

JAMIL A. KHAN

Professor

Department of Mechanical Engineering, College of Engineering

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PROFESSIONAL PREPARATION

Ph.D. Mechanical Engineering, Clemson University, 1988

M.S. Mechanical Engineering, Clemson University, 1984

B.Sc. Mechanical Engineering, Bangladesh Univ. of Engineering & Technology, 1977

APPOINTMENTS

Chair of Mechanical Engineering, University of South Carolina, Nov. 2007-Present

Interim Chair of Mechanical Engineering, University of South Carolina, July 2005-Oct. 2007

Professor of Mechanical Engineering, University of South Carolina, August 2004-Present

Associate Prof. of Mechanical Engineering, University of South Carolina, August 1996-July 2004

Interim Assistant Dean for Minority and Woman, College of Engineering, USC, August 1997-1998

Assistant Prof. of Mechanical Engineering, University of South Carolina, Aug 1990-July 1996

Assistant Professor, Valdosta State University, Valdosta, GA, September 1988- June 1990

Licensed Professional Engineer in South Carolina

Member of the American Society of Mechanical Engineers

RELEVANT RESEARCH EXPERIENCE

- Professor Khan has been involved with Ship System Thermal Management (SSTM) initiative sponsored by ONR for the last four years. As part of this initiative he has developed and incorporated several thermal models for dynamic simulation in VTB (work funded by ONR)
- Professor Khan has performed research in thermal management issued related to high band gap devices fabricated with Gallium Nitride (work funded by CMAT, SC)
- Professor Khan has developed dynamic thermo-chemical models of tubular Solid Oxide Fuel Cell for hybrid power generating system (work funded by ESRDC consortium, ONR)
- Professor Khan studied fluid flow and pressure drop related to micro-channel flow for Accelerator Production of Tritium (funded buy DOE SCUREF)

AWARDS

- Finalist Mungo Graduate Teaching Award, 2002 and in 2004
- Litman Teaching Award, College of Engineering, USC, 1999 (Highest teaching award of the college, awarded to 1 faculty per year)
- Mungo Teaching Award (University of South Carolina Teaching Award), 1996
- Professor of the Year, Pi Tau Sigma (Mechanical Engineering Honors Society), 1996
- Teacher of the Year, National Society of Black Engineers, 1993

- Best Teacher of the Year, National Society of Black Engineers, 1994
- Lilly Teaching Fellow, University of South Carolina, 1992-93
- Outstanding Graduate Teaching Assistant, Clemson University, 1988

SYNNERGISTIC ACTIVITIES

Has a very strong teaching record, he serves as the **Director of Undergraduate Studies** in the Department of Mechanical Engineering. Khan has a strong record of mentoring and assisting minority students. He is the **faculty advisor of the National Society of Black Engineer's (NSBE) USC**. During the time Khan was the faculty advisor of NSBE, its members has taken on several projects to enhance retention and success of minority students in engineering. Dr. Khan continues to be an active participant in the Ronald McNair Summer Research Program. He leads the research faculty in coordinating the summer research program and plays a role in helping students develop research programs and mentoring them through the research process. He is active with the SCAMP program. Khan has also served as the Acting **Assistant Dean of Minorities and Women at USC**.

RESEARCH INTERESTS:

Modeling of manufacturing processes, temperature distribution during machining, heat transfer and fluid flow with phase change (solidification/melting in casting, welding), computational and experimental fluid dynamics related to contaminants transport in rooms, heat transfer in porous media, micro-channel heat transfer. Thermodynamic analysis of IC Engines, CFD analysis of combustion processes etc.

PROFESSIONAL SERVICE: Technical Reviewer for: *J. of Mechanical Engineering Research and Development; Int. Journal of Mass and Heat Transfer; J. of Metallurgical Transactions; J. of Numerical Heat Transfe;AIAA J. Thermo Physics and Heat Transfer; ASME J. of Heat Transfer.*

FUNDED RESEARCH:

Had external funding (as either PI or CoPI) for every single year (morethan \$5 million total). Funding sources: NSF, DoE, NSF/EPSCoR, DHHS/NIOSH, SCUREF, SCHWMF, and Industries. ***The following are currently active grants:*** a \$ 607, 228 DHHS/NIOSH grant as Co-PI with Feigley; a \$155,000 grant from Westinghouse Company as PI, a \$ 640,000 grant from Army TACOM as Co-PI with Huhns.

SELECTED REFEREED ARTICLES IN PRINT:

Gholap, A., Khan, J. A., “Design and multiobjective optimization of heat exchangers for refrigerators”, *Journal of Applied Energy*, Volume 84, Issue 12, pp. 1226-1239, 2007
Wei Jiang, Jamil Khan, Roger A. Dougal “***Dynamic Centrifugal Compressor Model for System Simulation***”. *Journal of Power Sources* , Volume 158, Issue 2 , 25 August 2006, Pages 1333-1343.

- Wei Jiang, Ruixian Fang, Roger A. Dougal, Jamil Khan, “**Dynamic Electro-thermal Simulation of a Tubular Solid Oxide Fuel (SOFC)**”. 2006 ASME International Mechanical Engineering Congress & Exposition (IMECE), IMECE2006-16279 , Nov., 2006
- Wei Jiang, Ruixian Fang, Roger A. Dougal, Jamil Khan, “**Parameter Setting and Analysis of a Dynamic Tubular SOFC Model**”. Journal of Power Sources, Volume 162, Issue 1 , 8 November 2006, Pages 316-326
- Wei Jiang, Ruixian Fang, Roger A. Dougal, Jamil Khan, “**Thermo-electric Model of a Tubular SOFC for Dynamic simulation**”. ASME, Journal of Energy Resources Technology, accepted in Jan. 2007
- Jamil A. Khan, Sujan B. Pakala, Wei Jiang, Knight W. Travis, James S. Tulenko, “**Enhanced Thermal Conductivity for LWR Fuel**”, Nuclear Technology, submitted on Nov., 2006
- Wei Jiang, Ruixian Fang, Jamil Khan, “**Performance Prediction and Dynamic Simulation of Electric Ship Hybrid Power System**”, IEEE ESTS '07 conference, accepted in Jan. 2007
- Wei Jiang, Ruixian Fang, Jamil Khan, “**System Configuration and Performance Studies of Solid Oxide Fuel Cell -Gas Turbine Hybrid Cycle**”, ASME InterPACK '07 conference, accepted in Dec., 2006
- Ruixian Fang, Wei Jiang, Jamil Khan, “**System-Level Dynamic Thermal Modeling and Simulation for an All-Electric Ship Cooling System in VTB**”, IEEE ESTS '07 conference, accepted in Jan. 2007
- Wei Jiang, Ruixian Fang, Roger A. Dougal, Jamil Khan, “**Models Development and Dynamic Simulation of SOFC-Gas Turbine Hybrid System**”, Journal of Fuel Cell Science and Technology, ASME, Submitted on Feb. 2007
- Wei Jiang, Ruixian Fang, Roger A. Dougal, Jamil Khan, “**Control strategies and methodologies in Solid Oxide Fuel Cell power plant development**”, ASME’s 5th International Fuel Cell Science, Engineering & Technology Conference, Submitted on Feb. 2007
- Reynolds, W. Tang, Z. Khandkar, J.A. Khan, and K. Lindner, “ Relationships among weld parameters, hardness distributions, and temperature histories in alloy 7050 friction welds. in print in the *Journal of Science and Technology of Welding and Joining* , 2005
- Ahmed, M.R., Lee, E., Tamanna, S., Feigley, C. G., and Khan, J. A. “Effect of Inlet and Exhaust Locations and Density of Contaminant Gas on Indoor Air Contaminant Concentration”, accepted in the *Journal of Building and Environment*, 2005
- Baig.M. A., Khandkar, M.Z., Khan, J. A., Khan, M.A., Simin, G. “A Study of temperature Field in a GaN Heterostructure Field Effect Transistor”, in *Micro Electronics Journal*, Vol. 34, No. 3, pp. 207-214, 2003.
- Wiseman, B. K., and Khan, J. A., “Evaluation of the radiative properties of a dispersed particulate medium for construction material applications, in *Int. Journal of Heat and Mass Transfer*, Vol. 46, pp. 2291-2303, 2003.
- Khan, J. A., Hinton, J., and Baxter, S. C., “Enhancement of Heat Transfer with Inclined Baffles and Ribs Combined”, in *Journal of Enhanced Heat Transfer*, Vol. 9, No. 3, pp. 137-151, 2002.
- Khandkar, M. Z., Khan, J. A., Reynolds, A. P., “Thermal Modeling of Friction Stir Welding: An Input Torque Based Approach” in the *Journal of Science and Technology of Welding and Joining* , Vol. 8, No. 3, pp. 165-174, 2003.
- Kassem, A., Imran, J., Khan, J. A., “Three-Dimensional Modeling of a Negatively Buoyant Flow in a Diverging Channel” in the *ASCE Journal of Hydraulic Engineering*, Vol. 129, No. 12, 2003.

- Wiseman, B. K., and Khan, J. A., "Evaluation of the radiative properties of a dispersed particulate medium for construction material applications, in *Int. Journal of Heat and Mass Transfer*, Vol. 46, pp. 2291-2303, 2003
- Lee, E., Feigley, C., Khan, J., "An Investigation of Air-inlet Velocity Simulating the Dispersion of Indoor Contaminants Via Computational Fluid Dynamics", in *The Annals of Occupational Hygiene*, Vol. 46, No. 8., pp. 701-712, 2002
- Khandkar, M. Z., Khan, J. A. "Thermal Modeling of Overlap Friction Stir Welding for Al-Alloys", in *Journal of Materials Processing & Manufacturing Science*, Vol. 10, No. 2, pp. 91-105, 2002
- Baig, M. A., Khandkar, M. Z., Khan, J. A., Khan, M.A., Simin, G. "A Study of temperature Field in a GaN Heterostructure Field Effect Transistor", in *Micro Electronics Journal*, Vol. 34, No. 3, pp. 207-214, 2003.
- Reynolds, A.P., Khandkar, Z., Long, T., Tang, W and Khan, J., "Utility of Relatively Simple Models for Understanding Process Parameter Effects on FSW," in *Materials Science Forums*, Vols. 426-432, pp. 2959-2964, 2003
- Bennett, J., Feigley, C., Khan, J., "Comparison of Emission Models with Computational Fluid Dynamics and a Proposed Improved Model" accepted in the *American Industrial Hygiene Association Journal*, 64:739-54 (2003)
- Fleming, W.H., Khan, J. A., Rhodes, C. A., "Effective Heat Transfer in a Metal-Hydride-Based Hydrogen Separation Process, In *Int. Journal of Hydrogen Energy*, Vol. 26, pp. 711-724, 2001.
- Feigley, C., Bennett, J., Khan, J., Lee, E., "Performance of Deterministic Exposure assessment Models for Various Contaminant Source Inlet and Exhaust Locations" in the *American Industrial Hygiene Association Journal* , Vol. 63: pp. 402-412, 2002.
- Feigley, C., Bennett, J., Khan, J., Lee, E., "Improving the Use of Mixing Factors for Dilution Ventilation Design" in the *Applied Occupational and Environmental Hygiene Journal*, Vol. 17, No. 5, pp. 333-43, 2002.
- Khan, J. A., Pohan, A. N., Rhodes, C. A., "Single and Two-Phase Flow Between Two Parallel Micro-Channels: An Experimental Investigation", *Journal of Energy, Heat, and Mass Transfer*, Vol. 22, pp. 293-301, 2002.
- Khan, J.A. Broach, K., and Kabir, A.A.S.A., " Numerical Thermal Model of Resistance Spot Welding in Aluminum," *AIAA Journal of Thermophysics and Heat Transfer*, Vol. 14, No. 1, pp. 88-95, 2000.
- Bennett, J. S., Feigley, C. E., Khan, J.A., and Hosni, M. H. "Comparison of Mathematical Models for Exposure Assessment with Computational Fluid Dynamic Simulation", *J. of Applied Occupational and Environmental Hygiene*, Vol. 15, No. 1, pp. 131-144, 2000.
- Khan, J.A., Xu, L., Chao, Y., and Broach, K. (2000), Numerical Simulation of Resistance Spot Welding Process, *J. of Numerical Heat Transfer*, Part A., Vol. 37, No. 5, pp. 425-446.
- Lijun Xu, Khan, J. A., Zhihang, Chen, "Thermal Load Deviation Model for Superheater and Reheater of a Utility Boiler", in *Journal of Applied Thermal Engineering*, Vol. 20, No.6, pp. 545-558, 2000.
- Khan, J. A., Xu, L, Chao, Y-J., "Nugget Development during Resistance Spot Welding Using A Coupled Thermal-Electrical-Mechanical Model" in the *Journal of Science and Technology of Welding and Joining*, Vol. 4, No.4 , pp.201-207, 1999.
- Hays, A.M., Flora, J.R.V., and Khan, J.A., "Electrolytic Stimulation of Denitrification in Sand Columns-A Research Note" in the *Journal of Water Research*, Vol. 32, No. 9, pp. 2830-1834, 1998.

- Khan, J.A., Fang, Z., and Dutta, S. , "Computational Modeling of Aerosol Particle Transport and Deposition in Abrupt Contraction," in the *Journal of Computer Modeling and Simulation in Engineering*, No.4, Vol. 3, pp. 228-234, Nov. 1998.
- Dutta, S. and Khan, J.A., "Numerical Prediction of Fully Developed Rotating Channel Flow with Modified Two-Equation Turbulence Model," accepted to the *Journal of Mechanical Engineering Research and Development*, Vol. 20-21, pp. 53-70, 1999.
- Lijun Xu and Khan, J.A, Nugget Growth Model for Al-Alloys During Resistance Spot Welding, in *Welding Journal*, Vol. 78, No. 11, pp. 367-s to 372-s, 1999.
- Dutta, S., Zhang, X., Khan, J., and Bell, D. (1999), "Adverse and Favorable Mixed Convection Heat Transfer in a Two-sided Heated Square Channel." in the *Journal of Experimental Thermal and Fluid Science*, vol. 18, pp. 314-322, 1999.
- Khan, J.A. and Tong, X., "Unidirectional Infiltration and Solidification/Remelting of Al-Cu Alloy," *AIAA Journal of Thermophysics and Heat Transfer*, Vol. 12, No. 1, pp. 100-106, 1998.
- Dutta, S., Dutta, P., Jones, R.E., and Khan, J.A. (1998), "Heat Transfer Coefficient Enhancement with Perforated Baffles," *ASME Journal of Heat Transfer*, Vol. 120, No.3, pp795-797, 1998.
- Dutta, S., Morehouse, J.H., and Khan, J.A. (1997), "Numerical Analysis of Laminar Flow and Heat Transfer in a High Temperature Electrolyzer," *International Journal of Hydrogen Energy* Vol. 22, No. 9, pp. 883-895.
- Mitra, S. A., Acosta, G.M., Khan, J. A., and Smith, R.L., "Extraction of Zinc Oxide from Electric Arc Furnace Dust and Zinc Oxide in Aqueous Ammonium Chloride Solutions from 303-363K," in *Journal of Environmental and Health Science* Vol. A32, No. 2, pp. 497-515, 1997.
- Amin, M.R.and Khan, J.A., "Effects of Multiple Obstructions on Conjugate Forced Convection Heat Transfer,," in *Journal of Numerical Heat Transfer*, Part A, Vol. 29, pp. 265-279, 1996.
- Tong, X. and Khan, J. A., "Infiltration and Solidification/Remelting of Pure Metal in a Porous Preform," *ASME Journal of Heat Transfer*, Vol. 118, pp. 173-180, Feb., 1996.
- Tong, X. and Khan, J.A., Amin, M.R., "Enhancement of Heat Transfer by Inserting A Metal Matrix into A Phase Change Material," *Journal of Numerical Heat Transfer*, Part A, Vol. 30, PP. 125-141, 1996.
- Lee, S.F., Maskalenko, E., Acosta, G.M., Khan, J.A., and Smith, R.L., "Separation of Copper from Plastic Waste Material by Air Classification and Water Flotation," in *Journal of Environmental and Health Science*, Vol. A31, No. 5, pp. 1197-1214, 1996.
- Slater, S. A., Khan, J. A., and Smith, R. L., "Transferring Waste Minimization Solutions Between Industrial Categories With a Unit Operations Approach-- I. Chemical and Plating Industries," *Journal of Environmental and Health Science*, Vol. 30, No. 2, pp. 379-406, 1995.
- Morse, J. S., Khan, J., Caldwell, M., Baxter, S., Drake, B. D., and Smith, R. L., "A Unit Operation Approach to Waste Minimization," *Journal of Environmental and Health Science* Vol. 29. No. 7, pp. 1471-1489, 1994.
- Yao, G-F. and Khan, J. A., "A Numerical Study of Two-Dimensional High Rayleigh Number Natural Convection Between Two Reservoirs Connected by a Horizontal Duct" *ASME Journal of Heat Transfer*, Vol. 115, No. 3, pp. 800-803, 1993.
- Khan, J. A. and Yao, G-F., "Comparison of Natural Convection of Water and Air in a Partitioned Rectangular Enclosure" in *Int. J. Heat & Mass Transfer*, Vol. 36, No. 12, pp. 3107-3117, 1993.
- Khan, J. A., Pal, D., and Morse, J. S., "Numerical Modeling of a Rotary Kiln Incinerator," *Journal of Hazardous Waste and Hazardous Materials*, Vol. 10, No. 1, pp 81-95, 1993.

- Khan, J. A. and Morehouse, J. H., "A Metal Matrix for Heat Transfer Enhancement During Phase-Change Processes," *Transactions of ASHRAE*, Vol. 100, part II, pp. 707-714, 1994.
- Khan, J. A., Beasley, D. E., and Alatas, B., "Evaporation From a Packed Bed of Porous Particles Into Superheated Vapor," *Int. J. of Heat and Mass Transfer*, Vol 34, No. 1, pp 267-280, 1991.
- Khan, J. A. and Kumar, R., "Natural Convection in Vertical Annuli: A Numerical Study for Constant Heat Flux Inner Wall," in *ASME Journal of Heat Transfer*, Vol 111, pp 909-915, 1989.
- Khan, J. A. and Beasley, D. E., "Two-dimensional Effects on the Transient Response of a Packed Bed Regenerator," *ASME Journal of Heat Transfer*, Vol. 111, No. 2, pp 328-336, 1989.

GRADUATE STUDENTS: 3 post doctoral researchers;6 Ph.D., 24 MS-Thesis completed, and **currently** advising 4 Ph.D., and 2 M.S students. Lists of the students are provided in the supplementary documents.