Mokbel Karam
Graduate Research Assistant
Department of Chemical Engineering
The University of Utah
Salt Lake City, UT 84112, USA
Phone: +1 (801) 300-9396
email: mokbel.karam@chemeng.utah.edu

Research Interests

My research focuses on increasing the efficiency of numerical techniques for simulating reacting flows using supercomputers. I am focused on producing and developing methods that help to reduce the computational cost involved in these simulations. Following this objective, I worked on projects in different areas involving: Low-Mach-number flows, Pressure Projection Methods, Modified Equations, Machine Learning, Computational Fluid Dynamics, Simulation Science, Parallel Computing.

Education

2017– Ph.D. Candidate, Chemical Engineering Department / University of Utah, Salt Lake City Utah

- Current GPA: 3.933

2013–17 Bachelor in Mechanical Engineering / Notre Dame University, Zouk Mosbeh, Lebanon

- Graduated with a GPA of 3.89, Highest distinction.
- Dean's List for all semesters
- Scholarship: 75% Scholarship, all semesters

Skills

Communication Skills:

- Leadership skills: President of the American Society of Mechanical Engineers student section at NDU-North Lebanon Campus in 2013-2014.
- Languages: English, French (Fair), Arabic (Native Language)

Computer Skills:

C++, Object Oriented Programming (OOP), Python, Tensorflow, Sci-kit Learn, Sympy (symbolic library Python), Matlab, Web app development using Dash Python, Latex.

Publications

2019 **Mokbel Karam,** James C. Sutherland, and Tony Saad, "A Simple Recipe for Modified Equation Analysis", SIAM Journal on Numerical Analysis, under review.

2019 **Mokbel Karam,** Tony Saad, Michael Hansen, and James C. Sutherland, "A Framework for Analyzing the Temporal Accuracy of Pressure Projection Methods", 2019 AIAA Computational Fluid Dynamics Conference, AIAA Aviation Forum.

2018 Tony Saad, **Mokbel Karam**, and James C. Sutherland, "An Explicit Variable-Density Projection Method for Low-Mach Reacting Flows on Structured Uniform Grids", 2018 Fluid Dynamics Conference, AIAA AVIATION Forum, (AIAA 2018-4266).

Presentations

2019 **Mokbel Karam,** Tony Saad "On a Class of High-Order, Low-Cost Time Integrators for the Navier-Stokes Equations", 2019 Rocky Mountain Fluid Mechanics (RMFM) Research Symposium, CU Boulder.

2019 **Mokbel Karam,** Tony Saad, and James C. Sutherland, "Efficient Multistage Time Integrators for Incompressible Flows Using Projection Methods", SIAM Conference on Computational Science and Engineering.

2019 **Mokbel Karam**, Fady Najjar, Ming Jiang, James Sutherland, and Tony Saad. "Exploring the Predictability of Random Forests & Deep Neural Networks for the Sedov-Von Neumann-Taylor Blast Wave Solution", SIAM Conference on Computational Science and Engineering.

2018 Tony Saad, **Mokbel Karam**, and James C. Sutherland, "An Explicit Variable-Density Projection Method for Low-Mach Reacting Flows on Structured Uniform Grids", 2018 Fluid Dynamics Conference, AIAA AVIATION Forum, (AIAA 2018-4266)

2018 **Mokbel Karam**, Fady Najjar, Ming Jiang, James Sutherland, and Tony Saad. "Applying Machine Learning to the Sedov-von Neumann-Taylor Blast Wave", 2018 Rocky Mountain Fluid Mechanics (RMFM) Research Symposium, CU Boulder.

2018 **Mokbel Karam**, Fady Najjar, Ming Jiang, James Sutherland, and Tony Saad. "Applying Machine Learning to the Sedov-von Neumann-Taylor Blast Wave", Seminar, Lawrence Livermore National Laboratory.

Experience

2018 Internship at Lawrence Livermore National Laboratory with 10 weeks focus on Machine Learning, funded by the Predictive Science Academic Alliance Program II, Livermore CA , from June 4th to August 10th.

2016 Gained one month of experience in maintenance of kilns at a cement plant, August 2016

2016 Gained one month of experience in maintenance of refrigeration system at a food processing company, July 2016

- Have been tutoring Math and physics lessons for high school students.

Reference

Prof. Tony Saad
Assistant Professor,
Department of Chemical Engineering,
University of Utah,
Salt Lake City, UT 84112, USA
tony.saad@chemeng.utah.edu

Prof. James C. Sutherland
Professor,
Department of Chemical Engineering,
University of Utah,
Salt Lake City, UT 84112, USA
james.sutherland@chemeng.utah.edu

Dr. Fady Najjar
Design physicist, Ph.D.,
Lawrence Livermore National Laboratory,
Livermore, CA 94550, USA
najjar2@llnl.gov

Prof. Chady Ghnatios
Assistant Professor,
Department Mechanical Engineering,
Notre Dame University,
Zouk Mosbeh, Lebanon
cghnatios@ndu.edu.lb