M. Salman **Siddiqui**

Research Scientist · Doctoral Student

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"Make the change that you want to see in the world."

Education

NTNU(Norwegian University of Science and Technology)

Trondheim, Norway

P.h.D. in Applied Mathematics (Numerical Modeling of Offshore Wind Turbines) *Feb. 2015 - To Present*

- Skills acquired: Reynolds Averaged Navier Stokes, Computational Fluid Dynamics(CFD), Large Eddy Simulation, Empirical Mode Decomposition, Offshore Wind Turbines, Wind Energy, Stochastic and Reduced Order Modeling, Finite Volume Methods, Isogeometric Analysis

NUST(National Univeristy of Science and Technology)

Islamabad, Pakistan

M.S. in Mechanical Engineering(CFD Investigation of Urban Roof Top Wind Turbines) *Sep. 2010 - Sep 2012*

- Skills acquired: Advanced Computational Fluid Dynamics, Methods in Engineering, Wind Turbines, Finite Volume Method, Finite Element Method, Reduce Order Modelling.

NUST(National Univeristy of Science and Technology)

Islamabad, Pakistan

B.E. in Mechanical Engineering(Design and Analysis of Flapping Wing Micro Air Vehicles) *Jun. 2006 - Jun. 2010*

- Skills acquired:Modelling and Simulation, Fluid Mechanics, Thermodynamics, Heat and Mass Transfer, Solid Mechanics, Advanced Calculus, Mechanics of Materials, Computer Aided Engineering, Design of Machines.

Experience

SINTEF ICT

Trondheim, Norway

Research Scientist, Sintef Applied Mathematics *Feb. 2015 - To Present*

- Blade design of 10MW offshore wind turbine using CFD.
- Research and Development of CFD codes.
- Numerical investigation of wakes from wind turbine.

Norwegian univeristy of sciences & technology

Trondheim, Norway

Doctoral Assistant, Department of Mathematical Sciences *Feb. 2015 - To Present*

- Development of fluid structure modeling tools for wind turbines.
- Wind energy forecasting and wind turbine micrositing.
- Development and application of CFD tools for simulating flow around a rotating turbine.
- Development and application of mesh generators for wind turbines.
- Development and application of geometry modeling for wind turbines.

Air University

Islamabad, Pakistan

Lecturer, Mechanical Engineering Department *Sep. 2012 - Jan. 2015*

- Subjects taught: Engineering Drawing and Graphics, Engineering Dynamics, Thermodynamics, CAD/CAM/CAE.
- Supervised final year projects on Wind Turbines, Automated Screw Jacks, Heat Exchangers etc.
- Implemented and revised the curriclum of Thermo-Fluids as per the instructions of Pakistan Engineering Council(PEC).

HITEC(Heavy Industry Taxila Education City)

Taxila, Pakistan

Junior Lecturer, Mechanical Engineering Department *Dec. 2010- Aug. 2012*

- Laboratories taught: Engineering drawing and graphics, CAD/CAM(manual, autocad/autodesk and pro.engineer), mechanics of materials.
- Advanced training on Creo Parametric from Trojans Pakistan.

Projects

NOWITECH PROJECT *Trondheim, Norway*

Research Scientist, Sintef Applied Mathematics *Feb. 2015 - To Present*

- Validation of CFD codes based on splines Development & application of CFD tools for simulating flow around a rotating turbine
- Development & application of Mesh generators for wind turbines
- Development & application of Geometry Modeling for wind turbines

FSI-WT PROJECT *Trondheim, Norway*

Research Scientist, Sintef Applied Mathematics *Feb. 2015 - To Present*

- Numerical investigation of wakes
- Validation of numerical models
- To generate realistic boundary conditions for simulating flow around individual wind turbines

Publications: Journals

- M. Salman, A. Rasheed, M. Tabib, T. Kvamsdal, "Numerical Frame Work for NREL 5MW Wind Turbine using Variable Level of Geometric Approximations ", Wind Energy, June 2016.
- M. Salman, A. Rasheed, T. Kvamsdal, M. Tabib, "Comparison of 2D and 3D RANS Based Simulations of NACA0015 Offshore Wind Turbine Blade ", Elsevier Journal of Applied Energy, January 2016.
- M. Tabib, A. Rasheed, M. Salman "A full-scale 3D Vs 2.5D Vs 2D analysis of flow-patterns and forces at different sections of 5MW NREL reference wind-turbine and its implications for strip-theory and blade element method based approach", Elsevier Energy Procedia Journal, June 2016 (Submitted)
- M. Salman, A. Rasheed, M. Tabib, T. Kvamsdal, "Numerical Analysis of NREL 5MW Wind Turbine: A Study Towards a Better Understanding of Wake Characteristic and Torque Generation Mechanism ", Journal of Physics , October 2016.
- M. Salman, A. Rasheed, T. Kvamsdal, M. Tabib, "Three Dimensional Variable Turbulent Intensity Flow Field Characterization of a Vertical Axis Wind Turbine", Elsevier Energy Procedia Journal, November 2015, Pages. 312-320.
- M. Saif, T. Rabbani, I. Akhtar, N.Durani, M. Salman, "Reduced-Order Modeling of Torque on a Vertical-Axis Wind Turbine at Varying Tip-Speed Ratios" Journal of Computational and Nonlinear Dynamics, American Society of Mechanical Engineers, Volume 10, June 2015, Pages. 041012.
- M. Salman, N. Durrani, I. Akhtar, " Quantification of the Effects of Geometric Approximations on the Performance of a Vertical Axis Wind Turbine: A Numerical Approach" Elsevier Renewable Energy Journal, Volume 74, February 2015, Pages. 661-670.

Publications: Conferences

- M. Salman, A. Rasheed, M. Tabib, T. Kvamsdal, 2017 "Numerical Modeling Framework for Wind Turbine Analysis & Atmospheric Boundary Layer Interaction ", AIAA Scitech Conference , 9-13 January, Grapevine Texas, USA.
- M. Salman, A. Rasheed, T. Kvamsdal, M. Tabib, 2015 "Three Dimensional Variable Turbulent Intensity Flow Field Characterization of a Vertical Axis Wind Turbine", 12 Deep Sea Offshore Wind R&D Conference, Deepwind, Trondheim, Norway.
- F. Ahmed, S. Rahman, M. Salman, 2014 "Optimization of an Internal Combustion Engine's Efficiency for Fuel Conservation and Green Environment" International Conference on Energy Systems and Policies, 24-27 November, Islamabad, Pakistan.
- M. Salman, S.M. Hassan, 2014 "Optimized Design of a Straight Blade Urban Roof Top Vertical Axis Wind Turbine" International Conference on Energy Systems and Policies, 24-27 November, Islamabad, Pakistan.
- K. Suleman, M. Sarim Asif, M. Kamran, M. Salman, 2014 "Mathematical modeling of a single piston Gasoline Engine and Simulation of Efficiency Parameters" International Conference on Energy Systems and Policies, 24-27 November, Islamabad, Pakistan.
- M. Salman, H. Ahmad, M.Shaheer , 2014 "Numerical Simulation of a Compressed Air Driven Tesla Turbine" ASME Power Conference July 28-31, Baltimore, Maryland, USA.
- T. Rabbani, M. Saif, M. Salman, I. Akhtar, and N. Durrani, 2014 "Reduced Order Modeling Of Loads On A Vertical-Axis Wind Turbine" Proceedings of International Bhurban Conference on Applied Sciences and Technology 15 – 18 January Islamabad, Pakistan.
- K. Suleman, M. Sarim, M. Kamran, M. Salman, 2013 "Mathematical modeling of a single piston Gasoline Engine and Simulation of Efficiency Parameters" International Conference on Modeling and Simulation, 24-27 September, Islamabad, Pakistan.
- M. Salman, N. Durrani, I. Akhtar , 2013 "Numerical Study to Quantify the Effects of Struts and Central Hub on the Performance of A Three Dimensional Vertical Axis Wind Turbine Using Sliding Mesh" ASME Power Conference, July 26-31, Boston, Massachusetts, USA.
- M. Salman, N. Durrani, I. Akhtar, 2012 "Effect Of Third-Dimensionality On Vertical Axis Wind Turbine Blades: A Numerical Study" 2nd International Symposium on Frontiers of Computational Sciences 28-29 June, Islamabad, Pakistan.
- M. Salman, S.M. Hassan, M. Kamran, 2012 "Quick Return, flexible flap angle mechanism for a flapping wing Micro Air Vehicle" International Conference on Engineering Sciences, Institute of Chemical Engineering and Technology, February 28-29, Lahore, Pakistan.
- M. Salman, S. M. Hassan, M. Kamran, 2012 "Stress Analysis for Active Flapping and Pitching Mechanism of an Micro Air Vehicle" International Conference on Engineering Sciences, Institute of Chemical Engineering and Technology, February 28-29, Lahore, Pakistan.
- M.Kamran, M. Salman, S.M. Hassan, 2012 "Comparison among Conventional Blocks and Bricks with Compressed Stabilized Earth Blocks" International Conference on Engineering Sciences, Institute of Chemical Engineering and Technology, February 28-29, Lahore, Pakistan.
- S.M. Hassan, M. Nadeem, M. Salman, 2011 "An algorithm for the generation/selection of process plans based upon production rate" International Conference on Advance Modeling and Simulation, NUST College of EME, June 17-21, Rawalpindi, Pakistan.

Publications: Posters

- M. Salman"Fluid Surface Interaction (FSI) analysis of Mega Watt Size Offshore Wind Turbine", Math Meets Industry Conference, 22-23 September Trondheim, Norway.
- M. Salman, "Numerical Analysis of NREL 5MW Wind Turbine: A Study Towards a Better Understanding of Wake Characteristic and Torque Generation Mechanism ", The Science of Making Torque from Wind Conference, Torque, 4-7 October, Munich, Germany.
- M. Salman, A. Rasheed, T. Kvamsdal, M. Tabib, "Three Dimensional Variable Turbulent Intensity Flow Field Characterization of a Vertical Axis Wind Turbine", 12th Deep Sea Offshore Wind R&D Conference, Deepwind, 4-6 February 2015, Trondheim, Norway.

Invited Talks

Math Meets Industry Conference *Trondheim, Norway*

How mathematics have triggered the development in the field of renewable energy, in particular wind turbines. *Sep. 2016*

- Introduced the connection between mathematical sciences and renewable energy in a 5minutes talk.

Skills

OS	Linux, Windows, Mac.
Programming	Python, C/C++, LaTeX, MatLab, MPI, Parallel Computing.
CAD	Pro Engineer, AutoCad, Solid Works.
Mesh Generators	Gambit, PointWise, BlockMesh, SnappyHexMesh.
CFD Packages	OpenFoam, ANSYS Fluent, ANSYS CFX.
Airfoil Design Tools	XFOIL, AirFoil Prep, JavaFoil.
Languages	English, Urdu, Norwegian.

Committees/Honors & Awards

2016	**1st Runner up, 2016 Nordic Math Slam**, Math Meet Industry Conference	*Trondheim*
2015	**Reviewer**, DeepWind Conference	*Trondheim*
2015	**American Society of Mechanical Engineers**, Reviewer for the conference proceedings of ASME.	*USA*
2015	**Summer School**, Student ambassador from NOWITECH project in offshore wind turbine development.	*Norway*
2014	**Organizer & Finance Director**, International Conference on Energy Systems and Policies.	*Pakistan*
2012	**Organizer & International Coordinator**, International Conference on Modeling and Simulation.	*Pakistan*

References

Trond Kvamsdal

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Adil Rasheed

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