Curriculum Vitae

Dr. Prashant Kumar
Assistant Professor, Office-311, Department of Applied Sciences (Mathematics), National Institute of Technology Delhi. Date of Birth : 23-02-1982
Email: iitd.prashant@gmail.com , prashantkumar@nitdelhi.ac.in , M.Ph. : +91-7835014011

Education Qualification

B. Sc. (1998~2001) : With Mathematics, Physics and Chemistry, Vardhman College, Bijnor, M. J. P. Rohilkhand University India, 71.70/100.

P.G. diploma (2002~2003)
: With Computer Application from LBS Technical Training Institute Ghaziabad India, CGPA 8/10.

M. Sc. (2003~2005) : With Mathematics from Indian Institute of Technology (IIT) Delhi, CGPA: 6.77/10

Integrated Ph.D. (MS+Ph.D.) (2007~ 2013)
: With Computational Applied Mathematics from Pohang University of Science and Technology (POSTECH), South Korea (27^{th} Rank in the world in Time Higher Education, 2010, Top 10 institutes in Asia)

Thesis title : Modeling and Simulation for Wave Induced Oscillation in a Geometrically Arbitrary Domain with Corner Contribution and Chebyshev Point Discretization.

Research Associate (1^{st} January 2014 ~ 28^{th} February 2014)
: Department of Mathematics, POSTECH, Pohang, South Korea.

Post-Doctoral Fellow (1^{st} March 2014~14^{th} January 2015)
: Climate Change Research Laboratory (CCRL), School of Environmental Sciences, POSTECH, Pohang, South Korea.

Visiting Assistant Professor (8^{th} June 2015~3^{rd} July 2015)
: Department of Mathematics, POSTECH, South Korea.

Visiting Assistant Professor (17^{th} Dec 2015~4^{th} Jan 2015)

: Department of Mathematics, POSTECH, South Korea.

Research Interest

Computation Fluid Dynamics: Modeling and Simulation random ocean waves, linear and weakly non-linear waves, Wave spectral analysis, Coastal harbor hazzards problems, Boundary Element Method (BEM), Finite Element Method, Spectral Method, Chebyshev Point Discretization.

Climate Modeling **:** Global ocean wave height analysis, Impacts of natural climate variabilities such El Nino Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO) and North Atlantic Oscillation (NAO) over wave heights.

Membership **:** Society of Industrial and Applied Mathematics (**SIAM**), Korean Mathematical Society (**KMS**) and Korean Society of Industrial and Applied Mathematics (**KSIAM**).

Significant Academic Projects

(June 2008~July 2011)

Project 1: Wave induced oscillation in Pohang New Harbor Pohang, South Korea

Prof. Kim Kwang Ik (Academic advisor, Dept. of Mathematics, POSTECH)

Approved (31st December 2016)

Project2: Modeling and Simulation of moored ship motion in Paradip port under the resonance condition for multidirectional random waves, as Principal Investigator

Funding agency: Science and Engineering Research Board (SERB),DST,Government of India

Teaching Experience

- **Courses (2007~2013):** Regular teaching assistant of Calculus-I, Calculus-II, Applied linear algebra, Mathematical analysis, Applied numerical analysis, Applied complex variables, Different equations, Probability and statics.
- **Hilbert classes (2009~2013)**: Every semester Hilbert classes are taken to teach undergraduate student for solving mathematics problems in various courses.
- **Lecturer (2006~2007):** Taught **Mathematics-I and Mathematics-II** as lecturer in Sachdeva Institute of Technology, Mathura, UP, India.

Courses taught at NIT Delhi (2015-2016)

- **For UG students:** Mathematics-I (Advanced Calculus), Numerical Technique and Graph Theory, Mathematics-IV, Probability and Statistics,
- **For Ph.D. students:** Research Methodology (Numerical Analysis and Linear algebra), Mathematical Modeling.

Master and Ph.D. Thesis Supervision

- I have supervised one master thesis in Master of Science (M.Sc.) in Mathematics title on "**Mathematical Modeling of Wave Induced Oscillation in a Rectangular Domain by using Hybrid Finite Element Method**".
- Currently, I am supervising two Ph.D. students in National Institute of Technology Delhi.

List of Publications

1. Kumar, P., Zhang, H., Kim, K.I. **(2013)**. *Spectral Density Analysis for Wave Characteristics in Pohang New Harbor,* **Journal of Pure and Applied Geophysics (*PAGEOPH*),** vol. 171, issue-7, pp. 1169-1185 (**SCI, IF: 1.677**).
   link: http://link.springer.com/article/10.1007/s00024-013-0710-x
2. Kumar, P., Zhang, H., Kim, K.I., Yuen, D.A. **(2013)**. *Wave field analysis in a harbor with irregular geometry through boundary integral of Helmholtz equation with corner contributions*, **Computer & Fluids,** vol. 88, pp. 287- 297 (**SCI, IF: 1.891**).
   Link: http://www.sciencedirect.com/science/article/pii/S0045793013003654
3. Kumar, P., Zhang, H., Kim, K.I., Yuen, D.A., Shi, Y. **(2014)**. *Modeling wave spectra of multidirectional random ocean waves in a harbor through combination of boundary integral of Helmholtz equation with Chebyshev point discretization.* in the **Computer & Fluids,** vol. 108, pp. 13-24. (**SCI, IF: 1.891**).
   Link: http://www.sciencedirect.com/science/article/pii/S0045793014004514
4. Kumar, P., and Kim, K.I., **(2015).** *Hydrodynamics modeling of moored ship motion in an irregular domain*, **Procedia Engineering**, Vol. 127, pp. 598-604. ISSN: 1877-7058 (**IF: 0.73**).
5. Kumar P., Min, S.K., Weller, E., Lee H., Wang X**., (2016),** *Influence of Climate Variability on Extreme Ocean Wave Height Assessed from ERA- Interim and ERA20C Reanalyses,* **Journal of Climate**, Vol. 29, pp.4031-4046, (**SCI, IF: 4.65**). [3rd rank journal in Atmospheric sciences].
   Link: http://journals.ametsoc.org/doi/10.1175/JCLI-D-15-0580.1
6. Kumar, P., Zhang, H., Kim, K.I., Yuen, D.A. **(2016)**. *Modeling wave and spectral*

characteristics of a moored ship motion in Pohang New Harbor under the resonance conditions, **Journal of Ocean Engineering**. Vol. 119, pp. 101-113, **IF: 1.488** (**SCI**). [8th rank journal in ocean engineering].

Link: http://www.sciencedirect.com/science/article/pii/S0029801816300920

7. Kumar P*., Gulshan, Kim, K.I., (2016), Wave induced oscillation in Paradip Port under the resonance conditions, **Submitted in Computers & Fluids (SCI).**
8. Kumar P*., Gulshan, Kim, K.I., (2016), A three dimensional boundary element formulation for variable bathymetry in irregular domain, **Submitted in Engineering Analysis with Boundary Elements (SCI).**

Book Chapters:

1. Kumar P.*, Gulshan Batra, Kim K.I., A moored ship motion analysis in realistic Pohang New Harbor and Modified PNH, Chapter 7, Modern Mathematical methods and High Performance Computing in Science and Technology, **Springer Proceeding of Mathematics and Statistics**, Vol. 171, pp. 207-214.

   Link: http://link.springer.com/chapter/10.1007%2F978-981-10-1454-3_17

Note: * denote the corresponding authorship.

Summary of Domestic and International Conference proceedings

1. **Kumar, P**., Kim K.I., Mathematical Problems in Engineering, Aerospace and Sciences University of Genoa, Italy on June 25th-27th 2008, and the title "Theoretical analysis of wave oscillation of arbitrary shaped harbor".
2. **Kumar, P**., Kim K. I. , 2009 Joint meeting of Korean Mathematical Society (KMS) and American Mathematical Society (AMS), Ewha Women's University, Seoul, Korea on 16th -20th December 2009, and the title "Theoretical analysis and model based simulation to resolve the cause of POSCO New Harbor hazards". Vo. 2009, no.2, Sub. no. 0455, Proceeding of 2009 KMS-AMS.
3. **Kumar, P**., Kim K. I., International Conference on Challenges and Applications of Mathematics in Science and Technology (CAMIST-2010), organized by Department of Mathematics, NIT ROURKELA India on 11th -13th January 2010, and the title "Theoretical analysis and model based simulation of the POSCO New Harbor and the modified POSCO New Harbor.", vol. 29, pp. 329-337, Proceedings of CAMIST 2010.
4. **Kumar, P.,** Kim K. I., International Congress of Mathematics (ICM)-2010 Hyderabad India on 19th -27th August 2010, and the title "A moored ship motion analysis with the resonant frequency waves in the POSCO New Harbor" Proceedings of ICM

2010.

5. **Kumar, P.,** Kim K. I., 2010 Global KMS International Conference, POSTECH, Pohang on 22n-23rd October 2010, and the title "Wave-Induced Ship Motion Analysis in the POSCO New Harbor via Helmholtz Equation with Numerical Simulations", vol. 2001, no. 2, Sub. no.: 0123, Proceedings of KMS2010.
6. **Kumar, P.,** Kim B., Kim K. I., KMS Fall Meeting 2011, Kyungpuk National University, Daegu, South Korea on 21st -22n October 2011, and the title "The Boundary Integral Method for the Computation of Linearized Ocean Surface Wave Fields in a Highly Irregular Bounded Geometry", vol. 2012, no. 2, Sub. no.: 0130, Proceedings of KMS 2011.
7. **Kumar, P.,** Kim K. I., KMS Spring Meeting 2012 Sookmyung Women's University Seoul on 28th April 2012, and the title "Spectral density analysis of the Pohang new harbor", vol. 2012, no. 1., Sub. No.: 0070, Proceedings of KMS 2012.
8. **Kumar, P**., Kim K. I., International Conference on Mathematical Modeling and Applied Soft Computing (MMASC-2012), Coimbatore India on 11th -13th July 2012, and the title "Numerical Simulation of the Pohang New Harbor for Sciche Reduction", vol. 2, Proceedings of MMASC 2012.
9. **Kumar, P.**, Kim K. I., Mathematical Society of Japan (MSJ) Autumn Meeting 2012, Kyushu University, Fukuoka, Japan on 18th -22nd Sep. 2012, and the title "Mathematical modeling of the ship hydrodynamics in Pohang New Harbor", Proceedings of KMS-MSJ proceedings, Page 86.
10. **Kumar, P.**, Kim K. I., KSIAM conference at Kyungpook National University, Daegu on 23rd – 24th Nov. 2012, and the title "Spectral density analysis of a moored ship motion in Pohang New Harbor." vol. 7 No. 2, Proceedings of KSIAM 2012.
11. **Kumar, P**., Zhang, H., Kim K. I., The Asian Mathematical Conference (AMC-2013) at BEXCO center, Busan, South Korea on 30th June-4th July 2013, and the title "A moored ship motion analysis in arbitrary harbor geometry with various directional incident waves". Vol. 2013, no. 1., Sub. No.; 0471, Proceeding of KMS 2013
12. **Kumar, P**., Zhang, H., Kim K. I., 7th International conference on Mathematical Science for Advancement of Science and Technology (MSAST 2013), Kolkata, India on 21st - 23rd December 2013, and the title "A 3-D Boundary Element Model to Analyze the Multidirectional Random wave diffraction in a Harbor with Complex Geometry.", vol. 2, proceedings of MASAST 2013

13. **Kumar, P**., Min, S.K., 2015 Climate Variability Workshop, School of Environment Science and Engineering, POSTECH, Pohang, South Korea, on 12th -13th January 2015, and the title "Influence of Climate variability modes."
14. **Kumar, P**., Kim K.I., International Conference on Computational Heat and Mass Transfer (ICCCHMT-2015) organized by Department of Mathematics, National Institute of Technology, Warangal Orissa on 30th November 2015 to 2nd December 2015 and Presented a paper with title "Hydrodynamics modeling of moored ship motion in an irregular domain, Vol. 127, Proceeding of ICCCHMT-2015.
15. **Kumar, P**., Gulshan., Kim K.I., International Conference on Modern Mathematical methods and High Performance Computing in Science and Technology (M3HPCST 2015) organized by RKGIT, Ghaziabad U. P. on 27th December 2015 to 29th December 2015 and presented a paper with title "A moored ship Motion Analysis in Realistic Pohang New Harbor and Modified PNH", vol. 171, Proceedings of M3HPCST 2015.

List of Invited Talks

S.N.	Date and Time	Title of talks	Venue
1.	19/06/2015 5:00~6:30 PM	Modeling and Analysis of Moored Ship Motion in Pohang New Harbor under the Resonance Conditions	Math Bldg. POSTECH South Korea
2.	25/06/2015 5:00~6:30 PM	Influence of Climate Variability on Extreme Ocean Wave Height Assessed From ERA-Interim and ERA40 Reanalyses.	Math Bldg. POSTECH South Korea
3.	30/06/2015 5:00~6:30 PM	Stress analysis in mooring ropes and fender of a Moored ship under the resonance Conditions.	Math Bldg. POSTECH South Korea
4.	31/12/2015 4:00~5:30 PM	Moored Ship Motion Analysis in a complex geometry Domain	Math Bldg. POSTECH South Korea
5.	02/01/2016 3:00~4:30 PM	Impact of El Nino on Ocean Surface Wave Height for ERA-Interim and ERA20C Reanalyses	Math Bldg. POSTECH South Korea
6.	04/01/2016 4:00~5:30 PM	Hybrid Finite Element Modeling for wave oscillation in Pohang New Harbor	Math Bldg. POSTECH South Korea

Academic Collaborators and Recommendation (References)

1. **Prof. Kim Kwang Ik (Professor, Academic advisor):** Office-127, Department of Mathematics, POSTECH, Pohang, South Korea.

   Email: kimki@postech.ac.kr, M.Ph. No: +82-10-5370-2044

   Web: www.math.postech.ac.kr

2. **Prof. Jae Ryong Kweon (Professor, Expert member in Ph.D. thesis):** Office-319, Department of Mathematics, POSTECH, Pohang, South Korea-790784.

   Email:kweon@postech.ac.kr, M.Ph. No: +82-10-9169-7676.

   Web: http://math.postech.ac.kr/~kweon/

3. **Prof. Seung Ki Min (Associate Professor, Post-Doctoral advisor):** Climate Change Research Laboratory (CCRL), POSTECH, Pohang, South Korea-790784.

   Email: skmin@postech.ac.kr .

   Web: http://climatechange.postech.ac.kr/, **Ph. No. : +82-54-279-2286**.

4. **Prof. SCS Rao (Professor, Expert member in M.Sc. thesis):** Office: MZ163 Department of Mathematics, Indian Institute of Technology Delhi, New Delhi 110 016, INDIA.

   Phone: +91-11-26591489(Office) +91-11-26596829 (Residence)

   Fax: +91-11-26581005

   E-mail: scsr@maths.iitd.ac.in

Declaration

I declare that all the information given above is true to the best of my knowledge.

Prashant Kumar **Date:** 24-01-2017