Mustafa Hadj-Nacer, Ph.D.

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RESEARCH INTEREST/EXPERIENCE

- **Porous Media Two-Phase Flow and Phase Change**
  - Develop an open-source CFD code in OpenFOAM to model flow and phase-change in the porous media of loop heat pipe operating in micro-gravity. An experimental apparatus is developed to benchmark the numerical model.
- **Transportation and Storage of Used Nuclear Fuel**
  - Develop full-scale numerical models to simulate used nuclear fuel canisters/casks subjected to normal and accident conditions of storage and transportation. Small scale experiments are developed to validate the model.
- **Rarefied Gas Flow**
  - Develop experimental and numerical models to study rarefied heat transfer in micro/nano channels and larger systems.

The detail of my research interest and experience is given below.

APPOINTMENTS

Research Assistant Professor,

- DoE/Nuclear Energy University Program (NEUP), $399,754 (2017) "Development and Experimental Benchmark of Computational Models to Predict Cladding Temperature and Vapor Removal from UNF Canisters during Drying Operations." Greiner, Miles (PI, $250,000) and **Hadj Nacer, Mustafa (Co-PI, $149,754)**.
- Nevada NASA EPSCoR, $6,370 (2017) "NASA EPSCoR Travel and Workshop Opportunity", **Hadj Nacer, Mustafa** (sole PI).
- University of Nevada Reno, College of Engineering Dean's Office (Internal Funding), $29,975 (2017) "Repair and Construction of New Wind Tunnels for ME 322 Lab", **Hadj Nacer, Mustafa**

9. **Hadj-Nacer, M.,** I. Graur, P. Perrier, (2012) “Mass Flow Measurement Through Rectangular Microchannel From Hydrodynamic to Near Free Molecular Regimes”. *La Houille Blanche Journal* 4, pp. 49-54.

Section Helium-Filled Pressure Vessel," Proc. of the ASME Pressure, Vessel, and Pipe (PVP) conference, Vancouver, BC, Canada.

14. Maharjan, D., Hadj-Nacer, M., M. Greiner, S. K. Stefanov and I. Graur, (2017) "Gas Rarefaction Effect on Cladding Temperature during Vacuum Drying of Used Nuclear Fuel Canister," ANS Winter Meeting, Las Vegas, NV.

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15. Hadj-Nacer, M., M. Triton and M. Greiner, (2015) "Geometrically-Accurate-Three-Dimensional Simulations of a Used Nuclear Fuel Transfer Canister Filled with Pressurized Helium." Proc. of the ASME Pressure Vessels & Piping Conference, Boston, MA.

16. Green, R., M. Hadj-Nacer, and M. Greiner, (2015) "Design of an Experiment to Measure the Thermal Accommodation Coefficient Between Helium and Stainless-Steel in Concentric Cylinders" Proc. of the ASME Pressure Vessels & Piping Conference, Boston, MA.

17. Hadj-Nacer, M., D. Maharjan, M. T. Ho, I. Graur, S. K. Ste Mante MaTodatioB CoAe 7 . 6

4. Hadj-Nacer, M., N. Pandey, M. I. Hasan, K. Rahe and M. Greiner (2018), “Phase-change and two-phase flow in Porous media, Progress Report,” NASA Jet Propulsion Laboratory (JPL), Pasadena, CA.
5. Hadj-Nacer, M., M. Higley, D. Maharjan, C. Zampella, and M. Greiner (2018), “Temperature Prediction of a Used Nuclear Fuel Canister under Rarefied Gas Condition,” 31st Symposium on Rarefied Gas Dynamics (RGD), Glasgow, UK.
6. Hadj-Nacer, M., Md. Shujan, N. Pandey, and M. Greiner (2018), “Modeling of Heat Transfer and Flow Patterns in a Porous Wick: Parametric Study,” 3rd Thermal and Fluids Engineering Conference (TFEC),

GRADUATE STUDENT ADVISED AND CO-ADVISING

1.

8. Blake McCoy, B.S. (Spring and Summer 2014), "Construction of the heat flux gauges for flat and grooved passage channel experiment." University of Nevada Reno.
9. Joshua McGuire, B.S. (Spring and Summer 2014), "Construction of a guard heaters to eliminate heat loss from flat and grooved passage channel experiment." University of Nevada Rvr

- Perform CFD simulations in a geometrically-accurate three-dimensional model of a nuclear fuel canister (TN-24) created using ANSYS/FLUENT to evaluate its peak cladding temperature under vacuum drying and storage conditions.
- Apply evaporation and condensation models to CFD simulations of heat and mass transfer during Forced Helium Dehydration of a nuclear fuel assembly.
- Collaborate with Dr. Irina Graur and Dr. Stefan Stefanov to apply the kinetic theory of gases to heat transfer in concentric cylinders and parallel plates.
- Create a half model of the TN-32 nuclear fuel cask in ANSYS/FLUENT.
- Supervise research of one Ph.D., four Master's degree, and three undergraduate students.

Enhanced Heat Transfer in Grooved Channels, University of Nevada Reno 2013 - 2014

- Project: Enhanced Single-Phase Heat Transfer in Intermittently-Grooved Channels.
- Re-design and improve an existing apparatus to quantify the performance of flat and grooved passage channels used in cooling systems.
- Design, construct, and install heat flux gauges and guard heaters to eliminate heat loss from the experimental apparatus.
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