
VAHID SADRI

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Ph.D. Reasercher

Highlighted Strength and Expertise

- Author of **7** publications (6 published and 1 under review) on wind turbine aerodynamics and vortex dynamics, in peer reviewed journals such as **Physics of Fluids**, **Theoretical and Computational Fluid Dynamics**, **Scientia Iranica**, and also in the peer refereed conference proceedings like **American Institute of Aeronautics and Astronautics (AIAA) Conference** and **American Physical Society**.
- Researcher for **more than 6 (six)** years in academia and industry on **wind turbine aerodynamic, vortex dynamics, turbulent flow, and multiphase flow**.
- Recipient of **3 prestigious awards** including 2015 **Dean's Award for Outstanding Graduate Student**, and 2007 Sanjesh Awards for 2nd top student among 1104 participant in aerospace entrance exam.

Education

2013 - 2016	Ph.D. in Mechanical Engineering, Fluid Mechanics <i>Southern Methodist University, Dallas, TX</i> Thesis: "Formation and Interaction of Concentric Vortex Rings"
2007 - 2010	M.S. in Aerospace Engineering, Aerodynamics <i>Sharif University of Technology, Tehran, Iran</i> Thesis: "Effect of Surface Roughness and Free Stream Turbulence Intensity on the Performance of a Wind Turbine Blade Section"
2002 - 2007	B.S. in Mechanical Engineering, Fluid Mechanics <i>KNT University of Technology, Tehran, Iran</i> Thesis: "Reduction of Heavy-Duty Diesel Engine Emissions and Fuel Consumption by Matching of Turbocharger"

Work History

2013-01 - Present	Research Assistant <i>Southern Methodist University</i> Project (Ph.D. Dissertation): <i>Counter-Rotating Vortex Rings</i> <ul style="list-style-type: none">• Investigated the interactions and formation of counter-rotating vortex rings experimentally and numerically.• Developed a novel numerical approach to simulating the axisymmetric flow in the limit of 2D flow.• Provide a novel explanation for the difference between vortex pinch-off process in 2D and axisymmetric flow..• Provided an explanation for shedding of the axisymmetric vortex pair for long-time flow evolution based on principle of maximal energy of vortex pair system. Project: Water entry of flexible beams (in Professor Ioppolo' group) <ul style="list-style-type: none">• Designed the experimental launching system, and analyzed 3D fluid-structure interactions (FSI) during flat plate water impact.• Used high-speed PIV with using the particles that doped with fluorescent dyes to study the
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- mutual interaction between the fluid motion and the structural deformations.
- Indirect pressure measurement from particle image velocimetry in water entry impact.

2007-09 - 2010-12

Research Assistant

Sharif University of Technology

Project: *Effect of Surface Roughness and Free Stream Turbulence Intensity on the Performance of a Wind Turbine Blade Section*

- Prepared for, and conducted, model scale wind tunnel tests for aerodynamic experiments.
- Measured unsteady and steady surface pressures on a section of a 660kW wind turbine blade in a subsonic wind tunnel.
- Performed blade element momentum (BEM) analysis for wind turbine blade sections with custom-made FORTRAN code.
- Prepared Computational Fluid Dynamics (CFD) simulations, and post-processed the results.
- Compared experimental data from wind tunnel measurements with computational predictions.

CFD Projects:

- Developed CFD codes (C++) for quasi-one-dimensional compressible flow inside a "Shubin nozzle" to investigate Bean-Warming and Steger Warming methods.
- Developed CFD codes (C++) for "Elliptic Grid Generation for NACA0012 airfoil".
- Developed CFD codes (C++) for 2D compressible Euler equations using Roe flux differencing.

Research Interests

- Fluid Diagnostic Techniques (MTV, PIV, LIF & etc.)
- Computational Fluid Dynamics
- Vortex Dynamics
- Turbulence
- Biofluid Dynamics
- Image Processing
- Data Analysis
- Parallel Computing
- Fluid-solid interactions

Publications







Peer Reviewed Journal Papers (1 published and 2 under review)

- **V. Sadri**, PS Krueger, **"A Formation and behavior of counter-rotating vortex rings"**, submitted to *Theoretical and Computational Fluid Dynamics*, Mar 2016, under review.
- **V. Sadri**, PS Krueger, **"Pinch off of axisymmetric vortex pairs in the limit of vanishing vortex line curvature"**, *Physics of Fluids*, **28**(7).
- R. Soltani · Frashid Askari, **V.Sadri**, **"Roughness and Turbulence Effects on the Aerodynamic Efficiency of a Wind Turbine Blade Section"**, *Scientia Iranica*; **23**(3),927-941 .

Refereed Conference Papers (4 published)

- **V. Sadri**, and Paul S. Krueger. **" Numerical Study of the Formation of Concentric Vortex Rings "** *In 45th AIAA Fluid Dynamics Conference*, p. 2478.-2015.
- Soltani, A.R Davari, **V. Sadri**, and F. Askari, **"Effect of Canard Position on Wing Surface Pressure"**, *Proceedings of the 10th Conference of Iranian Aerospace Society*, Tarbiat Modares University, February 2011, Tehran, Iran.
- Soltani, A.R Davari, **V. Sadri**, and F. Askari, **"Study of the behavior of a pitching canard on wing surface pressure"** , *Proceedings of the 10th Conference of Iranian Aerospace Society*, Tarbiat Modares University, February 2011, Tehran, Iran.
- Soltani, **V. Sadri**, and F. Askari, **"Experimental study on the Effect of a Delta-Canard-Configuration on the Pressure Distribution of a Fuselage"**, *Proceedings of the 10th Conference of Iranian Aerospace Society*, Tarbiat Modares University, February 2011, Tehran, Iran.

Programming & Software Skills

Programming	 MATLAB , FORTRAN, C++
Computer Algebra Program	 Mathematica
Data Post-Processing	 Tecplot 360
Visual Programming	 LabVIEW
Numerical Simulation	 OpenFOAM, STAR-CCM+ , COMSOL, ANSYS FLUENT
Grid Generation	 ANSYS Meshing ,ANSYS ICEM CFD

Selective Honors

- Dean's Award for Outstanding Graduate Student, Southern Methodist University, Jan.
- D. scholarship for outstanding M.S. graduate student, Aerospace Dept. Sharif University, Sept. 2010.
- Certificate of Merit, 1st Ranking among graduate students in Aerodynamic program, Sharif University of Technology, Sept. 2007.
- Certificate of Merit, Second Rank among Iranian Aerospace Engineers in the Iran's University Entrance Exam for Graduate Studies in Aerospace Engineering.

Mentoring and Teaching Experience

2016 - Present	Fluid Mechanics Co-instructor <i>Southern Methodist University, Dallas, TX</i> <ul style="list-style-type: none">• Solving fluid mechanic problems for 40 students in fluid mechanics course.
2016 - Present	Fluid Mechanics Lab Instructor <i>Southern Methodist University, Dallas, TX</i> <ul style="list-style-type: none">• Hands on experience on boundary layer, pump performance, and Venturi tube experiments• Sensor calibrations and data
2015 - 2016	Thermodynamic Lab Instructor <i>Southern Methodist University, Dallas, TX</i> <ul style="list-style-type: none">• Hands on experience on thermodynamics experiments• Sensor calibrations and data

Professional Membership

- American Physical Society (APS)
- American Institute of Aeronautics and Astronautics (AIAA)
- American Society of Mechanical Engineers (ASME)

References

- Professor Paul Krueger (Ph.D. advisor)

Professor, Department of Mechanical Engineering, Southern Methodist University

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- Professor Peter Raad (Ph.D. committee member, supervisor for teaching assistant duties, and course instructor)

Linda Wertheimer Hart Professor, Department of Mechanical Engineering, Southern Methodist University

Tel: 214-768-3043 Email: praad@smu.edu

- Professor David Willis (Ph.D. committee member and course instructor)

Associate Professor, Department of Mechanical Engineering, Southern Methodist University

Tel: 214-768-3125 Email: dwillis@smu.edu

- Professor Tindaro Ioppolo (Ph.D. committee member)

Assistant Professor, Department of Mechanical Engineering, Southern Methodist University

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