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## Mohammad Saud Afzal

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CONTACT INFORMATION	Department of Civil Engineering Indian Institute of Technology, Kharagpur Kharagpur, West Bengal - 721302	Phone: +917236886666  saud@civil.iitkgp.ac.in
RESEARCH INTERESTS	Numerical modeling, Offshore Wind Energy, Waves, Hydrodynamics, Sediment Transport, Computational Fluid Dynamics, Port Planning, Design of coastal structures , Coastal Engineering in Arctic Areas	
EDUCATION	<b>Norwegian University of Science and Technology</b> , Trondheim, Norway PhD., Department of Marine Technology, Sept 2013-March 2017 <ul style="list-style-type: none"><li>Title: <i>Three-dimensional streaming in seabed boundary layer</i></li><li>Advisor: Dag Myrhaug, Professor and Lars Erik Holmedal, Professor</li></ul> M.S., Coastal and Marine Engineering and Management, June 2013 <ul style="list-style-type: none"><li>MSc Thesis: <i>3D Numerical Modeling of Sediment Transport under combined current and waves</i></li><li>Advisor: Øivind A. Arntsen, Associate Professor</li><li>Average Grade: <i>A</i></li></ul> <b>Indian Institute of Technology</b> , Kanpur, India B.Tech., Civil Engineering , July 2008	
WORK EXPERIENCE	<b>Assistant Professor</b> Department of Civil Engineering, Indian Institute of Technology, Kharagpur	Nov 2017- Present
	<b>Post-Doc</b> Department of Civil and Environmental Engineering, Norwegian University of Science and Technology	Jan 2017- Nov 2017
	<b>Hydraulic Engineer and Modeler</b> Marine and Coastal Division, DHI India Water and Environment Pvt Ltd	July 2008- June 2011
	<b>Research Assistant</b> Sustainable Arctic Marine and Coastal Technology, Norwegian University of Science and Technology	Jan 2013 to July 2013
	<b>Research Assistant</b> Marine Civil Engineering, Norwegian University of Science and Technology	Jan 2013 to July 2013
	<b>Internship</b> Department of Civil and Environmental Engineering Norwegian University of Science and Technology	Aug 2012 to Sep 2012
	<b>Summer Intern</b> Department of Environmental and Hydraulic Engineering, E2 Consulting Engineers, Oakland, California USA	May 2007- Jul 2007

AWARDS

- EU Visiting Professor Fellowship  
 • European Union. Trondheim, Norway June 2018  
 • Awarded fellowship to visit Norwegian Univeristy of Science and Technology, Trondheim-NO as a visiting professor.
- EU Visiting scholar Fellowship  
 • European Union, Delft, Netherlands July 2017  
 • Awarded fellowship to visit TU Delft as a visiting scholar.
- ASME Scholarship  
 • ASME, San Francisco June 2014  
 • Awarded scholarship to attend OMAE 2014 in San Francisco, Californnia, US.
- Erasmus Mundus Scholarship 2011-13  
 • European Union. Delft, Netherlands Aug 2011  
 • Awarded full scholarship to pursue MS in Coastal and Marine Engineering and Management from consortium of TU Delft, Netherlands, NTNU and University of Southampton.
- Highest Marks in Mathematics  
 • Uttar Pradesh State Science Department 2003  
 • Highest marks in Mathematics in class 12th in ISC board and also Smt Vimla Srivastava Gold Medal in 2003 at Little Flower High School.

STUDENTS SUPERVISION

- Doctoral Students Supervision : 2 Ongoing**  
 Department of Civil Engineering,  
 Indian Institue of Technology, Kharagpur
- MSc Students Supervision : 1 Ongoing, 5 Finished**  
 Norwegian University of Science and Technoilogy and,  
 Indian Institue of Technology, Kharagpur
- Btech/BSc Students Supervision : 3 Ongoing**  
 Department of Civil Engineering,  
 Indian Institue of Technology, Kharagpur

TEACHING EXPERIENCE

- Courses Taught at IIT Kharagpur  
 CE 69005 - Computer Applications in Free Surface Flow 2018-19, Autumn  
 CE 60111 - Viscous Fluid Flow 2018-19, Autumn  
 CE 60124 - Turbulent Fluid Flow 2017- 18, Spring  
 CE 13001 - Engineering Drawing and Computer Graphics 2017-18, 2018-19  
 CE 21003 - Hydraulics 2017- 18, Spring
- Courses Taught at NTNU  
 MR8303 - Kinematics and Dynamics of Ocean Surface Waves 2016,2015  
 MR8304 - Seabed Boundary Layer Flow 2015  
 TMR4235 - Stochastic Theory of Sealoads 2015  
 TBA 4145 - Port and Coastal Facilities 2012-2016  
 TBA 4265 - Marine Physical Environment 2012-2013

JOURNAL AND INTERNATIONAL CONFERENCE PUBLICATIONS

Ong, Muk Chen; Kamath, Arun; Bihs, Hans; Afzal, Mohammad Saud. (2017) Numerical Simulation of Free-Surface Waves past Two Semi-Submerged Horizontal Circular Cylinders

in Tandem. Marine Structures. vol. 52.

Afzal, Mohammad Saud; Holmedal, Lars Erik; Myrhaug, Dag. (2015) Three-dimensional streaming in the seabed boundary layer beneath propagating waves with an angle of attack on the current. Journal of Geophysical Research - Oceans. vol. 120 (6).

Afzal, Mohammad Saud; Bihs, Hans; Kamath, Arun; Arntsen, Øivind Asgeir. (2015) Three Dimensional Numerical Modeling of Pier Scour Under Current and Waves Using Level Set Method. Journal of Offshore Mechanics and Arctic Engineering-Transactions of The Asme. vol. 137 (3).

Afzal, Mohammad Saud; Lubbad, Raed. (2018) Development of Predictive Tool for Coastal Erosion in Arctic; A Review. In Press (Springer Nature).

Afzal, Mohammad Saud; Holmedal, Lars Erik; Myrhaug, Dag. (2018) Sediment transport in combined wave-current seabed boundary layers due to streaming. Submitted to Journal of Geophysical Research - Earth Surface.

Afzal, Mohammad Saud; Holmedal, Lars Erik; Myrhaug, Dag. (2016) Effect of bottom roughness on sediment transport due to streaming beneath linear propagating waves with an angle of attack on current. Scour and Erosion: Proceedings of the 8th International Conference on Scour and Erosion.

Afzal, Mohammad Saud; Holmedal, Lars Erik; Myrhaug, Dag. (2015) Sediment transport in wave-current bottom boundary layer under linear propagating waves at an angle with the current. Coastal Sediments 2015 The Proceedings of the Coastal Sediments 2015.

Afzal, Mohammad Saud; Holmedal, Lars Erik; Myrhaug, Dag; Wang, Hong. (2015) Sediment transport beneath horizontally uniform linear waves plus current in coastal areas. Proceedings of MekIT'15 Eighth National Conference on Computational Mechanics.

Ahmad, Nadeem; Afzal, Mohammad Saud; Bihs, Hans; Arntsen, Øivind Asgeir. (2015) Three-dimensional numerical modelling of local scour around a non-slender cylinder under varying wave conditions. 36th IAHR World Congress Proceedings.

Afzal, Mohammad Saud; Bihs, Hans; Arntsen, Øivind Asgeir. (2014) 3D Numerical Modelling of Contraction Scour under Steady Current Using the Level Set Method. Proceedings of the 11th International Conference on Hydroscience and Engineering.

Afzal, Mohammad Saud; Bihs, Hans; Kamath, Arun; Arntsen, Øivind Asgeir. (2014) Three Dimensional Numerical Modelling of Pier Scour Under Current and Waves Using Level Set Method. Proceedings ASME 2014 33rd International Conference on Ocean, Offshore and Arctic Engineering, Volume 2: CFD and VIV.

Bihs, Hans; Afzal, Mohammad Saud; Kamath, Arun; Arntsen, Øivind Asgeir. (2013) REEF3D : An Advanced Wave Energy Design Tool for the Simulation of Wave Hydrodynamics and Sediment Transport. International Workshop on Ocean Wave Energy, . Department of Ocean Engineering, IIT Madras; Chennai. 2013-12-02 - 2013-12-03.

## RESEARCH PROJECTS

3D CFD Modeling of the Hydrodynamics and Local Scour Around Offshore Structures Under Combined Action of Current and Waves

- Institute Scheme for Innovative Research and Development (ISIRD, IIT Kharagpur) March 2018- March 2021

Sea ice and iceberg observation and analysis in Western Barent Sea in 1987

- Sustainable Arctic Marine and Coastal Technology (SAMCoT) Jan 2013-Present

- Analysis of sea ice and iceberg observation in Western Barent sea in 1987. This research will be used for further research models in arctic field development.

#### Numerical Modeling of waves and sediment transport using MIKE 21

- Norwegian University of Science and Technology Jan 2013- Present
- Development of waves and sediment transport modeling template to be used in future for such type of studies. This includes site identification characteristics, type of data required for such studies and setting up the model.

#### Wave Propagation Over Rugged Topography using SWAN Model

- Norwegian University of Science and Technology Aug 2012-Sep 2012
- The project was done during the summer job and as a part of specialization project for Marine Civil Engineering MSc degree at NTNU. It involved development of a tutorial of SWAN and wave propagation study in Mehamn area in Norway and its validation using physical model experiment of SINTEF.

#### Bachelor of Technology Project

- Indian Institute of Technology Kanpur, India August 2007-April 2008
- 2D Numerical modeling of pollutant transport in rivers.

#### Remedial Action Plan : Hydraulic and Environmental Summer Intern

- E2 Consulting Engineers, Emeryville, California USA May 2007-Jul 2007
- Study of PGE Topock Site, CA and Remedial Action Plan for Controlling Pollution of Colorado River from Hazardous and Toxic Metal Waste from Gas pipeline in the region.

#### Simulating water flow in rivers

- Indian Institute of Technology Kanpur, India May 2006-Jul 2006
- Simulating water flow in river channel through HECRAS Software.

#### Remote Sensing

- Indian Institute of Technology Kanpur, India Jan 2006-Apr 2006
- Remote Sensing Data Analysis of Lightning Flashes, Nox level and ozone in lower Stratosphere over Ganga Basin in different seasons, months spread over a period of 10 years and concluding that with increase in Lightning flashes and Nox level there is increase in formation of ozone. Also variation of ozone level in different months of the year.

#### Digital Elevation Model

- Indian Institute of Technology Kanpur, India Jan 2006-Apr 2006
- Made digital elevation model of Andaman Region to study land feature disturbances because of Land Slides and Earthquakes through ARCVIEW and ERDAS software.

#### COMMERCIAL PROJECTS

#### Numerical Modeling of waves, hydrodynamics and sediment transport

- DHI India Jul 2008- Jun 2011
- Worked on several wave modeling and hydrodynamic/ sedimentation studies in different areas of India in which i used MIKE 21/3 HD/ST and SW module.
  - Deep Water Port at Hugli, West Bengal India 2010
  - Shipyard/Offshore Fabrication Yard at Mahua, Bhavnagar, India 2009
  - Pre-Feasibility Study for development of Dahej Port, Gujarat, India 2009
  - ABG Shipyard , Dahej, Gujarat, India 2009
  - Dredging Malad Creek for the Development of Fishing and Passenger Traffic in North Mumbai, India 2008
  - Mathematical studies at proposed port near Vadarevu, Nizampatnam, India 2008

- Port Planning
- DHI India 2011
    - Preliminary Port Planning of 3 minor ports ( Palur, Bahuda Muhan and Barunei Muhan) in Orissa, India for M/s Jindal Steel and Power Limited.
- Pipeline Project
- DHI India 2011
    - Expert Opinion on burial depth for sea water intake and outfall system for gas based combined cycle power plant of 700 MW capacity, Pipavav, Gujarat , India.
- Littoral Transport Study
- DHI India 2010
    - Erosion and Accretion Study for the proposed Gopalpur Port upto Rushikulya River Mouth, Orissa, India. Did Coastline Evolution/ Shoreline Changes using MIKE LITPACK and Hydrodynamic and Sedimentation studies and modeling using MIKE 21.
- Tidal Power Site Selection
- DHI Singapore 2010
    - Tidal Power Site Selection in Gulf of Kutch and Khambhat, Gujarat. Hydrodynamic study and modeling of Gulf of Kutch and Khambhat using MIKE 21 HD for site selection for tidal power generation by harnessing strong currents in the gulf.
- Intake and Outfall Studies
- DHI India 2009
    - Selection of Intake and Outfall locations for Krishnapatnam UMPP. Advection and Dispersion studies using MIKE 21/3, Littoral Transport studies using MIKE LITPACK. Designed Breakwater, Intake Channel and prepared project BOQ.
- Integrated Coastal Zone Management
- DHI India 2008-2010
    - Consolidated Emergency Plan for the Proposed TPP, at Village Dehrand, Distt. Raigad, Maharashtra, on left bank of Dharamtar Creek where i helped in preparation of Onsite and Offsite emergency plan.

PROFESSIONAL ASSOCIATIONS	<ul style="list-style-type: none"> <li>• Member - American Society of Civil Engineers (ASCE)</li> <li>• Member - COPRI - Coasts, Oceans, Ports, Rivers Institute</li> <li>• Executive Member - Society of Civil Engineers, IIT Kanpur</li> </ul>	<p>Sep 2011-Present</p> <p>Sep 2011-Present</p> <p>Jul 2004- Jul 2008</p>
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SOFTWARES AND COMPUTATIONAL SKILLS	<p>Modeling Softwares</p> <ul style="list-style-type: none"> <li>• CFD packages OPENFOAM, REEF3D</li> <li>• MIKE 21/3 SW/BW/HD/ST/LITPACK</li> <li>• DELFT 3D Suite</li> <li>• SWAN</li> <li>• ARCGIS</li> <li>• HECRAS</li> <li>• GEOSLOPE</li> </ul> <p>General Utility Softwares</p> <ul style="list-style-type: none"> <li>• MATLAB 2012</li> <li>• AUTOCAD 2011</li> <li>• LATEX</li> </ul> <p>Computer Languages</p> <ul style="list-style-type: none"> <li>• FORTRAN</li> <li>• C/C++</li> <li>• JAVA</li> </ul>
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- HTML/PHP

EXTRA  
CURRICULAR  
ACTIVITIES

- General Secretary, International Club of Trondheim Aug 2012 – Present
- Norwegian University of Science and Technology
- Coordinator, Alumni Contact Program May 2006 – May 2007
- Indian Institute of Technology Kanpur
    - For the first time in India, IIT Kanpur started in May 2006 a formal Alumni Solicitation Program wherein the current students contacted all the alumni on phone and seeking donations for the institute. I worked full time in this programme during May-July 2006 as a member of five student team. In between 2006-2007, I coordinated this highly successful initiative to connect alumni with IIT Kanpur.
- Executive Member in various technical and cultural festivals Jul 2004 – May 2008
- Indian Institute of Technology Kanpur
    - Executive Member of various organizing teams in the capacity of Coordinator of Hospitality Cell in Udghosh'06(IITK Sports Festival) and Coordinator Gymkhana Lecture and Discussion Club during 2006-2007 and Nostalgia (Farewell of passing out students in 2006). Executive member in Students Placement Cell at IIT Kanpur during 2005-2006 and 2006-2007 and Hall Executive Committee for Hall of Residence II, IIT Kanpur, during 2005-06. Core Team Member of various Institute Level Festivals.
- Coordinator Gymkhana Lecture and Discussion Club Jul 2006 – May 2007
- Indian Institute of Technology Kanpur