TONY SAAD

411 B.H. Goethert Parkway Tullahoma, TN 37388
tsaad@utsi.edu - http://tsaad.utsi.edu
Tel: 931–393-7146, Cell: 931-841-2904

EDUCATION

PH.D. UNIVERSITY OF TENNESSEE SPACE INSTITUTE

Mechanical and Aerospace Engineering, May 2010
Dissertation: Theoretical Models for Wall Injected Flows
Subjects: Asymptotic and Exact Analytical Methods (Perturbation, Decomposition, and Homotopy Techniques), Numerical Simulation of Chemically Reacting Flows, Swirl Dominated Flows, Internal Flows, Wall Injected Flows, Rotational and Irrotational Compressible Flows

M.E. AMERICAN UNIVERSITY OF BEIRUT

Mechanical Engineering, July 2005
Graduation with High Distinction
Thesis: Implementation of a Finite Volume Unstructured CFD Solver using Cluster Based Parallel Computing

B.E. NOTRE DAME UNIVERSITY

Mechanical Engineering, July 2003
Graduation with High Distinction
Thesis: Tackling Turbulence using Large Eddy Simulation

AWARDS AND FELLOWSHIPS

- Recipient of the NSF IREE research internship - Peking University, 2008.
- Recipient of the "Outstanding Graduate Research Assistant" award – University of Tennessee Space Institute, 2007.
- Recipient of the Crawford Lloyd Fellowship – University of Tennessee Space Institute, 2007.
- Recipient of the Crawford Lloyd Fellowship – University of Tennessee Space Institute, 2005.
- Graduate Research Assistantship – University of Tennessee Space Institute, 2005 - present.
- Graduate Research Assistantship – American University of Beirut, 2003-2005.
- Dean's List – American University of Beirut, all semesters.
- Recipient of the "Abd el Aal Litani River Award", 2003.
- Exemption from tuition fees – Notre Dame University, spring 2003.
- Scholarship: 25-50% Scholarship – Notre Dame University, all semesters.
- Dean's List – Notre Dame University, all semesters.

PUBLICATIONS

JOURNAL ARTICLES [11]

1. **Saad, T.**, and Majdalani, J., "**Is Kelvin's Minimum Energy Theorem Valid in Open Regions?**," *under review.*

2. **Saad, T.**, and Majdalani, J., "**On the Lagrangian Optimization of Wall-Injected Flows: from the Hart-McClure Potential to the Taylor-Culick Rotational Motion**," *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences.* (**DOI: 10.1098/rspa.2009.0326**)

3. **Saad, T.**, and Majdalani, J., "**Rotational Flowfields in Porous Channels with Arbitrary Headwall Injection**," *Journal of Propulsion and Power*, vol. 25, No. 4, 2009, pp. 921 - 929. (**DOI: 10.2514/1.41926**)

4. Darwish, M., **Saad, T.**, and Hamdan, Z., "**Parallelization of an Additive Multigrid Solver**," *Numerical Heat Transfer, Part B: Fundamentals,* Vol. 54, No. 2, 2008, pp. 157 - 184. (**DOI: 10.1080/10407790802182638**)

5. Sams, O. C., Majdalani, J., and **Saad, T.**, "**Mean Flow Approximations for Solid Rocket Motors with Tapered Bores**," *Journal of Propulsion and Power*, Vol. 23, No. 2, 2007. (**DOI: 10.2514/1.15831**)

6. Majdalani, J., and **Saad, T.**, "**The Taylor-Culick Profile With Arbitrary Headwall Injection**," *Physics of Fluids*, Vol. 19, No. 9, 2007. (**DOI: 10.1063/1.2746003**)

7. **Saad, T.**, Sams, O. C., and Majdalani, J., "**Rotational Flow in Tapered Slab Rocket Motors**," *Physics of Fluids*, Vol. 18, No. 1, 2006. (**DOI: 10.1063/1.2354193**)

8. **Saad, T.**, and Darwish, M. S., "**A Topology Scheduling Algorithm for Parallel Computing**," *in preparation*.

9. Kupershmidt, B. A., and **Saad, T.**, "**Irregularity of the Number of Divisors Function**," *in preparation.*

10. **Saad, T.**, and Majdalani, J., "**On the Integrability of the Navier-Stokes Equations**," *in preparation.*

11. **Saad, T.**, and Majdalani, J., "**Kelvin's Minimum Energy Theorem for Compressible Flows**," *in preparation.*

CONFERENCE PAPERS [11]

1. **Saad, T.**, and Majdalani, J., "**On the Compressible Irrotational Taylor Flow in Porous Channels**," 40th AIAA Fluid Dynamics Conference and Exhibit, Chicago, Illinois, USA, June 28- July 1, 2010.

2. **Saad, T.**, and Majdalani, J., "**Pressure Integration Rules and Restrictions for the Navier-Stokes Equations**," 40th AIAA Fluid Dynamics Conference and Exhibit, Chicago, Illinois, USA, June 28- July 1, 2010.

3. **Saad, T.**, and Majdalani, J., "**Extension of Kelvin's Minimum Energy Theorem to Flows with Open Regions**," 40th AIAA Fluid Dynamics Conference and Exhibit, Chicago, Illinois, USA, June 28- July 1, 2010.

4. **Saad, T.**, and Majdalani, J., "**Energy Based Solutions of the Bidirectional Vortex with Multiple Mantles**," 45th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Denver, Colorado, USA, August 2-5, 2009.

5. **Saad, T.**, and Majdalani, J., "**Energy Based Solutions of the Bidirectional Vortex**," 44th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Hartford, Connecticut, USA, July 20-23, 2008.

6. **Saad, T.**, and Majdalani, J., "**Energy Based Mean Flow Solutions for Slab Hybrid Rocket Chambers**," 44th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Hartford, Connecticut, USA, July 20-23, 2008.

7. **Saad, T.**, and Majdalani, J., "**The Taylor Profile in Porous Channels with Arbitrary Headwall Injection**", 37th AIAA Fluid Dynamics Conference and Exhibit, Miami, Florida, USA, June 25-28, 2007.

8. Majdalani, J., and **Saad, T.**, "**Energy Steepened States of the Taylor-Culick Profile**," AIAA Paper 2007-5797, July 2007. **Nominated for Best Solid Rockets Paper by Robert Geisler**.

9. Darwish, M. S., **Saad, T.**, and Hamdan, Z., "**A High Scalability Parallel Algebraic Multigrid Solver**," ECCOMAS CFD Conference, Egmond Aan Zee, Netherlands, September 5-8, 2006.

10. **Saad, T.**, and Darwish, M. S., "**A High Scalability Parallel Algebraic Multigrid Solver**," 4th ICCFD Conference, Ghent, Belgium, July 10-14, 2006.

11. **Saad, Y. T.**, "**Implementation and Performance Analysis of a Parallel Algebraic Multigrid Solver**," 4th FEA Student Conference, American University of Beirut, Lebanon, May 26-27, 2005.

RESEARCH EXPERIENCE

- Experience in analytical modeling of fluid dynamics problems using asymptotic and exact methods: perturbation, decomposition, and homotopy techniques.
- Experience in physical modeling of: mass and heat transfer, internal flows, swirl dominated flowfields, and supersonic flow.

- Experience in programming the finite volume method, unstructured grids, parallel computing, and visualization.
- Experience in writing user defined functions for Fluent.
- Extensive experience (8+ years) in using Fluent to model various flow regimes and physics (multiphase, combustion, turbulence, free surface, and supersonic).
- Efficient computation of several number-theoretic sequences related to a proof of Riemann's conjecture. (Work done with Prof. Boris Kupershmidt, chairperson and program director of the UTSI mathematics department).
- Experience in object oriented programming and graphical user interface design for engineering and physics simulations.
- Design and implementation of a parallel visualization code using the Visualization Toolkit (vtk) and the Message Passing Interface (MPI).
- Contributed to book chapter in AIAA progress series. Fundamentals of Hybrid Rocket Combustion and Propulsion - Chapter 4 "*Analytical Models for Hybrid Rockets*".
- Substituted for professor in Perturbation and Advanced Perturbation Methods classes.
- Teaching assistant: Numerical Methods, Computational Methods in Fluids Dynamics, Solidification Processes, and Advanced CFD.
- Helped review journal articles.
- Helped review two proposals (NSF).
- Helped prepare three proposals.
- Judged AIAA student conference papers.
- Chaired graduate technical sessions in AIAA student conference.

LANGUAGES

	WRITTEN	READ	SPOKEN
ENGLISH	Excellent	Excellent	Excellent
FRENCH	Very Good	Very Good	Good
ARABIC	Excellent	Excellent	Excellent

COMPUTER SKILLS

PROGRAMMING

C, Objective-C, C#, Fortran, Visual Basic, VB.Net, Visualization Toolkit (vtk), Message Passing Interface (MPI), HTML/CSS/Web Design, LaTeX.

SOFTWARE

Fluent (attended five day advanced training at Fluent Inc. in 2006), Gambit, AirPak, IcePak, Mathematica, MathCAD, Tecplot, OriginLab, Microsoft Office Suite.

CONTRIBUTIONS

- **PLEASE MAKE A NOTE** — Founder and author - Science and research blog. http://pman.utsi.edu
- **DEAD ENGINEERS SOCIETY** — Co-Founder and contributor. http://des.utsi.edu
- **CFD-ONLINE** — Administrator and contributor - CFD-Wiki project. http://www.cfd-online.com/Wiki/

PROFESSIONAL AFFILIATIONS

- **APS** — American Physical Society, Member
- **AIAA** — American Institute of Aeronautics and Astronautics, Member
- **ASME** — American Society of Mechanical Engineers, Member
  Served on student chapter committee at Notre Dame University (2001 - 2003)

GRADUATE COURSEWORK

Advanced Heat Transfer, Computational Fluid Dynamics, Advanced Fluid Mechanics, Inviscid Flow, Viscous Flow, Advanced Viscous Flow Theory, Mathematical Fluid Mechanics, Introduction to Combustion, CFD for Chemically Reacting Flows, Perturbation Methods, Advanced Perturbation Methods, Propulsion, Aeroacoustics, Nonlinear System Modeling, Rocket Propulsion, Hybrid Rocket Propulsion.