M. Salman **Siddiqui**

Research Scientist · Doctoral Student

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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, Finite Element Method, Atmospheric Flow Modelling

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: Computational Fluid Dynamics, Numerical Methods in Engineering, Wind Turbines, Finite Volume Method, Finite Element Method, Reduce Order Modelling, Fluid Surface Interaction

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 analysis of MW size wind turbines using CFD
- Research and Development of CFD codes
- Numerical investigation of wakes from wind turbine
- Development of Reduced Order Models for wind turbines
- Modelling and Simulation of Atmospheric Boundary Layer interaction of wind turbines

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

- Courses responisbilities: Engineering Drawing, Engineering Dynamics, Thermodynamics, Fluids Mechanics, CAD/CAM/CAE.
- Supervision of graduate and undergraduate students
- Development of curriclum for Thermo Fluids laboratory
- Administration and management of research projects
- Head of monitoring committee for examination
- Administration and management of research projects
- Member of recruitment committee of new employees

HITEC(Heavy Industry Taxila Education City)

Taxila, Pakistan

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

- Courses/Labortary responisbilities: Engineering Drawing, Modelling & Simulation, Mechanics of Materials, Heat & Mass Transfer
- Undergone certifications on professional Modeling and Simulation technologies
- Supervision and development of high performance super computing laboratory
- Supervision of undergraduate students with their final year projects
- Mentoring of laboratory staff
- Organization of meetings and resource allocation

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 of Reduced Order Models for wind engineering applications
- 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 in wind turbine and wind farms
- Validation of numerical models
- To generate realistic boundary conditions for simulating flow around individual wind turbines
- Numerical modelling of Atmospheric and Marine Boundary Layer
- Compilation of scientific reports and presentations in International Conferences

Publications: Journals

- Tabib M, Rasheed A, **Siddiqui MS** "Influence of Tip Speed Ratio on Wake Flow Characteristics Utilizing Fully Resolved CFD Methodology ", Journal of Physics Conference Series (Wake Conference), pp. xxxx, 2017.
- **Siddiqui MS**, Rasheed A,Tabib M, Kvamsdal T, "Influence of Tip Speed Ratio on Wake Flow Characteristics Utilizing Fully Resolved CFD Methodology ", Journal of Physics Conference Series (Wake Conference), pp. xxxx, 2017.
- **Siddiqui MS**, Rasheed A,Tabib M, Fonn E, Kvamsdal T, "On the interaction between Wind Farms and Marine Boundary Layer", OMAE, pp. xxxx, 2017.
- Rasheed A, Kvamsdal T, Tabib M, **Siddiqui MS**, "Wind Energy Modelling from 2D blade sections to Wind farms", OMAE, pp. xxxx, 2017.
- Tabib M, Rasheed A, Fonn E, Tabib M, **Siddiqui MS**, "Analysis of unsteady hydrodynamics relevant to vortex induced vibrations on bluff-bodied offshore structure", OMAE, pp. xxxx, 2017.
- **Siddiqui MS**, Rasheed A,Tabib M, Kvamsdal T, "Explaining the Torque vs TSR curve of a 5MW NREL reference turbine", Elsevier Energy Procedia Journal, pp. xxxx, 2017.
- **Siddiqui MS**, Rasheed A, Tabib M, Kvamsdal T, "Simulating Single turbine and associated wake development - validation and comparison of computational methods (Actuator Line Vs Sliding Mesh Interface Vs Multiple Reference Frame)", Elsevier Energy Procedia Journal, pp. xxxx, 2017.
- Rasheed A, Tabib M, **Siddiqui MS**, Foon E, Suld JK, Kvamsdal T, "A comprehensive multiscale numerical framework for wind energy modelling", Elsevier Energy Procedia Journal, pp. xxxx, 2017.
- Tabib M, Rasheed A, Fonn E, Fuchs FG, **Siddiqui MS**, "CFD data based spectral and mode decomposition analysis of unsteady aerodynamics relevant to vortex induced vibrations on wind-turbine structure", Elsevier Energy Procedia Journal, pp. xxxx, 2017.
- Tabib M, Rasheed A, **Siddiqui MS**, "A 3D Vs 2.5D Vs 2D CFD analysis of 5MW NREL reference wind-turbine to study impact of bluff sections", Elsevier Energy Procedia Journal, pp. xxxx, 2017.
- Fonn E, Rasheed A, Tabib M, **Siddiqui MS**, "A step towards a reduced order modelling of flow characterized by wakes using Proper Orthogonal Decomposition", Elsevier Energy Procedia Journal, pp. xxxx, 2017.
- **Siddiqui MS**, Rasheed A, Tabib M, Kvamsdal T, "Insights on aerodynamics of the industrial-scale NREL 5MW reference wind turbine through comparison of different numerical frame-works with variable levels of geometric approximations ", Wind Energy, 2016.
- **Siddiqui MS**, Rasheed A, Kvamsdal T, Tabib M, "Comparison of 2D and 3D RANS Based Simulations of NACA0015 Offshore Wind Turbine Blade ", Elsevier Journal of Applied Energy, 2016.
- **Siddiqui MS**, Rasheed A, Tabib M, Kvamsdal T, "Numerical Analysis of NREL 5MW Wind Turbine: A Study Towards a Better Understanding of Wake Characteristic and Torque Generation Mechanism ", Journal of Physics Conference Series 753(2016)032059.
- **Siddiqui MS**, Rasheed A, Kvamsdal T, Tabib M, "Three Dimensional Variable Turbulent Intensity Flow Field Characterization of a Vertical Axis Wind Turbine", Elsevier Energy Procedia Journal, pp. 312-320, 2015.
- Saif M, Rabbani T, Akhtar T, Durrani N, **Siddiqui MS**, "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, , pp. 041012, 2015.
- **Siddiqui MS**, Durrani N, Akhtar I, " 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, , pp. 661-670, 2015.

Publications: Conferences

- **Siddiqui MS**, Rasheed A, Tabib M, Kvamsdal T, 2017 "Numerical Modeling Framework for Wind Turbine Analysis & Atmospheric Boundary Layer Interaction ", AIAA Scitech Conference , 9-13 January, Grapevine Texas, USA.
- **Siddiqui MS**, Rasheed A, Kvamsdal T, Tabib M, 2015 "Three Dimensional Variable Turbulent Intensity Flow Field Characterization of a Vertical Axis Wind Turbine", 12 Deep Sea Offshore Wind R&D Conference, Deepwind, 4-6 Feburary, Trondheim, Norway.
- Ahmed F, Rahman S, **Siddiqui MS**, 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.
- **Siddiqui MS**, Hassan SM, 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.
- **Siddiqui MS**, Ahmad H, Shaheer M , 2014 "Numerical Simulation of a Compressed Air Driven Tesla Turbine" ASME Power Conference July 28-31, Baltimore, Maryland, USA.
- Rabbani T, Saif M, **Siddiqui MS**, Akhtar I, and Durrani N, 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
- Suleman K, Asim MS, Kamran M, **Siddiqui MS**, 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
- **Siddiqui MS**, Durrani N, Akhtar I , 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
- **Siddiqui MS**, Durrani N, Akhtar I, 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.
- **Siddiqui MS**, Hassan SM, Kamran M, 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.
- **Siddiqui MS**, Hassan SM, Kamran M, 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.
- Kamran M, **Siddiqui MS**, Hassan SM, 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.
- Hassan SM, Nadeem M, **Siddiqui MS**, 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

- **Siddiqui MS** "Fluid Surface Interaction (FSI) analysis of Mega Watt Size Offshore Wind Turbine", Math Meets Industry Conference, 22-23 September Trondheim, Norway.
- **Siddiqui MS**, Rasheed A, Tabib M, Kvamsdal T "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.
- **Siddiqui MS**, Rasheed A, Kvamsdal T, Tabib M, "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, AutoDesk Inventor, Rhino, FreeCAD
Mesh Generators	Gambit, PointWise, BlockMesh, SnappyHexMesh, ICEM
CFD Packages	OpenFoam, ANSYS Fluent & CFX, IFEM
Airfoil Design Tools	XFOIL, AirFoil Prep, JavaFoil, Design Foil
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*

Extra Curricular

Travelling

- Travelled to USA, UK, Norway, Sweden, Denmark, France, Switzerland, Germany, Italy, Netherlands, Belgium, Austria, Czech Republic, UAE,

References

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