellowship (2009–10)
- US Department of Energy Summer Faculty Fellowship, Oak Ridge (2008 & 2003)
- Editorial Board Member of The Open Fuels and Energy Science Journal (2008)
- N.E.D. University of Eng. & Tech., Karachi, Visiting Faculty Fellowship (2008 & 2005)
- Michigan Memorial Phoenix Energy Institute's Faculty Affiliate (2007)
- Editorial Board Member of JP Journal of Heat and Mass Transfer (2006)
- Society of Automotive Engineers (SAE) Ralph Teetor Award (2004)

- National University of Singapore, Visiting Faculty Fellowship (2004)
- Elected to the Board of Associates of ASME I.C. Engine Division (2002)
- Registered Professional Engineer, State of Michigan (2002)
- Rackham Faculty Fellowship, The University of Michigan, Ann Arbor (2000)
- Listed in Who's Who in Science and Engineering, and International Who's Who of Professionals (2000); Who's Who in America 2001 (2001)
- NASA/DOE Research Assistantship, The University of Michigan (1993–97)
- Department's short listed candidate for Rackham Predoctoral Fellowship (declined nomination due to early graduation date), The University of Michigan (1996)
- Graduate Fellowship, Michigan State University, East Lansing, MI (1992)
- University of Windsor Postgraduate Scholarship, Ontario, Canada (1991–92)
- Offered Quaid-e-Azam Aligarh Trust Scholarship, Karachi, Pakistan (1989)
- Career Forum Scholarship, Karachi, Pakistan (1988)
- Graduated from N.E.D. University in top 2% rank, Karachi, Pakistan (1988)
- Fauji Foundation Merit Scholarship, Rawalpindi, Pakistan (1982–86)