Alexander Wright, PhD

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SKILLS

Engineering
Systems Engineering; CFD & Mechanical Simulation; Mechanical Design; Aerodynamics, Thermodynamics; CAE, CAD, CAM

Experimental
Design & Conduct; Data Acquisition, Reduction & Analysis; Hardware-In-The-Loop; Wind Tunnel Design & Operation; Mechatronic Design & Installation

Programming
Python; MATLAB; Simulink; LabView; YAML; LaTeX

Technology
IP Network Design, Implementation, Security; High Performance Computing

Miscellaneous
Problem-solving; Communication; Presentation; Documentation

PROFESSIONAL EXPERIENCE

Equatorial Launch Australia (ELA) Adelaide, SA, Australia

Head of Engineering (Acting) Apr 2024 – Nov 2024

- Tailored the NASA Systems Engineering Handbook to create the framework for development work at ELA.
- Led a diverse team of 4 engineers to develop the system requirements and initial designs of technologies for use at the Arnhem Space Centre (ASC).
- Ensured no subsystem design interoperability via holistic, systems aware management of engineering activities.
- Produced written company policies and plans for Systems Engineering, Information and Communication Technology, Cybersecurity and Physical Security.

Launch Technology Manager Aug 2022 – Apr 2024

- Lead systems engineering and procurement of a $5,000,000 flight safety system for installation at the ASC.
- Developed business relationships with potential satellite communication customers on service contracts worth $70,000+ per month.
- Designed and developed high-availability IP network architecture for the ASC.
- Mentored intern, new graduate and early career engineers at ELA.
- Technical liaison with launch clients, translating technical aerospace and rocketry concepts to colleagues.
- Trained in vehicle launch and re-entry trajectory and risk hazard assessment methods.

Turbine Aeronautics Adelaide, SA, Australia

Senior Engineer - Aerothermal Design Jul 2019 – Jun 2022

- Principal designer of a novel, patented heat exchanger (HX) for recuperation of a 200 SHP turboprop engine.
- Modelled complex HX geometries in Solidworks; used ANSYS Fluent to analyse aero- and thermodynamic performance.
- Simulated turbomachinery (propellers, compressors, turbines) to develop performance maps over the engine's full operating range.
- Accelerated development tasks 3x via improved in-house high-performance computing.
- Initiated digital twin creation of a Brayton cycle engine for control system development.
- Lead a team performing CFD analysis on a single-seater air frame investigating vehicle dynamics and stability.

APG-Neuros Blainville, QC, Canada

Aerothermal Specialist Engineer Apr 2017 – May 2018

- Supervised a small team on the development of MATLAB based software for scaling environmental conditions of blower test reports.
- Developed and implemented a system for computational fluid dynamic design and analysis of a bio-derived methane-burning turbine engine.
- Provided expertise and knowledge diversify from sales of third party electric-blower equipment into the manufacture and sales of proprietary turbomachinery technology.

National Research Council Canada – Aerospace Research Centre Ottawa, ON, Canada

PhD Student Intern and Research Officer Jan 2011 – Sep 2015

- Successfully developed a turbofan exhaust technology research and development project valued at $\$500,000$.
- Collaborated with industry on design of a novel exhaust mixer now in production on modern turbofan engines.
- Supported projects with solid modelling, CFD pre-processing, simulation, post-processing and analysis.

ACADEMIC EXPERIENCE AND EDUCATION

University of Adelaide Adelaide, SA, Australia

Casual Lecturer - Advanced Topics in Aerospace Engineering Jul 2024 – Dec 2024

- Presented the concepts of aircraft stability, classic and modern control to 37 engineering honours students.

Dalhousie University Halifax, NS, Canada

Doctor of Philosophy, Mechanical Engineering Dec 2019

- Thesis: *Design and Aerodynamic Analysis of a Novel Medium Bypass Turbofan Engine Exhaust System*.
- Six (6) publications in peer reviewed international journals and conferences.
- Comprehensive examinations on turbomachinery, fluid dynamics, heat transfer and thermodynamics.
- Coursework: CFD, computational methods, measurement, viscous theory, heat transfer, reliability theory.
- Designed wind tunnel test sections modelling jet engine exhaust to improve accuracy over past designs.
- Developed control system ensuring accuracy and precision of probe measurements.
- Designed test section mechanisms and parts for traditional CNC processes and additive manufacturing.
- Rapid iteration design of aerodynamic parts using commercial & open-source CFD code.
- Validated CFD simulations via in-house experimental measurements.
- Automated large data analysis via python resulting in 200x efficiency improvement.

Bachelor of Engineering, Mechanical Engineering May 2010

PUBLICATIONS

"Patent: Heat Exchanger"
A. Wright, A. Mahallati
US Patent Application Publication, US 11639828 B2

"On the Efficacy of Integrating Structural Struts with Lobed Mixers in Turbofan Engine Exhaust Systems"
A. Wright, A. Mahallati, J. Militzer.
ASME Turbo Expo 2018, Oslo, Norway. GT2018-77168

“Measurement of Large Flow Angles with Non-Nulling Multi-Hole Pressure Probes”
M. J. Conlon, **A. Wright**, H. M. Abo El Ella.
ASME Turbo Expo 2017, Charlotte, North Carolina, USA. GT2017-64932

“The Effect of Stiffening Tabs on the Performance of Lobed Mixers at Off-Design Conditions”
A. Wright, A. Mahallati, J. Militzer, M. J. Conlon.
12th Euroturbo Conference, Stockholm, Sweden. ETC2017-371

“Effects of Swirl on the Performance of a Turbofan Forced Mixer with Stiffening Members”
A. Wright, A. Mahallati, J. Militzer.
Laboratory Technical Report prepared at NRC, 2015. LTR-GTL-2015-0005

“Effects of Area Ratio on the Performance of a Turbofan Forced Mixer with Swirling Core Flow”
A. Wright, A. Mahallati, J. Militzer.
ASME Turbo Expo 2014, Düsseldorf, Germany. GT2014-27200

“Isolating Effects of Area Ratio from Lobe Number for Turbofan Engine Exhaust Systems”
A. Wright, A. Mahallati, J. Militzer.
Presentation at the Seventh Annual Mechanical Engineering Research Conference, Halifax, NS.

“Establishing a Turbulence Model for Flowfield Predictions of Lobed Mixers with Stiffening Members”
A. Wright, A. Mahallati, J. Militzer.
International Society for Air Breathing Engines, Busan, Korea. ISABE-2013-1418

“Effects of Swirl on the Performance of a Turbofan Forced Mixer with Stiffening Members”
A. Wright, A. Mahallati, J. Militzer.
Presentation at the Sixth Annual Mechanical Engineering Research Conference, Halifax, NS.

“Effects of Scalloping on the Mixing Mechanisms of Forced Mixers with Highly Swirling Core Flow”
A. Wright, Z. Lei, A. Mahallati, M. Cunningham, J. Militzer.
Published in the Journal of Engineering for Gas Turbines and Power Vol. 135, No. 7. GTP-12-1397

“Design of a Three Degree of Freedom Probe Traverse Mechanism”
A. Wright, A. Mahallati, J. Militzer.
Presentation at the Fourth Annual Mechanical Engineering Research Conference, Halifax, NS.