Nitish Anand

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Interests

- Computational fluid dynamics
- Optimization techniques
- Numerical methods
- Supersonic turbine design
- Machine learning

Tech. Skills

- Simulation : SU2, openFoam.
- Programming : Python, Matlab.
- Optimisation : SLSQP, SNOPT.

Personal Skills

- Communicative
- Collaborative
- Team player
- Open-minded

Languages

- English : Professional proficiency
- Dutch : Basic
- German: Intermediate
- Hindi : Native

Professional Profile

An open-minded and outgoing individual, with exceptional command in fluid mechanics and optimization. Principle developer of two python-based open-access research software. Aspires to be part of an international research and development team. Enjoys meeting people and sharing technical, social and cultural views.

Appointments

Aug 2021 — *R&D Thermal Energy Systems | VITO/EnergyVille, BE.* — Present

Road-map: Optimal design and control of thermal energy systems.

Feb 2021 — *Post-doc Researcher | Delft University of Technology, NL.* — 5.0 Months

Project: SU2-Evo and Bosch.

Feb 2017 — *PhD Researcher | Delft University of Technology, NL.* — 4.0 Years

Thesis: Progress in CFD-based automated design with application to unconventional turbomachines.

Research exchange: University of Surrey, United Kingdom.

Novelty
- Fluid-dynamic optimization framework for turbomachines
- Design methods for supersonic turbines

Achievements
Synthesised for the first time an adjoint based aerodynamic and aero-elastic design optimization framework in open-source software. The framework was able to obtain 10% performance improvement in academic cases and 7% in industrial cases.

Aug 2015 — *Research Intern | Triogen B.V., NL.* — 1.0 Year

Objectives
- Fluid dynamic assessment of the turbine
- Re-design of the turbo-generator

Achievements
Performed detailed fluid-dynamic assessment of the supersonic turbo-expander and proposed new design with 2% fluid dynamic performance improvement.

Aug 2012 — *Asst. Manager, R&D | Mahindra & Mahindra Ltd., IND.* — 2.0 Years

Key responsibilities
- Load cycle development
- Vehicle life and performance assessment

Education

2016 — *Master of Science | Delft University of Technology, NL.* — 2.0 Years

Faculty: Mechanical Engineering
Specialization: Advanced Fluid Mechanics
Dissertation: Supersonic Turbine Design using Method of Characteristics.

2012 — *Bachelor of Technology | Siksha 'O' Anusandhan, IND.* — 4.0 Years

Faculty: Mechanical Engineering
Dissertation: Case study of a Nuclear Fuel Rod.

Hobbies

- Road cycling
- Beer enthusiast
- Rasberry Pi

Achievements

- **Best Poster Award**
  Energy Initiative Day, TU Delft.
- **Best Technology Project**
  Mahindra & Mahindra Ltd., India.

Other projects

- Humidification System
- Swimming Microbial Animal
- Rube Goldberg Machine

Selected publications

Journals	**N. Anand, M. Pini.**	2020
	Comparative assessment of asymmetric and symmetric supersonic vanes at on- and off-design conditions for non-ideal compressible flows, *Energy Journal*, Under Review.	
	N. Anand, P. Colonna, M. Pini.	2020
	Design guidelines for supersonic stators operating with fluids made of complex molecules, *Energy Journal*, **203**, pp. 117698.	
	N. Anand, S. Vitale, M. Pini, G.J. Otero, R. Pecnik.	2019
	Design Methodology for Supersonic Radial Vanes Operating in Non-ideal Flow Conditions, *Journal for Gas Turbines and Power*, **131**(2), pp. 022601.	
Conferences	**N. Anand, A. Rubino, P. Colonna, M. Pini.**	2020
	Adjoint-based aeroelastic design optimization using a harmonic balance method, *ASME TurboExpo, GT2020-16208.*	
	N. Anand, S. Vitale, P. Colonna, M. Pini.	2018
	Assessment of FFD and CAD-based shape parametrization methods for adjoint-based turbomachinery shape optimization, *GPPS Montreal*, GPPS-NA-2018-135.	

Software Experience

Developer	**ParaBlade**
	An open-source turbomachinery blade parametrization tool to perform gradient based shape optimization. (python based code available on GitHub.)
	open-MoC
	An open-source method of characteristics code to design de-Laval nozzles. (python based code to be made available on GitHub)
Contributor	**SU2-Code**
	Have implemented new features and objectives to the direct and the adjoint solver. (Implemented features available on SU2-Code's GitHub page)
User	**openFoam**
	Used to simulate swimming of a microbial animal. It involved imposing a deforming surface a 3D wedge type mesh and CFD simulation.

Academic Experience

Supervision	**Principal Supervisor**
	6 master thesis projects
	Co-supervisor
	2 master thesis projects
	2 bachelor projects
Presentation	**Conferences**
	ASME TurboExpo, 2020, Virtual Online.
	SU2 Conference, 2020, Live Online.
	Organic Rankine Cycle Conference, 2019, Crete, Greece.
	SU2 Annual Developers Meet, 2019, Varenna, Italy.
	Global Power and Propulsion Conference, 2018, Montreal, Canada
	Lecture
	Turbomachinery Seminar, 2020, Live Online

Professional Involvement

Member	**Member of Knowledge Center for Organic Rankine Cycle**
Reviewer	**Invited reviewer for Elsevier Energy Journal** **Invited reviewer for three international conferences**