

Yousef Saleh

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EDUCATION

Doctor of Philosophy, Mechanical Engineering, Summer 2024 Florida State University	Tallahassee, FL
Master of Science, Mechanical Engineering, Fall 2023 Florida State University	Tallahassee, FL
Bachelor of Science, Aerospace Engineering, December 2018 The University of Texas at Austin	Austin, TX

PROJECTS

Project S

- Record quantitative information of supersonic flow generated by non-axisymmetric supersonic jets
- Integrate novel technique to reconstruct three-dimensional flow-fields to accompany acoustic surfaces
- Derive connections between flowfield and concurrent acoustics

Project Y

- Reconstruct three-dimensional surface to map acoustics radiated by a supersonic jet
- Designed system capable outputting 1,000 Nm of torque to spin a supersonic nozzle under load
- Automated testing process to collect > 300 million points necessary for acoustic reconstruction

Supersonic nozzle design

- Innovate Method of Characteristics(MOC) method to design supersonic nozzle
- Design two-piece supersonic rectangular nozzle
- Automate MoC algorithm to invent geometry for novel elliptic nozzle

Supersonic flow visualization

- Constructed Z-type schlieren system to visualize flows with strong gradients
- Synchronized acquisition cameras, LEDs, and facility equipment to capture footage with $<10 \mu\text{s}$ exposure time
- Employed modal decomposition techniques to understand the strongest features of the flow

Acoustic measurements in an Anechoic chamber

- Calibrated and synchronized 8 B&K Type 4954B microphones
- Measured far-field noise generated by a supersonic diamond jet at various configurations
- Published findings in peer-reviewed journal articles and presented results at scientific conferences

Data acquisition improvements

- Reconfigured complex, existing LabView software
- Introduced new mechanisms to prevent loss of data during tests
- Performed rigorous calibrations to ensure reliability of test data

Unstart control

- Installed new hardware coupled with a custom PID controller to control the location of shocks in a scramjet engine isolator
- Maintained location of shocks within an engine isolator regardless of incoming perturbations
- Designed system capable outputting 1,000 Nm of torque to spin a supersonic nozzle under load
- Published results in peer-reviewed journal articles

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Aircraft design

- Developed wing-loading simulation test to test theoretical and real limits of wing load
- Designed and built payload dropping mechanism
- Defended, discussed, and negotiated aircraft design decisions with consumers

Budget defense

- Coordinated between executive team members to evaluate organizational costs & resources
- Created succinct presentation to present results
- Defended resource spending to regulatory authority and requested additional funding for growth

EXPERIENCE

Graduate Research Engineer, Florida State University

08/2019 – present

- Operated a high-pressure anechoic facility with stagnation temperatures up to 1500 K, generating supersonic jets up to a fully expanded Mach number of 2.5.
- Analytically design supersonic nozzles of various geometries through innovation of established techniques for new purposes to create Mach 2 Rectangular and Elliptic nozzles
- Produced flow visualizations through recognized techniques such as Shadowgraph, Schlieren, and Particle Image Velocimetry (PIV)
- Recorded and Analyzed data obtained using a variety of transducers to obtain spectral characteristics and recognize the acoustic capabilities of various types of nozzles and forms of active & passive flow control
- Exposure to high Overall Sound Pressure Level (OASPL) sounds and experience on how to mitigate and control
- Analyzed continuous time signals and perform digital signal processing on discrete time signals
- Authored multiple conference and peer-reviewed journal papers and technical instructions/documentation
- Automated experimental processes to rapidly collect and process billions of data points to develop better understandings of the problems investigated
- Designed and developed a mechanism to rotate a supersonic nozzle in-situ, in increments of 0.25°, in order to map the acoustics generated by the jet

Research Assistant, The University of Texas at Austin

12/2016 – 12/2018

- Initiated new process of data collection which increased efficiency from 92% to 100% through innovation of the LabVIEW software that controls the mechanical devices, instruments, and transducers, data collection units, and tanks that govern the Mach 1.8 wind tunnel
- Integrated a system of high-pressure jet streams, in conjunction with a ramp contained within the wind tunnel to introduce pressure perturbations into the flow
- Constructed a PID controller to maintain the location of the shock train in the face of pressure disturbances regardless of frequency or magnitude
- Built hardware and software applications to further understand flow properties and analyze physical behaviors

ACADEMIC & LEADERSHIP EXPERIENCES

Chief Engineer, Aircraft Design, The University of Texas at Austin

01/2018 – 05/2018

- Managed a team of 8 engineers to meet requirements, such as wing loading, payload, mass, speed, duration, risk assessment, sizing, and power, as requested by the customer in the RFI
- Evaluated control surfaces, electrical connections & wires, sensors, and autopilot systems

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- Performed risk assessment and generated risk mitigation protocols
- Developed an Unmanned Air System (UAS) capable of following a flight path for assistance with fire & rescue emergency services via surveillance and payload drops

President, The University of Texas Water Ski Team

11/2016 – 11/2017

- Coordinated 60 members with a 10-person executive officer board to produce new forms of revenue, established a modern website, designed advertisements to accentuate the team brand across the nation
- Oversaw use of \$55,000 to lease a competition ski lake, procure new equipment, uphold and maintain a boat, cover traveling & accommodation costs, and restructured merchandise acquisition and distribution
- Refocused the team towards competitiveness and recruited a coach to accelerate individual growth
- Developed a long-term plan for the growth of the team and talent development

SKILLS

- Expert in Acoustics, Fluid Mechanics, Heat transfer, Test design, and system evaluation and automation
- Experienced with MATLAB, Python, C, SOLIDWORKS, LabVIEW, Office, HTML, CSS, JavaScript, oscilloscopes, multimeters, power supplies, lab equipment, active noise control, signal generators, anechoic chambers and their specifications
- Adept with high pressure systems, data acquisition, microphones, discrete and continuous time signal processes, labs, audio analysis, acoustic measurements using tools like B&K microphones, and digital signal processing
- Strong oral & written communication, self-motivated, team leadership, time management, test automation, attention to detail, managing large sets of data, and problem solving
- Work independently or in teams and adapt communication methods
- Proficient with engineering management, scheduling, technical discussion, room acoustics, passive noise control, and explanation of complex concepts
- Fluent in Arabic and English

PUBLICATIONS

- **Saleh, Yousef**, Sellappan, P., Alvi, F.S., "Experimental Characterization of the Acoustics of a Supersonic Diamond Jet", *AIAA Journal* 61.10 (2023) pp: 4546-4555.
- **Saleh, Y.**, Seckin, S., Song, M. and Alvi, F.S., 2023. Mapping 3D Acoustics of a Supersonic Diamond Jet: An Odyssey in the Golden Age of Aeroacoustics. In *AIAA AVIATION 2023 Forum* (p. 3214).
- Prasad, A., **Saleh, Y.**, Sellappan, P., Unnikrishnan, S. and Alvi, F.S., 2022. Effects of Expansion Ratio and Nozzle Asymmetry on Flowfield of Diamond Jets. *AIAA Journal*, 60(9), pp.5215-5231.
- Prasad A., **Saleh, Yousef**, et al. "Near-field and far-field effects of heating in an over-expanded Mach 2 diamond jet." In *AIAA SCITECH 2022 Forum*. 2022.
- **Saleh, Yousef**, et al. "Experimental and Computational Study of a Mach 2 Diamond Jet." In *AIAA Scitech 2021 Forum*. 2021.
- Vanstone, L., Bosco, A., **Saleh, Y.**, Akella, M., Clemens, N.T. and Gogineni, S., 2020. Closed-loop control of unstart in a Mach 1.8 isolator. *Journal of Propulsion and Power*, 36(1), pp.153-157.