

## Mohammad Saud Afzal, Associate Professor

---

CONTACT INFORMATION	Department of Civil Engineering Indian Institute of Technology, Kharagpur Kharagpur, West Bengal - 721302	Phone: +917236886666  <a href="mailto:saud@civil.iitkgp.ac.in">saud@civil.iitkgp.ac.in</a>
RESEARCH INTERESTS	Coastal Engineering, Computational Fluid Dynamics, Hydraulics, Hydrodynamics, Sediment Transport, Wave-Current interaction, Wave Mechanics, Numerical modeling, Coastal Structures, Application of Machine Learning in coastal and hydraulic engineering, Port Planning and Coastal Engineering in Arctic Areas	
ACADEMIC PROFILE LINKS	<a href="#">Google Scholar</a> <a href="#">ORCID ID : 0000-0003-0715-3715</a> <a href="#">Web of Science</a>	
EDUCATION	<b>PhD: Norwegian University of Science and Technology</b> , Trondheim, Norway <ul style="list-style-type: none"><li>• Duration: <i>2<sup>nd</sup> Sept 2013 - 7<sup>th</sup> March 2017</i></li><li>• Department: <i>Department of Marine Technology</i></li><li>• Title: <i>Three-dimensional streaming in seabed boundary layer</i></li><li>• Advisor: Dag Myrhaug, Professor and Lars Erik Holmedal, Professor</li></ul> <b>MS: Delft University of Technology (TU Delft), Netherlands</b> <ul style="list-style-type: none"><li>• Duration: <i>2011 - 2013</i></li><li>• Program: <i>Coastal Engineering and Management</i></li><li>• Department: <i>Department of Hydraulic Engineering of the Faculty of Civil Engineering and Geosciences</i></li><li>• MSc Thesis: <i>3D Numerical Modeling of Sediment Transport under combined current and waves</i></li><li>• Average Grade: <i>A</i></li></ul> <b>B.Tech: Indian Institute of Technology, Kanpur, India</b> <ul style="list-style-type: none"><li>• Duration: <i>2004 - 2008</i></li><li>• Department: <i>Department of Civil Engineering</i></li></ul>	
WORK EXPERIENCE (TOTAL 10 YEARS)	<b>Associate Professor</b> Department of Civil Engineering, Indian Institute of Technology, Kharagpur	July 2023 - Present
	<b>Assistant Professor (5 years 9 months)</b> Department of Civil Engineering, Indian Institute of Technology, Kharagpur	Nov 2017 - July 2023
	<b>Post-Doc (11 Months)</b> Department of Civil and Environmental Engineering, Norwegian University of Science and Technology	Jan 2017 - Nov 2017
	<b>Hydraulic Engineer and Modeler (3 years)</b> Marine and Coastal Division, DHI India Water and Environment Pvt Ltd Supervisor: Dr Ajay Pradhan	July 2008 - June 2011

TEACHING	<p>Courses Taught at IIT Kharagpur</p> <p>CE 21003 - Hydraulics (Average Feedback: 4.4 out of 5 in last 5 years)</p> <p>CE 29006 - Water Resources Engg. Laboratory (Average Feedback: 4.0 out of 5 in last 4 years))</p> <p>CE60222- Coastal Hydrodynamics (111 students registered in this newly floated elective, Spring 2023) at IIT Kharagpur, Average Feedback: 4.28/5.0</p> <p>CE39204- Water Resources and Geotechnical Engineering Sessional (110 students in this newly developed core course for 3rd year UG students, Spring 2023) at IIT Kharagpur, Average Feedback: 4.34/5.0</p> <p>CE 69005 - Computer Applications in Free Surface Flow</p> <p>CE 60111 - Viscous Fluid Flow</p> <p>CE 60124 - Turbulent Fluid Flow</p> <p>CE 13001 - Engineering Drawing and Computer Graphics</p>								
	<p><b>NPTEL Courses</b></p> <table> <tr> <td>Hydraulic Engineering (Spring 2020)</td><td>No of Participants: 4757</td></tr> <tr> <td>Hydraulic Engineering (Spring 2021)</td><td>No of Participants: 2700</td></tr> <tr> <td>Hydraulic Engineering (Spring 2022)</td><td>No of Participants: 5211</td></tr> <tr> <td>Hydraulic Engineering (Spring 2023)</td><td>No of Participants: 5010</td></tr> </table>	Hydraulic Engineering (Spring 2020)	No of Participants: 4757	Hydraulic Engineering (Spring 2021)	No of Participants: 2700	Hydraulic Engineering (Spring 2022)	No of Participants: 5211	Hydraulic Engineering (Spring 2023)	No of Participants: 5010
Hydraulic Engineering (Spring 2020)	No of Participants: 4757								
Hydraulic Engineering (Spring 2021)	No of Participants: 2700								
Hydraulic Engineering (Spring 2022)	No of Participants: 5211								
Hydraulic Engineering (Spring 2023)	No of Participants: 5010								
	<p><b>Courses Taught at NTNU</b></p> <p>MR8303 - Kinematics and Dynamics of Ocean Surface Waves</p> <p>MR8304 - Seabed Boundary Layer Flow</p> <p>TBA 4145 - Port and Coastal Facilities (Partly)</p> <p>TBA 4265 - Marine Physical Environment (partly)</p>								
STUDENT SUPERVISION	<p>Single Doctoral Students Supervision: <b>1 Completed (IIT Kharagpur)</b></p> <p>Joint Doctoral Students Supervision: <b>2 Completed (NTNU)</b></p> <p>MSc Students Supervision : 6 Finished</p> <p>Btech/BSc Students Supervision : 12 Finished</p> <p>Summer Project Students Supervision : 21 finished</p>								
SPONSORED PROJECTS AS PRINCIPAL INVESTIGATOR	<p>Computational Fluid Dynamics modelling of hydrodynamics and scour around coastal structures</p> <table> <tr> <td> <ul style="list-style-type: none"> <li>Funding Agency: SERB</li> <li>Fund Sanctioned: <b>43.07 Lakh INR</b></li> <li>Status: <b>Accepted and Ongoing</b></li> </ul> </td><td>Feb 2023- March 2026</td></tr> </table> <p>Predictive Tool for Arctic Coastal Hydrodynamics and Sediment Transport</p> <table> <tr> <td> <ul style="list-style-type: none"> <li>Funding Agency: National Centre for Polar and Ocean Research,Earth System Science Organisation, Ministry of Earth Sciences</li> <li>Fund Sanctioned: <b>37.51 Lakh INR</b></li> <li>Status: <b>Completed</b></li> </ul> </td><td>July 2019- September 2023</td></tr> </table> <p>Large Scale CFD modelling of the Hydrodynamics and scour around Offshore Wind Farms</p> <table> <tr> <td> <ul style="list-style-type: none"> <li>Funding Agency:SERB</li> <li>Fund Sanctioned: <b>30.38 Lakh INR</b></li> <li>Status: <b>Completed</b></li> </ul> </td><td>March 2019- September 2022</td></tr> </table> <p>3D CFD Modeling of the Hydrodynamics and Local Scour Around Offshore Structures Under Combined Action of Current and Waves</p> <table> <tr> <td> <ul style="list-style-type: none"> <li>Funding Agency: SRIC (<a href="#">ISIRD</a>, IIT Kharagpur)</li> <li>Fund Sanctioned: <b>28 Lakh INR</b></li> </ul> </td><td>March 2018- March 2022</td></tr> </table>	<ul style="list-style-type: none"> <li>Funding Agency: SERB</li> <li>Fund Sanctioned: <b>43.07 Lakh INR</b></li> <li>Status: <b>Accepted and Ongoing</b></li> </ul>	Feb 2023- March 2026	<ul style="list-style-type: none"> <li>Funding Agency: National Centre for Polar and Ocean Research,Earth System Science Organisation, Ministry of Earth Sciences</li> <li>Fund Sanctioned: <b>37.51 Lakh INR</b></li> <li>Status: <b>Completed</b></li> </ul>	July 2019- September 2023	<ul style="list-style-type: none"> <li>Funding Agency:SERB</li> <li>Fund Sanctioned: <b>30.38 Lakh INR</b></li> <li>Status: <b>Completed</b></li> </ul>	March 2019- September 2022	<ul style="list-style-type: none"> <li>Funding Agency: SRIC (<a href="#">ISIRD</a>, IIT Kharagpur)</li> <li>Fund Sanctioned: <b>28 Lakh INR</b></li> </ul>	March 2018- March 2022
<ul style="list-style-type: none"> <li>Funding Agency: SERB</li> <li>Fund Sanctioned: <b>43.07 Lakh INR</b></li> <li>Status: <b>Accepted and Ongoing</b></li> </ul>	Feb 2023- March 2026								
<ul style="list-style-type: none"> <li>Funding Agency: National Centre for Polar and Ocean Research,Earth System Science Organisation, Ministry of Earth Sciences</li> <li>Fund Sanctioned: <b>37.51 Lakh INR</b></li> <li>Status: <b>Completed</b></li> </ul>	July 2019- September 2023								
<ul style="list-style-type: none"> <li>Funding Agency:SERB</li> <li>Fund Sanctioned: <b>30.38 Lakh INR</b></li> <li>Status: <b>Completed</b></li> </ul>	March 2019- September 2022								
<ul style="list-style-type: none"> <li>Funding Agency: SRIC (<a href="#">ISIRD</a>, IIT Kharagpur)</li> <li>Fund Sanctioned: <b>28 Lakh INR</b></li> </ul>	March 2018- March 2022								

	<ul style="list-style-type: none"> <li>• Status: <b>Completed</b></li> </ul>
CONSULTANCY PROJECTS	<ul style="list-style-type: none"> <li>• 3rd Party Agency for Anti erosion work to the left bank of river Hooghly Bhagirathi for a length of 3437.00M in Kalyani, Dist Nadia <b>Kolkata Port Trust</b>.(2024)</li> <li>• Distribution Design and Drawings and Proof Checking and Technical Vetting for the work of Execution of rural Piped water Supply project pertaining to 17 GP of Tangi block of Khorda District including 05 years of Operation and Maintenance <b>NCC LIMITED</b>. (2023)</li> <li>• Study of Sustainable Design of <b>ABB Electrification Products ABB Global Industries and Services Private Ltd</b>. (2023)</li> </ul>
PATENTS	<p><b>Pier Scour Protector under combined wave-current flows in coastal environment (modified collar with bubbles)</b></p> <ul style="list-style-type: none"> <li>• Country: Indian Patent</li> <li>• Status: Filed</li> <li>• Filing Date: 22/02/2023</li> </ul> <p><b>Arctic Coastal Bluff erosion Protector under combined wave-current flows (Honeycomb structure with geosynthetic bags)</b></p> <ul style="list-style-type: none"> <li>• Country: Indian Patent</li> <li>• Status: Filed</li> <li>• Filing Date: 06/03/2023</li> </ul> <p><b>Sediment Flusher</b></p> <ul style="list-style-type: none"> <li>• Country: Indian Patent</li> <li>• Application Number: 371917-001</li> <li>• Cbr Number: 206780</li> <li>• Cbr Date: 02/10/2022</li> </ul>
CONFERENCES AND COURSES ORGANIZED	<p>1st Online <b>International Conference</b> on Recent Advances in Computational and Experimental Mechanics 2020</p> <ul style="list-style-type: none"> <li>• Role: Secretary</li> <li>• Fund Sanctioned: <b>Self Sponsored</b></li> <li>• Dates: 4-6 September <b>2020</b></li> </ul> <p><b>GIAN Course</b> on Riverbed Erosion and local scour at hydraulic structures</p> <ul style="list-style-type: none"> <li>• Role: Principal Investigator</li> <li>• Fund Sanctioned: <b>10 Lakh INR</b></li> <li>• Dates: December <b>2020</b></li> </ul> <p><b>AICTE QIP</b> short term course on Hydrodynamics and sediment transport in unsteady flows</p> <ul style="list-style-type: none"> <li>• Role: Principal Investigator</li> <li>• Fund Sanctioned: <b>4.5 Lakh INR</b></li> <li>• Dates: October <b>2019</b></li> </ul> <p><b>AICTE QIP</b> short term course on Mechanics of sediment transport in rivers and oceans</p> <ul style="list-style-type: none"> <li>• Role: Co-Principal Investigator</li> <li>• Fund Sanctioned: <b>4.5 Lakh INR</b></li> <li>• Dates: March <b>2021</b></li> </ul> <p><b>AICTE QIP</b> short term course on Mathematical modelling of flow and transport processes in fluid mechanics and numerical simulations</p> <ul style="list-style-type: none"> <li>• Role: Co-Principal Investigator</li> </ul>

- Fund Sanctioned: **4.5 Lakh INR**
- Dates: February **2021**

EDITORIAL BOARD • **Associate Editor** of Journal of Water Management Modelling (2023- til date). Indexing: Scopus, ESCI, Web of Science. IF: NA

- **Guest Editor:** Journal of Marine Science and Engineering (Feb 2023- September 2023). Special Issue "Hydrodynamics and Scour around Coastal and Hydraulic Structures under Combined Wave-Current Action", Indexing: SCI, Scopus, Web of Science. IF: 2.8
- **Guest Editor:** Frontiers in Built Environment (Dec 2022- June 2023). Special Issue "Analytical and Numerical Modelling Approaches Related to Coastal and Ocean Engineering", Indexing: SCI, Scopus, Web of Science. IF: 2.6

PUBLICATIONS:  
INTERNATIONAL  
JOURNALS.  
TOTAL: 34

Dutta, D. and **Afzal, M.S., (2024)**. Numerical investigation of hydrodynamic characteristics for flow past a square cylinder due to combined wave-current effect. *Physics of Fluids*, 36, 000000; doi:10.1063/5.0213177.

**Afzal, M.S.** and Pradhan, A., (2024). Sediment transport analysis under combined action of waves and current using a novel semi-coupled computational fluid dynamics solver. *Environment, Development and Sustainability*, <https://doi.org/10.1007/s10668-024-04810-3>.

Dutta, D. and **Afzal, M.S., (2024)**. Scour around twin piles under combined wave-current flows. *Coastal Engineering*, 189, 104477.

Kumar, L. and **Afzal, M.S., (2024)**. Computational fluid dynamics modeling of scour around abutment geometries under combined effects of waves and currents. *Ocean Engineering*, 294, 116812, 1-21.

Dutta, D. and **Afzal, M.S., (2024)**. 3D Numerical study of scour around a pile group in the staggered arrangement under combined wave-current flows. *Journal of Irrigation and Drainage Engineering, ASCE*, 150(2): 04024004.

Kumar, L., **Afzal, M.S., (2024)**. Estimating pier scour depth under combined waves and current using boosting machine-learning models. *Acta Geophysica*, 72, 1895–1911.

Kumar, L. and **Afzal, M.S., (2023)**. Experimental and numerical investigation of scour at vertical wall abutment under strong current-dominated combined wave-current flow in low Keulegan-Carpenter number regime. *Ocean Engineering*, 285(2), 115394, 1-19.

Kumar, L., **Afzal, M.S., (2023)**. A review of the state of research on bridge pier scour under combined action of waves and current. *Acta Geophysica*, 71:2359–2379.

Kumar, L., **Afzal, M.S., (2023)**. Numerical Simulations of Scour around Vertical Wall Abutments with Varying Aspect Ratios under Combined Waves and Current Flows. *Journal of Marine Science and Engineering*, 11(10), 1886.

Parida, V. K., Saidulu, D., Bhatnagar, A., Gupta, A. K., **Afzal, M.S., (2023)**. A critical assessment of SARS-CoV-2 in aqueous environment: existence, detection,

survival, wastewater-based surveillance, inactivation methods, and effective management of COVID-19. *Chemosphere*, 327, 138503, 1-16.

Kumar, L., **Afzal, M.S.**, Ghosh, S., (2023). A novel-tuned Custom ensemble machine learning model to predict abutment scour depth in clear water conditions. *AQUA-Water Infrastructure, Ecosystems and Society*, 72(5), 798-813.

Dutta, D., **Afzal, M.S.**, Alhaddad, S., (2023). 3D CFD Study of Scour in Combined Wave-Current Flows around Rectangular Piles with Varying Aspect Ratios. *Water*, 15(8), 1541, 1-20.

Priyadarshan, A. and **Afzal, M.S.**, (2023). Numerical investigation of flow past a circular cylinder modified with a single groove at low Reynolds number. *Physics of Fluids*, 35(2), 027125, 1-29.

**Afzal, M.S.**, Kumar, L., Chugh V., Kumar, Y., Zuhair, M., (2023). prediction of significant wave-height using machine learning and its application to extreme wave analysis. *Journal of Earth System Science*, 132(2),1-17.

**Afzal, M.S.**, Holmedal, L.E. and Myrhaug, D., (2022). Effect of wave skewness and sediment particle size on sediment transport due to combined wave-current seabed boundary layer streaming. *Journal of Hydraulic Engineering, ASCE* 148 (9), 06022011.

Dutta, D., Bihs, H. and **Afzal, M.S.**,(2022), Computational Fluid Dynamics modelling of hydrodynamic characteristics of oscillatory flow past a square cylinder using level set method. *Ocean Engineering*, 253,111211.

Pradhan, A., Reyaz, A., **Afzal, M.S.** and Gazi, A.H,(2022), On the origin of forces in the wake of an elliptical cylinder at low Reynolds number. *Environmental Fluid Mechanics*,22, 1307–1331.

Kumar, L., **Afzal, M.S.** and Ahmad, A., (2022). Prediction of water turbidity in a marine environment using machine learning: A case study of Hong Kong. *Regional Studies in Marine Science*, p.102260.

**Afzal, M.S.**, and Kumar, L., (2022). Propagation of wave over a rugged topography. *Journal of Ocean Engineering and Science*, 7(1), 14-28

Purkayastha, S. and **Afzal, M.S.**, (2022). Review of smooth particle hydrodynamics and its applications for environmental flows. *Journal of The Institution of Engineers (India): Series A*, 1-21

Gautam, S., Dutta, D., Bihs, H. and **Afzal, M.S.**, (2021). Three-dimensional Computational Fluid Dynamics modelling of scour around a single pile due to combined action of the waves and current using Level-Set method. *Coastal Engineering*, 170, 104002.

**Afzal, M.S.**, Holmedal, L.E. and Myrhaug, D., (2021). Sediment Transport in Combined Wave-Current Seabed Boundary Layers due to Streaming. *Journal of Hydraulic Engineering, ASCE*, 147(4): 04021007.

Islam, M.A., Lubbad, R., Amiri, S.A.G., Isaev, V., Shevchuk, Y., Uvarova, A.V., **Afzal, M.S.** and Kumar, A., (2021). Modelling the seasonal variations of soil temperatures in the Arctic coasts. *Polar Science*, 30, p.100732.

Kumar, L., **Afzal, M.S.** and Afzal, M.M., (2020). Mapping shoreline change using machine learning: a case study from the eastern Indian coast. *Acta Geophysica*, 68 (4), pp.1127–1143.

Gazi, A.H. and **Afzal, M.S.**, (2020). A review on the hydrodynamics of horseshoe vortex at a vertical cylinder mounted on a flat bed and its implication to scour at a cylinder. *Acta Geophysica*, 68(3), pp.861-875.

Dutta, D., Mandal, A. and **Afzal, M.S.**, (2020). Discharge performance of plan view of multi-cycle W-form and circular arc labyrinth weir using machine learning. *Flow Measurement and Instrumentation*, 73, p.101740.

**Afzal, M.S.**, Bihs, H. and Kumar, L., (2020). Computational fluid dynamics modeling of abutment scour under steady current using the level set method. *International Journal of Sediment Research*. 35 355-364

Islam, M.A., Lubbad, R. and **Afzal, M.S.**, (2020). A Probabilistic Model of Coastal Bluff-Top Erosion in High Latitudes Due to Thermoabrasion: A Case Study from Baydaratskaya Bay in the Kara Sea. *Journal of Marine Science and Engineering*, 8(3), p.169.

Gazi, A.H., Purkayastha, S. and **Afzal, M.S.**, (2020). The equilibrium scour depth around a pier under the action of collinear waves and current. *Journal of Marine Science and Engineering*, 8(1), p.36.

Gazi, A.H. and **Afzal, M.S.**, (2020). A new mathematical model to calculate the equilibrium scour depth around a pier. *Acta Geophysica*, 68(1), pp.181-187.

Gazi, A.H., **Afzal, M.S.** and Dey, S., (2019). Scour around piers under waves: Current status of research and its future prospect. *Water*, 11(11), p.2212.

Ong, M.C., Kamath, A., Bihs, H. and **Afzal, M.S.**, (2017). Numerical simulation of free-surface waves past two semi-submerged horizontal circular cylinders in tandem. *Marine Structures*, 52, pp.1-14.

**Afzal, M.S.**, Holmedal, L.E. and Myrhaug, D., (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*, 120(6), pp.4370-4391.

**Afzal, M.S.**, Bihs, H., Kamath, A. and Arntsen, Ø.A., (2015). Three-dimensional numerical modeling of pier scour under current and waves using level-set method. *Journal of Offshore Mechanics and Arctic Engineering*, 137(3), 032001-032007.

PUBLICATIONS: PEER REVIEWED BOOK CHAPTERS (SCI AND SCOPUS), TOTAL: 09	Purkayastha, S., Dutta, D., <b>Afzal, M.S.</b> , and Bihs, H.,(2023). 3D Numerical study of hydrodynamics around a monopile foundation under combined wave current effect. <i>Coastal Management, Environment, and Risk</i> , Coastal Engineering Proceedings 2023.  Dutta, D., and <b>Afzal, M.S.</b> ,(2023). Numerical study of local scour around rectangular cylinder due to combined wave-current effect. <i>The Proceedings of the Coastal Sediments 2023</i> , Coastal Sediments 2023, New Orleans, LA, USA, 11 – 15 April 2023.
--	--

Kumar L., **Afzal M.S.**, Chalwad S. (2022). Flood Inundation Mapping Using HEC-RAS 2D in Sangli City of Krishna River Basin, Maharashtra (India). In: Maiti D.K.

et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol II. Lecture Notes in Mechanical Engineering. Springer, Singapore.

Gazi A.H., and **Afzal, M.S. (2022)**. The Flow Hydrodynamics Around Tandem Cylinders. In: Maiti D.K. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol II. Lecture Notes in Mechanical Engineering. Springer, Singapore.

Dutta D., Kumar L., **Afzal, M.S.**, and Rathore P. **(2022)**. Hydrodynamic Study of the Flows Caused by Dam Break Around a Rectangular Obstacle. In: Maiti D.K. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol II. Lecture Notes in Mechanical Engineering. Springer, Singapore.

Khan Z.T., and **Afzal, M.S. (2022)**. Study of Rivulet Flow Through Small Channels. In: Maity D. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol—I. Lecture Notes in Mechanical Engineering. Springer, Singapore.

**Afzal, M.S.** and Lubbad, R., **(2019)**. Development of predictive tool for coastal erosion in Arctic—A review. *Lecture Notes in Civil Engineering*, 23, 59-69

**Afzal, M.S.**, Holmedal, L.E. and Myrhaug, D., **(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, M.S.**, Bihs, H. and Arntsen, Ø.A., **(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.

PUBLICATIONS: **Afzal, M.S.**, Dutta, D., **(2023)**. 3D Numerical study of hydrodynamics around a  
PROCEEDINGS OF monopile foundation. Accepted to *IAHR World Congress, Vienna, Austria, 2023*).  
INTERNATIONAL  
CONFERENCES, Kumar, L., Dutta, D., and **Afzal, M.S.,(2023)**. Scour around a pair of abutments  
TOTAL: 20 under combined wave-current flow. Accepted to *IAHR World Congress, Vienna, Austria, 2023*).

Dutta, D., and **Afzal, M.S.,(2023)**. Numerical study of hydrodynamic effect around pier group. Accepted to *IAHR World Congress, Vienna, Austria, 2023*).

Firoj, S., and **Afzal, M.S.,(2023)**. 3D Numerical modeling of Solitary wave interaction over a conical island. Accepted to *SCACR23*.

Firoj, S., and **Afzal, M.S.,(2023)**. Numerical investigation of wave forces and vortex evolution over emerged and submerged breakwater under breaking and non-breaking waves. Accepted to *HYDRO 2023*.

Purkayastha, S., and **Afzal, M.S.,(2023)**. Convergence studies for flow past a triangular cylinder placed above a moving wall. Accepted to *HYDRO 2023*.

Dutta, D., and **Afzal, M.S.,(2023)**. LES model of scour around a boulder-like object in combined wave-current flows. Accepted to *HYDRO 2023*.

Kumar, L., and **Afzal, M.S.,(2023)**. Computational fluid dynamics modeling of scour around vertical-wall abutment with varying aspect ratios under combined wave-current

flows. Accepted to *HYDRO 2023*.

Firoj, S., **Afzal, M.S.**, Kumar, A., and Mohan, R., **(2023)**. Predictive Tool for Arctic Coastal Hydrodynamics and Sediment Transport. *National Conference on Polar Sciences (NCPS-2023), Goa, May 2023*.

Purkayastha, S., Dutta, D., Kumar, L., and **Afzal, M.S.**, **(2022)**. Numerical Modelling of Flow past a Slippery Elliptical Cylinder. *27th International Conference on Hydraulics, Water Resources, Environmental and Coastal Engineering (HYDRO 2022)*.

Dutta, D., Kumar, L. and **Afzal, M.S.**, **(2022)**. Three-Dimensional Numerical Study of hydrodynamics around a pair of circular cylinders due to the combined wave-current effect using the level set method. *IAHR World Congress, Granada, Spain, June 2022*

Purkayastha, S., Dutta, D. and **Afzal, M.S.**, **(2022)**. Effect of bottom moving wall on the hydrodynamics around an elliptical cylinder placed at 45 degrees angle of incidence. *IAHR World Congress, Granada, Spain, June 2022*

Firoj, S., **Afzal, M.S.**,. **(2022)**. Breaking wave interaction over different sloping beds with a deformed vertical bluff. Proceedings of the 3<sup>rd</sup> IAHR Young Professionals Congress.

Purkayastha, S., **Afzal, M.S.**,. **(2022)**. Effect of the cylinder position on the flow past an isolated elliptical cylinder. Proceedings of the 3<sup>rd</sup> IAHR Young Professionals Congress.

Lubbad R., Katherina A., **Afzal, M.S.**, Depina I. **(2018)**. Numerical Modelling of Arctic Coastal Erosion due to Thermodenudation. Proceedings of AIC2018 Transportation infrastructure engineering in cold regions, pp 34-35.

**Afzal, M.S.**, Holmedal, L.E. and Myrhaug, D., **(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.

Ahmad, N., **Afzal, M.S.**, Bihs, H., Kamath, A. and Arntsen, Ø.A., **(2015)**. Three-dimensional numerical modelling of local scour around a non-slender cylinder under varying wave conditions. 36th IAHR World Congress Proceedings.

**Afzal, M.S.**, Bihs, H., Kamath, A. and Arntsen, Ø.A., **(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, M.S.**, Bihs, H., Kamath, A. and Arntsen, Ø.A., **(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.

**Afzal, M.S.**, Holmedal, L.E., Myrhaug, D. and Wang, H. **(2015)**. Sediment transport beneath horizontally uniform linear waves plus current in coastal areas. Proceedings of MekIT'15 Eighth National Conference on Computational Mechanics.

## BOOKS

Maiti D.K. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol II. Lecture Notes in Mechanical Engineering. Springer, Singapore.



Maity D. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol—I. Lecture Notes in Mechanical Engineering. Springer, Singapore.

AWARDS	<ul style="list-style-type: none"> <li>• Best Paper (First Position) Award on the theme “Coastal Engineering” from HYDRO 2023 International, held at National Institute of Technology, Warangal, Telangana, India</li> <li>• EU Visiting Professor Fellowship 2018 to NTNU, Norway in June 2018</li> <li>• Shortlisted for INAE Young Engineer Award 2018</li> </ul>
PROFESSIONAL ASSOCIATIONS	<ul style="list-style-type: none"> <li>• Member - American Society of Civil Engineers (ASCE) Sep 2011-Present</li> <li>• Member - COPRI - Coasts, Oceans, Ports, Rivers Institute Sep 2011-Present</li> <li>• Member - International Association for Hydro-Environment Engineering and Research (IAHR) May 2023- present</li> <li>• Member - Indian Soccity of Hydraulics (ISH) May 2023- present</li> </ul>
ADMINISTRATIVE EXPERIENCE	<ul style="list-style-type: none"> <li>• HWRE Lab Incharge, Department of Civil Engineering IIT Kharagpur, July 2020-June 2023</li> <li>• Assistant Warden, R.K Hall of Residence IIT Kharagpur, April 2019- April 2021</li> <li>• NSS Program Officer, IIT Kharagpur, Jan-Dec 2019</li> <li>• MoU coordinator between IIT Kharagpur and Norwegian University of Science and Technology (NTNU)</li> <li>• Faculty Advisor for 1st Year UG Civil Engineering Students batch of 2018</li> <li>• Sports Secretary Technology Club 2018</li> <li>• Board Member of NTNU Alumni India 2018-2023</li> </ul>