

Lamyaa El-Gabry

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Education

PhD Mechanical Engineering; Rensselaer Polytechnic Institute, 2003

Thesis: Local Heat Transfer Distribution on Smooth and Roughened Surfaces under an Array of Angled Impinging Jets

BS Mechanical Engineering; The American University in Cairo, 1998 (highest honors)

Professional Experience

Lecturer, Princeton University, Princeton, New Jersey

8/17 – Present

- Taught courses and labs in Thermodynamics, fluid mechanics, and renewable energy. Developed new courses and labs to modernize curricula and increase student engagement. Supervised undergraduate research projects in broad areas.
- Advised first year science/engineering students on course selection, choosing a major, and adjusting to university life.
- Proposed and implemented international summer internship opportunities for students to address global problems in energy and food production in water-impooverished communities in developing countries.
- Awarded educational grants totaling over \$250,000 to support innovative teaching and learning
- Received outstanding teaching award “Princeton Engineering Commendation List for Outstanding Teaching”

Assistant/Associate Professor, The American University in Cairo, Cairo, Egypt

9/06 – 6/20

- Developed courses and labs in Thermodynamics, fluid mechanics, numerical methods, introduction to engineering
- Advised graduate student master’s thesis research in turbine aerodynamics and heat transfer
- Employed Community Based Learning to engage students in solving engineering problems in the community.
- Consulted on energy projects in the Middle East and North Africa on water and energy
- Recognized for outstanding teaching, received AUC Provost Award for Service in Center for Learning & Teaching

Expert Witness, US Department of Justice, International Trade Field Office, New York, NY

4/18– 3/20

- Reviewed case and provided expert opinion on a topic related to fluid mechanics machinery. Deposed for several hours by Defendant on expert testimony

Principal Engineer/Consultant, Solar Turbines, San Diego, CA

6/17– 3/18

- Trained engineers at Solar Turbines in topics in gas turbine heat transfer and computational fluid dynamics (CFD)
- Modeled using CFD the flow and heat transfer on a film cooled vane to study coolant injection on a contoured endwall compared to data in a linear cascade. Work published and presented at international peer reviewed conference.

Affiliated Senior Faculty/Visiting Researcher, KTH Royal Institute of Technology, Stockholm, Sweden

2010 – 2015

- Conducted experimental research on film cooling flow within an annular vane cascade for a Siemens gas turbine.
- Supervised thesis of PhD student on internal cooling flows. Work resulted in four refereed journal publications.
- Delivered seminars on turbulence modeling and CFD. Advised graduate students on personal/professional matters.

Research Fellow, NASA Glenn Research Center, Cleveland, OH

Summers 2007, 2008, 2010, 2011, 2015

- Developed computational heat transfer models for film cooling flows and analyzed unsteady flows using NASA Glenn code
- Measured experimental aerothermal data on large-scale film cooling hole including detailed turbulence measurements that were novel and extensive and serve as validation data for the research community
- Characterized seal whiskers as part of a biomimicry project. Analyzed whisker geometry and surface details. Measured using Particle Image Velocimetry the flow field in the wake of simulated whiskers of varying morphology.

Consultant, Xzero AB, Stockholm, Sweden

Dec 2010 – Dec 2012

- Designed water desalination plant using waste heat to operate a membrane distillation system for factory in Saudi Arabia. Post-processed field performance data on existing membrane distillation product and published paper with findings.

Instructor, Northeastern University, Boston, MA

Summer 2010

- Taught International Fluid Mechanics course in Cairo to mechanical engineering students from Northeastern. Prepared lab session to supplement traditional course. Mentored students beyond the course on graduate school and work.

Research Fellow, Air Force Research Lab, Wright Patterson Air Force Base, OH

Summer 2009

- Conducted experimental research using IR thermography on pulsating film cooling that challenged existing findings in the literature. Detailed thermal measurements were published in a refereed journal and conference.

- Mechanical Engineer, GE Global Research Center, Fluid Mechanics Lab Niskayuna, NY** 1/04 – 8/06
- Developed tools for aero and heat transfer analysis of gas turbine blades and vanes for power and aviation. Introduced heat transfer capabilities for in-house CFD solver TACOMA and supported in-house mesh generation MBGrid and post-processor.
 - Supported multi-stage aero analysis of the CFM 56 engines and used tools in the design of the CFM56 and the analysis of blade tip concepts for the 9H steam-cooled gas turbine.
 - Modeled and analyzed the aerothermal behavior in the under-cowl region of the GE 90 aircraft engine. Developed a new suite of tools and methods for post-processing and understanding the results to identify hotspots and clearances.

- Ventilation & Heat Transfer Engineer / Project Engineer, GE Energy – Generator Technology, Schenectady, NY** 10/00 – 9/03
- Led rotor ventilation design on the 330H generator. Activities include 3D thermal (ANSYS) and fluid dynamics modeling (YFT & CFD) of the rotor. Led overall ventilation design of 450 MW generator. Developed cooling design concepts for the rotor, stator, fan, and other parts of the ventilation network.
 - Developed advanced analysis design tools used in flow and thermal analysis of generator rotors. Validated design tools with test data and CFD results. Awarded “Best In Class” distinction for project on development of rotor cooling design practice.
 - Planned & coordinated testing to validate heat transfer design method. Managed cross-functional team of suppliers, manufacturing, engineering, and researchers at GE Research. Coordinated design tool development with EACoE, a global partner in India. Mentored EACoE engineers in Six Sigma projects.
 - Responded to field issues related to thermal performance of generators as needed.

- Heat Transfer Research Engineer, GE Global Research Center – Mechanical Systems Lab, Niskayuna, NY** 1/00 – 10/00
- Developed test rig to study the effect of various parameters on impingement heat transfer effectiveness and using liquid crystal thermography to measure the heat transfer of jet arrays on smooth and brazed micro turbulator roughened surfaces.
 - Supported shroud heat transfer tests for GEAE and performed analysis and communicated results & recommendations of the 7FB nozzle cast bump tests to GEPS design engineers.
 - Received Corporate Recognition Award for Experimental Heat Transfer Research

- Gas Fuel & Combustion Controls Engineer, GE Energy - Controls, Accessories, & Systems Engineering, Schenectady, NY** 6/99 – 1/00
- Developed control logic for Dry Low Nox Combustion system for the 9H gas turbine. This involved logic development, module testing, and simulation on the Mark VI control panel. Developed and tested logic for sequencing, combustion mode transfers, fuel scheduling, purging, and other functions related to the control of the DLN combustion system.
 - Received Corporate Recognition Award for Advanced Controls Development

- Gas Turbine Design Engineer, GE Power Systems – Steam Cooled Gas Turbine Engineering, Schenectady, NY** 8/98 – 6/99
- Led flow & thermal design of 7H steam-cooled gas turbine bucket through Conceptual Design. Modeled flow and thermal circuit using ANSYS, YFT, CALIDE, TBGEOM, Bez-Cav, SIESTA, and other GE in-house gas turbine design codes. Analyzed thermal and mechanical stress and optimized single crystal orientation of casting to optimize LCF life.
 - Received Corporate Recognition Award for Steam Cooled Gas Turbine bucket design. Received Power Award for completion of Six Sigma projects on LCF life optimization and bucket design process development and automation.

- Mechanical Engineer, GE Power Systems – Power Plant Engineering, Schenectady, NY** 6/97 – 9/97
- Designed fuel forwarding and fuel filtering skids for various power plant projects. Responsible for writing equipment specifications, evaluating bids, selecting equipment for the skids, and creating various drawings.
 - Automated generation of drawings as part of a product structuring effort. Worked to reduce cycle time of combined cycle power plant. Supported proposals for liquid and dual fuel power plant and Conversions, Modifications, and Uprates (CM&Us)

Volunteer work

Associate Editor, ASME Journal of Turbomachinery (5/22 - pr). **Women in STEM Mentor (6/19 – pr).** **Women in Aeronautics & Astronautics Faculty advisor (Princeton University, 9/20 – pr).** **Board of Directors, Mercer Bulldogs Special Hockey (1/22 – pr).** **President, Princeton Special Education Parent Advisory Group (5/22-pr).** **Riverside Elementary School Science Day organizer / presenter (2/19-pr).** **Prison Teaching Initiative (College Math Instructor at New Jersey state and federal prison, 2018 – 2020).** **Chair, ASME International Gas Turbine Institute (IGTI) Education Committee (3/22-pr).** **Treasurer/Secretary of ASEE Community Engaged Division (2021-pr).** **ASME Turbo Expo Vanguard Chair/Session Organizer (2004-pr)**

Summary

25 years of experience in gas turbine aerothermal design and research spanning industry, government, and academia. Authored over 50 journal and refereed conference papers and hold two patents. Strong initiative and self-starting skills. Years of mentoring experience. Demonstrated ability to work with diverse, cross-functional teams. U.S. Citizen.