

Assaad Helou Mechanical Engineer PhD

An enthusiastic and creative mechanical engineer specialized in thermal/fluids sciences with interdisciplinary research and knowledge in semiconductor devices and microfabrication training and experience seeking a position in the microelectronics industry.

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📍 Dallas, TX, USA

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EDUCATION

Mechanical Engineering, MS, PhD GPA 3.96/4.00

Southern Methodist University, Dallas, TX, USA 08/2015-05/2020

Mechanical Engineering, BE GPA 4.00/4.00

American University of Beirut, Lebanon 08/2011-05/2015

Relevant Courses:

- Semiconductor Devices and Fab.
- Nanoscale Heat Transfer
- Solid and Continuum Mechanics
- Advanced Heat Transfer
- Solid State Physics
- Design of Thermal Systems
- Computational Fluid Dynamics
- Intermediate Fluid Dynamics

TECHNICAL SKILLS

- **Instrumentation, Data Collection, and Data Analysis**
LabVIEW, Simulink, NI-Visa, NI My-DAQ
- **Numerical Modeling and Engineering Analysis**
Proficient in MATLAB, Mathematica and Excel
- **Design and Optimization of Thermal Fluids Systems**
Thermal modeling using ANSYS Fluent, IcePak, MATLAB
- **Microelectronics/MEMS Thermal Design and Reliability**
Thermoreflectance imaging (TMX T°Imager), multi-scale numerical thermal modeling (TMX T°Solver), wafer probing
- **Semiconductor Fabrication and Processing**
Metals and Dielectrics Thin Films Deposition (CVD, cryo e-beam, ion-beam sputtering), Lithography, Etch, Diffusion, Wet Process
- **Mechanical Design and Prototyping**
AutoCAD Inventor, 3D printing, Mechanical fabrication
- **Soft Skills**
Research, Data Analysis, Optimization, Presentation, Programming, Logical Reasoning, Creative Thinking, Problem Solving, Teamwork, Verbal Communication, Commitment

RELEVANT PROJECTS

- Assessing thermal cooling effect of CMP fill in BEoL
- Thermal Modeling of IC BEoL interconnect network
- Self-Heating assessment in High Power GaN HEMTs
- Thermal analysis of switching in NbOx memristive devices
- Investigating of ACET heating in microfluidic electrodes

LANGUAGES

English Full Professional Proficiency

French Full Professional Proficiency

Arabic Native language

Italian Elementary Proficiency

HONORS and AWARDS

Best Poster Award at Research Day (05/2019) SMU, Dallas

Thermal Engineering Associates Inc. Best Student experimental paper Award (03/2018) and P. K. Mulay Best Student paper Award (03/2018)

Semi-Therm Conference, San Jose CA

Farouk Agha Excellency Award (06/2015) AUB, Beirut

PROFESSIONAL EXPERIENCE

Research Assistant at Nanoscale Electrothermal Sciences

Lab (NETSL) Southern Methodist University, Dallas, TX

08/2017 – Present

- Developed compact 3D thermal model for EM reliability assessment
- Conducted numerical thermal characterization analysis for high power GaN HEMT and Si LDMOS devices
- Characterized the thermal switching mechanism in NbOx NDR devices
- Investigated self-heating in lab-on-chip AC electrophoretic flow

Engineering Intern

TMX Scientific, Richardson, TX

06/2016 – 08/2016

- Performed numerical analysis of heat transfer in microelectronics
- Developed and assembled thermal imaging system
- Conducted experimentation and data collection using LabVIEW

Engineering Intern

Petrofac Ltd, Sharjah, UAE

06/2014 – 08/2014

- Introduced to mechanical operations in gas plants
- Designed mechanical systems for oil and gas plant such as: Pressure vessels, towers, separators, slug catchers
- Sized and Procured mechanical equipment such as pumps, turbines, heat exchangers, and HVAC components

VOLUNTEERING and ORGANIZATIONS

- Lyle Graduate Student Committee (GSC) *Treasurer*
- Engineers without Borders Lebanon (EWB) *VP & Communications*
- IEEE *Student Member*
- Chi Alpha Internationals *Member*
- Association of Graduate International Lyle Engineers (AGILE) *Member*
- ASME Lebanon *Member*

SELECT PUBLICATIONS

1. El Helou, A., Venugopal, A., & Raad, P. E. (2020). Standardized Heat Spreader Design for Passive Cooling of Interconnects in the BEOL of ICs. *IEEE Transactions on Components, Packaging and Manufacturing Technology*.
2. El Helou, A., Tadjer, M. J., Hobart, K. D., & Raad, P. E. (2018). Full 3D Thermal Simulation of GaN HEMT using Ultra-Fast Self-Adaptive Computations Driven by Experimentally Determined Thermal Maps. *2018 24rd International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)*, 1–3.
3. El Helou, A., Raad, P., & Venugopal, A. (2019). Assessment of CMP Fill Pattern Effect on the Thermal Performance of Interconnects in Integrated Circuits BEOL. *2019 IEEE 69th Electronic Components and Technology Conference (ECTC)*, 405–409.
4. El Helou, A., Raad, P. E., Kande, D., & Venugopal, A. (2018). Thermal Modeling and Experimental Validation of Heat Sink Design for Passive Cooling of BEOL IC Structures. *2018 24rd International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)*, 1–3.