

My Curriculum Vitae

Matiur Rahman*
122 Hazelholme Drive
Halifax, Nova Scotia
Canada B3M 1N5

**Adjunct Professor of Dalhousie University*
Eminent Scientist in Fluid Mechanics Sciences
Fellow of Institute of Mathematics and Its Applications, UK
Fellow of Wessex Institute of Great Britain

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Synopsis

Professor Matiur Rahman was a Faculty member of Dalhousie University in Halifax, Canada where he was a Professor of Applied Mathematics and Fluid Mechanics in the Department of Engineering Mathematics, and he has gained extensive experience in teaching mathematical methods in many universities worldwide, including Jorhat Engineering College in Assam, Imperial College of Science, Technology and Medicine in UK, Windsor, Moncton, Ottawa and Manitoba Universities in Canada. Originally from the foothills of the Himalayas in the State of Assam, in India, he has gone on to become a leading scientist in his field. He received his *PhD* (1973) from Windsor University, Canada and his *DSc* (Eng) (1992) from London University, UK. His other academic achievements include a *BSc* (Hons) (1962) from Cotton College, India; an *MSc* (1964) from Gauhati University, India; a **DIC** (1969) from Imperial College, UK and a *MPhil* (1969) from London University, UK. In 1990, he was elected a Fellow of the Institute of Mathematics and Its Applications (*FIMA*), in 1991, a Chartered Mathematician (*CMath*) of IMA, and in 1992 the American Biographical Institute selected him as *Man of the Year*. Professor Rahman earned a WIT (UK) *Eminent Scientists Award* for his outstanding research contributions in *Fluid Mechanics Science* and a medal was presented at the Fourth International Conference on Advances in Fluid Mechanics held at Ghent, Belgium on 15 May 2002. He is the first Canadian Scientist to receive such a medal. Professor Rahman has been admitted as a *Fellow of Wessex Institute of Great Britain* for his outstanding research and leadership in fluid mechanics sciences and a certificate was presented at the Fifth International Conference on Advances in Fluid Mechanics on 24 March 2004 held at Lisbon, Portugal 22-24 March 2004. I was *felicitated* for my outstanding research and teaching accomplishments by the Assam Sahitya Sabha at its 68th Open Session held at Sipajhar, Assam, India on 19 February 2005. It is my great pleasure to record that the Assam Convention 2005 has presented me a *commemorative inscription* in recognition of my outstanding and brilliant contribution in the field of *Fluid Mechanics* and *Mathematics Education* at Calgary, Canada on 02 July 2005. *Felicitations* were received from the Golden Jubilee Celebration Committee of Dumunichowki High School, Assam on 17 December 2000 and from the Mangaldoi Press Club, Assam on 26 December 2000. At the Dalhousie University's Fall Convocation on 15 October 2005, I was *recognized as a PhD Thesis supervisor* of the graduating PhD student Seyed Hossein Mousavizadegan for guiding his PhD thesis on *Analytical and numerical approaches to determine the second-order forces in wave-body interactions*.

Professor Rahman has published 27 textbooks and research monographs and over 250 research papers in refereed journals and proceedings. His graduate textbook *Water Waves: Relating Modern Theory to Advanced Engineering Applications* brought considerable accolades from the scientific community, was reviewed in the SIAM Reviews, and received an award from the Natural Sciences and Engineering Research Council of Canada (NSERC) in 1996. Professor Rahman has been awarded the 2001 *Outstanding Academic Title Award* for his book *Mathematical Methods with Applications* by the CHOICE Magazine, which is published by the Association of College and Research Libraries in the USA. This book has been chosen to be one of the "best of the best" among the 23,000 books reviewed by CHOICE in the year 2001. The book is meant for the scientists, engineers, graduate students and senior undergraduate students. Professor Rahman's main research interests are

in areas of waves and hydrodynamic loading, fluid-structure interaction, natural convection flows with diffusion and reaction, stability of tubular chemical flow reactors, temperature stratification in large bodies of water, and non-linear ocean waves. Professor Rahman is currently Managing Editor (Editor-in-Chief) of the international series on *Advances in Fluid Mechanics*, published by WIT Press, UK, 45 volumes of which has been published since it was created by him in 1993. The main aim of the Series is to exchange new research findings and ideas on modern fluid mechanics between scientists and engineers. Professor Rahman has been an external and internal examiner of over 45 MASc and PhD theses in Applied Mathematics and Engineering disciplines, and has supervised several MSc(12) and PhD(5) theses in Fluid Mechanics. Many Postdoctoral Fellows had worked with him including a Killam PDF. He has invited many Foreign Professors to visit and deliver lectures in International Conferences organized by him. Sir James Lighthill, FRS, a pioneer in the field of Fluid Mechanics delivered a Keynote speech at the Eleventh Canadian Applied Mathematics Society's Conference held in Halifax in 1990. Because of his outstanding research accomplishments and for providing high-standard training, NSERC has been funding him research grants continuously since 1981. Professor Rahman is one of the recipients of the Atlantic Innovation Funds (AIF) in the amount of \$2.7 million for the oil and gas recovery and production research. I have created a journal entitled *International Journal of Applied Mathematics and Engineering Sciences (IJAMES)* in April 2006. The publisher is the prestigious *Serials Publications* from New Delhi, India. I am the Editor-in-Chief of this Journal. I am also Editor of the *Journal of Applied Mathematics (JAM)* published by Hindawi, USA. The American Biographical Institute (ABI) has nominated me an award of **Gold Medal for Canada** on 19 March 2010 for my outstanding research accomplishment in the field of science and education. *The Gold Medal is an honor reflective of championship and struggles endured to ascend to the top.* And in this medal, the ABI cited about my *passion, courage, commitment, success, excellence, virtue and spirit.* I am a Member of Nova Scotia Government Retired Employees Association since 2008. My biography has been recorded (**Record ID: 0000017115**) in the prestigious *Writers Directory* in 2010. I have received an appointment as an *Adjunct Professor* in the Faculty of Computer Science at Dalhousie University, Halifax, Nova Scotia, Canada B3H 1W5 for the next 5 years effective October 28, 2010 – October 27, 2015.

Personal Particulars

Name: MATIUR RAHMAN
Date of Birth: September 01, 1940
Place of Birth: Dumunichowki, Darrang, Assam, India
Citizenship: Canadian (2 November 1976)
Social Insurance No.: 445 649 254
Family: Wife Nasim, daughter Susan, son Tarjin, grandsons Jake & Dylan

Mailing Address:

(a) Current Office Address: Dalhousie University
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(b) Permanent Home Address: 122 Hazelholme Drive
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Education

- **HSLC**, Division **I**, 1958, Gauhati University, India.
- **ISc**, Division **I**, 1960, Gauhati University, India.
- **BSc** (Hons. Math), First Class First, 1962, Gauhati University, India.
- **MSc** (Math), First Class, 1964, Gauhati University, India.
- **DIC** (Appl. Math), 1969, Imperial College, U.K.
- **MPhil** (Appl. Math), 1969, London University, U.K.
- **PhD** (Appl. Math), 1973, Windsor University, Canada.
- **FIMA**, 1990, Fellow of Inst. of Maths and its Applications (IMA), U.K.
- **CMath**, (Chartered Mathematician) 1991, IMA, U.K
- **DSc** (Eng.), 1992, London University, U.K.
- **FWIGB**, 2004, Fellow of Wessex Institute of Great Britain, UK.

Academic Awards

- Proficiency prize in Mathematics by Gauhati University, 1958
- Submerson medal in Mathematics by Cotton College, India, 1961
- Submerson medal in Mathematics by Cotton College, India, 1962
- National scholarship in Math by Indian Government, 1963
- Overseas scholarship in Math by Indian Government, 1966
- Research fellowship in Math by NRC Canada, 1969
- Postdoctoral fellowship in Math by NRC Canada, 1973
- WIT Medal for outstanding achievements in research presented at the AFM96 Conference held at New Orleans, USA in June 1996.
- The Institute of Mathematics and Its Applications elected me as **Fellow of Institute** on the 16 October 1990.
- I have been admitted by the Senate of London University to the degree of **Doctor of Science (Engg.)** on 18 November 1992.
- WIT Medal for **eminent scientist** in the field of *Fluid Mechanics Science* bestowed on me at the AFM02 Conference held at Ghent, Belgium in 2002. I was the 15th scientist to be honored by the Wessex Institute of Technology, Southampton, UK since its inception ten years ago.

- I have been admitted as a **Fellow of Wessex Institute of Great Britain** on 24 March 2004 at the Fifth International Conference on Advances in Fluid Mechanics held at Lisbon, Portugal 22-24 March 2004. This award was presented in the presence of a group of world's leading scientists, engineers and applied mathematicians for my outstanding research and leadership in fluid mechanics field.

Academic/Professional Appointments

1. 1964-1966 Lecturer, Dept. of Math, Jorhat Engg. College, Assam, India.
2. 1966-1969 Research fellow and teaching assistant, Dept. of Math, Imperial College, London, U.K.
3. 1969-1973 Research fellow and sessional lecturer, Dept. of Math, Windsor University, Windsor, Canada.
4. 1973-1976 Postdoctoral fellow and assistant research prof., Dept. of Engg., Moncton University, Moncton, Canada
5. 1976-1977 Research associate and teaching assistant, Dept. of Applied Math, University of Manitoba, Winnipeg.
6. 1977-1980 Assistant Research Officer and Research Associate, Hydraulics Laboratory, NRC, Ottawa, Canada.
7. 1977-1980 Adjunct Professor, Dept. of Math, University of Ottawa, Canada.
8. 1980-1987 Associate Professor, Dept. of Applied Mathematics, Technical University of Nova Scotia, Halifax, N.S., Canada.
9. 1987-1988 Visiting Professor, Department of Mechanical Engineering University College London, London, England.
10. 1987-1997 Professor, Department of Applied Mathematics, Technical University of Nova Scotia, Halifax, N.S., Canada.
11. 1997-2010 Professor, Department of Applied Mathematics, Dalhousie University, Halifax, N.S., Canada.
12. 1988-2010 Adjunct Scientist, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada.
13. 1989-1997 Honorary Adjunct Professor, Department of Mathematics, Statistics and Computer Science, Dalhousie University, Halifax, N.S., Canada.
14. 1996-2015 Member of Academic Council of the Board of Governors of the Wessex Institute of Technology, Southampton, UK.
15. 2010-2015 Adjunct Professor, Faculty of Computer Science, Dalhousie University Halifax, Nova Scotia, Canada.

Service Record in Teaching

Institution	Capacity	No of Years	
1. Jorhat Engg. College	Lecturer	1964-1966	2
2. Imperial College	Teaching Asst.	1966-1969	3
3. Windsor University	Sessional Lecturer	1969-1973	4
4. Moncton University	Asst. Res. Prof.	1973-1976	3
5. University of Man.	Research Assoc.	1976-1977	1
6. University of Ottawa	Adjunct Prof.	1977-1980	3
7. Technical Univ. N.S.	Assoc. Prof.	1980-1987	7
8. Technical Univ. N.S.	Professor	1987-1997	10
9. Dalhousie Univ.	Professor	1997-2010	12
10. Dalhousie Univ.	Adjunct Prof.	2010-2015	5.

Membership in Professional Societies

- Member, Imperial College London Alumni (1966) (Membership No. 90088914).
- Member, London University Convocation Committee(1969).
- Member, Tensor Society of Japan(1972).
- Member, Calcutta Mathematical Society(1972).
- Member, Canadian Society of Mechanical Engineering(1973).
- Member, Engineering Institute of Canada(1973).
- Member, Professional Institute of Public Service(1977).
- Member, Canadian Applied Mathematical Society(1980).
- Member, Int Society for Computational Methods in Engineering(1980).
- Member, Cotton College Alumni Association (1958).
- Member, Gauhati University Alumni Association (1962).
- Member, Jorhat Engineering College Alumni Association (1964).
- Member, Imperial College Alumni Association (1966).
- Member, Windsor University Alumni Association (1969).
- Member, TUNS Alumni Association(1982).
- Member, Dalhousie University Alumni Association (1997).
- Member, Society for Industrial and Applied Mathematics (SIAM 1984).
- Member, International Society of Boundary Elements (ISBE 1986).

- Fellow, Institute of Mathematics and its Applications (IMA 1990).
- CMath, Chartered Mathematician of IMA 1991.
- Advisor, Editorial Board for the JASS & Procs, Assam, India (1990).
- Member, New York Academy of Sciences, New York (1995).
- Member, Academic Council of Governors of Wessex Institute of Technology(1996).
- Member, Editorial Board of IJMMS (2000).
- Member, Editorial Board of Luitor Pora Thamesoloi (2000).
- Member, Editorial Board of the Journal of Applied Mathematics (2001).
- Fellow, Wessex Institute of Great Britain (2004).
- Member, Editorial Board of the International Review of Applied Mathematics (2004).
- Member, Editorial Board of the Journal of Contemporary Mathematics (2006).
- Member, Editorial Board of Transactions of Wessex Institute of Technology.

Biographical References:

- American Men and Women of Science	1976
- Directory of Scientists & Technologists of India	1981
- Muslims in Contemporary Physics	1982
- Who's Who in the East	1983
- Men of Achievements	1984
- Personalities of America	1985
- Who's Who in America	1985
- Dictionary of International Biography	1986
- Biography International	1986
- International Who's Who of Intellectuals	1986
- 5,000 Personalities of the World	1988
- Man of the Year 1992 award by ABI	1992
- Council Member of ABI	1998
- Writers Directory	2010
- Global Directory of Who's Who	2010

Participation in symposium and Conferences

1. Fluid mechanics conferences attended and participated:

- Imperial College (1966–69), Windsor University (1969–73), McMaster University (1974), Univ. British Columbia (1976), Univ. Windsor (1982).

- CANCAM held at University of New Brunswick (1975), Univ. of British Columbia (1977), Univ. Moncton (1981).
- Third Int. Conf. in Finite Element Methods in Water Resources held at Univ. Mississippi, 1980.
- Fourth Int. Conf. in Finite Element Methods in Water Res. held at Hannover, West Germany, 1982.
- Third Int. Conf. Numerical Methods Laminar and Turbulent Flow held at Seattle, U. S. A., 1983.
- Conf. Wave Phenomena held at Toronto, Canada, 1983.
- Second Int. Conf. Computer Methods Experimental Measurements (CMEM 84) held aboard the Queen Elizabeth II from New York to Southampton, 1984.
- Fourth Int. Conf. Numerical Methods Laminar Turbulent Flow held at Swansea, United Kingdom, 1985.
- Int. Conf. Ocean Space Utilization held at Tokyo, Japan, 1985.
- Pacific Congress Marine Technology (PACON) held at Honolulu, Hawaii, 1986.
- Third CMEM'86 held at Porto carras, Greece, 1986.
- Ist Int. Conf. ICIAM held at Paris, France, 1987.
- Ninth CAMS Conference held at Burnaby, Canada, 1988.
- Eleventh CAMS Conf. held at Halifax Hilton, Canada, 1990.
- Fifth CMEM'91 held at Montreal, Canada, 1991.
- Thirteenth CAMS Conf. held at Edmonton, Canada, 1992.
- BOSS'92 held at Imperial College, London, UK, 1992.
- Sixth CMEM'93 held at Sienna, Italy, 1993.
- Seventh CMEM'95 held at Capri, Italy, 1995.
- Third Int. Conf. ICIAM held at Hamburg, Germany, 1995.
- First AFM96 held at New Orleans, USA, 11-13 June 1996.
- Twelveth Canadian Symposium on Fluid Dynamics held at Winnipeg, 29-31 May 1996.
- International Symposium on Theoretical and Computational Fluid Dynamics held at Tallahassee, USA, in honour of Sir James Lighthill, 6-8 November 1996.
- International Symposium in honour of Dr Leslie Jaeger held at TUNS 28 January 1997.
- Eighth CMEM'97 held at Rhodes, Greece, 1997.
- International Conference on Computational Acoustics held at Aquasparta, Italy, 1997.
- Second AFM98 held at Udine, Italy, May 13-15, 1998.
- Canadian Applied Mathematics Society's Conference (CAMS) held at Vancouver, Canada, May 28- June 1, 1998.

- OMAE Conference held in Lisbon, Portugal, July 6-9, 1998.
- Ninth CMEM'99 held at Sorrento, Italy, 1999.
- Third AFM00 held at Montreal, Canada, May 24-26, 2000.
- Tenth CMEM'01 held at Alicante, Spain, 4-6 June 2001.
- Wave Phenomena III held at Edmonton, Canada, 11-15 June 2001.
- Fluid-Structure Interactions held at Halkidiki, Greece, 24-26 September 2001.
- Fourth AFM02 Conference held at Ghent, Belgium from 15-17 May 2002.
- CAIMS Meeting held at Calgary, Canada from 8-10 June 2002.
- Second Fluid-Structure Interaction Conference held at Cadiz, Spain, 24-26 June 2003.
- Fifth AFM04 Conference held in Lisbon, Portugal 22-24 March 2004.
- 23rd Offshore Mechanics and Arctic Engineering (OMAEE) held in Vancouver 20-25 June 2004.
- CAIMS Meeting held at Dalhousie University, Halifax, Canada 13-15 June 2004.
- CAIMS Meeting held at The University of Manitoba, Winnipeg, Canada 16-18 June 2005.
- Third International Conference on Fluid-Structure Interaction at La Coruna, Spain, 19-21 September 2005.
- Sixth Int. Conf. AFM 06 at Skiathos, Greece, 8-10 May 2006.
- Fourth International Conference on Fluid-Structure Interaction held at New Forest, UK., May 2007.
- Seventh International Conference on Advances in Fluid Mechanics held at New Forest May 2008.
- Fifth International Conference on Fluid-Structure Interaction held at Crete, Greece in May 2009.
- Eighth International Conference on Advances in Fluid Mechanics held at Algarve, Portugal 15-17 September 2010.
- Sixth Subrata Chakrabarti International Conference on Fluid-Structure Interaction held at Orlando, Florida, USA, May 2011.

2. Invitation and Nomination:

- I was invited to give a talk on "Finite element analysis of turbulent flow with heat transfer in a 3-rod bundle" by Advanced Engg. Branch, AECL Chalk River, 1982.
- I was invited to speak on "Nonlinear wave loading on offshore structures" at the Int. Symposium on Ocean Space Utilization held in Tokyo, 1985.
- I visited the Institute of Oceanographic Sciences (presently, Proudman Oceanographic Laboratory) in England at the invitation of Dr. D. Prandle, a well-known scientist at the Laboratory, 1982.

- I was invited by Dr. S. N. Chin, Research Officer, NRC's Institute for Marine Dynamics, to attend an opening Symposium on Arctic Vessel Research, held in St. John's, Newfoundland, 1985.
- I invited Dr. A.K. Borkakati, Reader of Mathematics, Dibrugarh University, India, as a visiting scientist during the summer of 1985 for research collaboration.
- I was invited by Professor Sir James Lighthill, F.R.S., Provost, University College London, England, to spend my sabbatical year July 1, 1987 to June 30, 1988.
- I organized a special seminar and invited Dr. D. Prandle, one of the world's leading authorities in tidal dynamics to give a talk on 'Tidal Power Schemes: Theoretical Frameworks for Their Design and Impact on Tidal Propagation and Salinity Intrusion', Aug. 15, 1986. Several scientists and academicians, including Dr. Richard Collins, a Foulis Chair in Bio-Medical Engg., TUNS, Dr. L.G. Jaeger, Vice-President Research, TUNS, Dr. D. Greenberg, a senior scientist at B.I.O., attended the seminar. Dr. George C. Baker, P.Engg., Executive Vice-President, Tidal Power Corporation, Halifax, has shown considerable interest in this seminar and sent his deputy to attend the seminar. Mr. Walter Van Walsum, Vice-President and General Manager of Tidal Power Consultant Ltd., Montreal, talked with me on the telephone about this seminar and asked for the reprint of the talk.
- I was invited by Dr. Judith Wolf, scientist of Proudman Oceanographic Laboratory, Birkenhead, England, to speak at a seminar on wave loads on offshore structures on November 4, 1987.
- I was invited by Professor I.C. Chakravartty, Trent University, Peterborough, Canada to speak on Wave Diffraction on Rectangular Caissons on March 7, 1988.
- I was invited to attend an open house at the Institute of Oceanographic Sciences, Wormley, Surrey, England on October 15, 1987.
- I was invited by Dr. William A. Perrie, a senior scientist at B.I.O. as a guest scientist to work on a problem on 'Spectral Evolution of Wind Generated Surface Gravity Waves in a Dispersed Ice Field' during the period May - June, 1988.
- I have been awarded a SPECIAL MERIT supplement for outstanding research accomplishment by the Civil Engineering Grants Selection Committee, NSERC in 1988.
- I was Chairman of the Eleventh Annual Conference of the Canadian Applied Mathematics Society held in the Halifax Hilton May 29 to June 1, 1990. Many distinguished mathematicians, engineers and scientists from many parts of the world are invited to speak at this conference. Sir James Lighthill, F.R.S. was the Keynote speaker in this conference. Sir James talked on "New Discoveries (1987-89) on Mechanisms Underlying Hearing Sensitivity". Financial support was received from the following agencies: TUNS-\$10,000; NSERC-\$7,000; NS Govt.-\$3,000; British Council-\$1,000; B.I.O.-\$2,000; Department of Tourism and Culture, NS, provided assistance in distributing the conference brochures. In addition the following world's leading authorities in Fluid Mechanics have kindly

accepted my invitations to participate in this important conference: Professor J Trevor Stuart, FRS; Professor CJR Garrett, FRSC, FRS; Professor GFD Duff, FRSC; Professor David Benney and Dr David Prandle.

- I was one of the five applicants to NSERC for the Super Computer worth of \$3.5 million.
- Member of the Scientific Advisory Committee for the Conference on Computational Methods and Experimental Measurements held in Sienna, Italy in May 3-5, 1993.
- Member of the Scientific Advisory Committee for the Conference on Computational Methods and Experimental Measurements held in Capri, Italy in May 1995.
- Member of Scientific Advisory Committee for CMEM'97 held at Rhodes, Greece, May 1997.
- I have been nominated for the prestigious Izaak Walton Killam Memorial Prize by Sir James Lighthill, FRS, Dr Leslie Gordon Jaeger, FRSE, Dr David Prandle, and Dr Lokenath Debnath in June 30, 1995. This prize is intended to honour eminent Canadian scholars actively engaged in research. The prize provides \$50,000 and a citation. The money is tax free and can be used by the recipient as desired. Only Canadian citizens are eligible for this honour.
- I was one of the invited speakers at the International Symposium on Theoretical and Computational Fluid Mechanics held in honour of Sir James Lighthill, FRS, at the Florida State University, Tallahassee, Florida, November 6-8 1996. This special conference was organized by Professor MY Hussaini of Applied Mathematics and Computer Science Department. Many world's scientists and applied mathematicians participated in this conference including Professor David Crighton, FRS, Professor Tim Pedley, FRS, Professor Trevor Stuart, FRS, and Professor John Blake. I delivered a 40 minutes lecture on **waves and hydrodynamic loading** under the chairmanship of Professor Stuart.
- I was the invited speaker at the Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton UK, January 15-19, 1997.
- I was one of the invited speakers at the International Symposium held in honour of Dr Leslie Jaeger, at TUNS, Halifax, January 28, 1997.
- I was an Instructor at a Computer Workshop held at the University of Perugia, Terni, Italy, May 24-June 6, 1997.
- I spent my sabbatical leave 1 July 1999 to 30 June 2000 at Bedford Institute of Oceanography, Wessex Institute of Technology, Imperial College, McGill University and Trent University. It was a very productive year. I published one graduate monograph, one Conference Proceedings book, two refereed journal papers, one chapter in the Ocean Engineering Handbook and one report on Mathematical Modelling of Ocean Waves.
- I invited Dr Sarada Sarma of Imperial College, London, UK to collaborate research with me as a research scientist on the research project "Earth-quake Engineering and Soil Mechanics", September 2000.

- I invited Dr Sarada Sarma of Imperial College, London, UK to collaborate research with me as a research scientist on the research project “Seismic Response of Earth-dam: A Theoretical Investigation”, September 2003.
- I was an invited speaker at the Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton UK, February 20-24, 2003. I talked on “Seismic response on earth dams: An analytical approach”.
- I was an invited speaker at the Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton UK, February 25, 2005. I talked on “Weber’s transform method to determine the second-order forces on a circular cylinder in finite depth”.
- I sponsored Dr Seyed Hossein Mousavizadegan of Dalhousie University’s Mechanical Engineering Department for research collaboration with me as an AIF Postdoctoral Fellow in the research project “Analytical and numerical approaches to determine the solution of nonlinear flow equations using Adomian method”, October 2005.
- I sponsored Dr Chefi Ketata of Dalhousie University’s Mining Department for research collaboration with me as an AIF Postdoctoral Fellow in the research project “Safety of petroleum reservoir for oil and natural gas extraction”, September 2004.

Research interest

- Hydrodynamic Loading:
The research on hydrodynamic loading on offshore structures has recently received considerable attention in Eastern Canada due to the oil and gas recovery and production from the sea-bed off the coast of Newfoundland and Nova Scotia. Knowledge of wave loading estimation on offshore structures is very important in designing these structures. It has been found experimentally that for real solid structures when subjected to ocean waves, there are significant nonlinear effects associated with the irrotational component of the fluid flow because of the large amplitude of ocean waves. These waves are of special interest in this research. This research was funded by Imperial Oil of Canada for three years (1981–84). Presently, it is funded by the NSERC operating grants. I am extremely pleased to report that I have been able to make a significant contribution in developing a theoretical formula to calculate the wave loading on large circular cylindrical structures. Two very important mathematical solutions of the nonlinear partial differential equations governing the physical system have been found; one due to direct perturbation technique and the other due to Lighthill’s method. Excellent correlation between the theory and experiment was found.
- Tidal Response in Estuaries:
The knowledge of tidal response is very important in constructing a power plant near dam site. Canadian Government is looking into various schemes for the extraction of hydraulic power throughout the Bay of Fundy. For this purpose, a good deal of

expertise in the areas of tidal elevations, currents and sediment transport is very essential. I have made some significant contributions in this area also. This research is funded by NSERC operating grants.

- Heat Transfer in a Nuclear Reactor
Atomic reactor fuel elements generally consist of bundles of parallel rods arranged in a symmetrical pattern. Each rod is composed of fissile material encased in a suitable cladding; heat generated by the nuclear fission process is removed by axial flow of the coolant (heavy water) through the spaces between rods. Accurate design of fuel elements requires prediction of flow and heat transfer behavior. AECL funded this research for two years (1981–1983).
- Thermal Stratification in Water
Thermal stratification exists in almost all lakes and reservoirs. Prediction of temperature structures is the most important part of this research. NSERC funded this research for four years (1981–85).
- Spectral prediction of the wave-ice interaction in dispersed ice field; The wind-wave-current-ice coupling; Implications on ice motion and drift; Similarity analysis of natural convection flows; Resonant response of harbors of arbitrary shapes.

Special Awards and Honours

- Professor Rahman has been awarded the 2001 *Outstanding Academic Title Award* for his book *Mathematical Methods with Applications* by the CHOICE Magazine, which is published by the Association of College and Research Libraries in the USA. This book has been chosen to be one of the “best of the best” among the 23,000 books reviewed by CHOICE in 2001. This book is meant for the scientists, engineers, graduate students and senior undergraduate students.
- Professor Rahman earned a WIT (UK) *Eminent Scientist Award* for his outstanding research contributions in *Fluid Mechanics Science* and a medal was presented at the Fourth International Conference on Advances in Fluid Mechanics held at Ghent, Belgium on 15 May 2002. He is the first Canadian Scientist to receive such a medal from WIT.
- The Government of Canada has granted \$15.616 million to a number of scientists of Atlantic Canada for Oil and Gas research as AIF. The Minister of State for ACOA has announced the award at Memorial University on 2 July 2002 at 11:00AM. I was one of these scientists to receive such an honour.
- I have been admitted as a *Fellow of Wessex Institute of Great Britain* for my outstanding research and leadership in Fluid Mechanics Sciences at the Fifth International Conference on Advances in Fluid Mechanics held at Lisbon on 22-24 March 2004. A certificate was presented to me on 24 March 2004 before more than 100 world’s leading scientists, engineers and applied mathematicians.

- I was *felicitated* by the Golden Jubilee Celebration Committee of Dumunichowki High School, Assam, India on 17 December 2000.
- I was *felicitated* by the Mangaldai Club, Assam, India on 26 December 2000.
- I was *felicitated* for my outstanding research and teaching accomplishments in many countries around the world by the Assam Sahitya Sabha at its 68th Open Session held at Sipajhar, Assam, India on 19 February 2005.
- I was *felicitated* by the Silver Jubilee Celebration Committee of Daulguri Elementary School on 3 April 2005.
- I was *felicitated* by the Assam Convention of North America held at Calgary, Canada on 2 July 2005.
- At the Dalhousie University's Fall Convocation on 15 October 2005, I was recognized as a PhD Thesis supervisor of the graduating PhD student Seyed Hossein Mousavizadegan for guiding his thesis on *Analytical and numerical approaches to determine the second-order forces in wave-body interactions* .
- I am the Editor-in-Chief of a new journal *International Journal of Applied Mathematics and Engineering Sciences (IJAMES)*. The publisher is the prestigious **Serials Publications** from New Delhi, India. ISSN: 0973-5275.
- I am Editor of the Journal of Applied Mathematics (JAM). The Publisher is the *Hindawi Publishing Company* New York. ISSN: 1110-757X, e-ISSN: 1687-0042.
- I was nominated as *Emeritus Professor* in 2009 at Dalhousie University.
- I was presented a 23K Gold memento on my retirement in 2009 by the President of Dalhousie University.
- Merit increment received at TUNS

1981–82	2 merit increments	\$998.48
1982–83	1 merit increment	\$559.14
1983–84	2 merit increments	\$1185.38
1984–85	1 merit increment	\$605.73
1989–90	1 merit increment	\$745.94
1991–92	1 merit increment	\$745.94
1992–93	2 merit increments	\$1559.01
1993–94	1 merit increment	\$779.50
1994–95	1 merit increment	\$756.12
1995–96	1 merit increment	\$756.12

Research support since 1981

YEAR	AMOUNT	TYPE	AGENCY	TYPE OF RESEARCH
1981-82	\$60,000	contract	CDC	Computer aided design tides
1981-83	\$40,000	contract	AECL	Heat trans. nuclear reactor
1981-84	\$23,000	grant	IMP-OIL	Wave forces on structures
1984-85	\$10,160	grant	N.S. GOVT	Wave forces on structures
1981-82	\$1,166	grant	NSERC	Waves & thermal stratification
1982-85	\$9,858	grant	NSERC	Waves & thermal stratification
1985-88	\$36,000	grant	NSERC	Hydrodynamic loading & tides
1988-89	\$5,000	contract	DREA	Green's function form for Ship Motions at Forward Speed (in collaboration with Dr. Ross Graham)
1988-91	\$51,000	grant	NSERC	Hydrodynamic loading on offshore structures.
1989-90	\$8,000	grant	N.S. GOVT	Numerical Hydrodynamics Challenge'89 and '90.
1990-91	\$16,000	contract	DFO	Analysis of Construction of Algorithms for Wave-Ice Dynamics Study DSS File No. OSC90-00348-(011) (in collaboration with Dr. Perrie)
1991-94	\$51,000	grant	NSERC	Hydrodynamic loading on offshore structures.
1990-91	\$4,000	grant	N.S. Govt	Numerical Hydrodynamics Challenge'91.
1991-92	\$8,000	grant	DFO	The Wind-Wave-Current-Ice Coupling: Implications on Ice Motions and Drift.
1992-93	\$7,000	grant	DFO	The Wind-Wave-Current-Ice Coupling:
1992-93	\$4,000	grant	N.S. Govt	Challenge'92.
1992-93	\$5,000	grant	NSERC	Water Waves: Relating Modern Theory to Advanced Engineering Applications.
1993-94	\$3,000	grant	TUNS	Postgraduate Scholarship by Dean Caley
1994-98	\$62,800	grant	NSERC	Hydrodynamic loading on offshore structures.
1996-97	\$5,000	grant	TUNS	Postgraduate assistantship by Dean Hamdullahpur
1998-99	\$17,600	grant	NSERC	Waves and Wave-Structure Interaction
1999-00	\$18,480	grant	NSERC	Waves and Wave-Structure Interaction
2000-01	\$18,480	grant	NSERC	Waves and Wave-Structure Interaction
2001-02	\$18,480	grant	NSERC	Waves and Wave-Structure Interaction
2002-03	\$17,600	grant	NSERC	Waves and Wave-Structure Interaction
2003-06	\$52,800	grant	NSERC	Waves and Wave-Structure Interaction
2002-06	\$250,000	grant	AIF	Hydrodynamic Loading
2006-11	\$60,000	grant	NSERC	Waves and Wave-Structure Interaction

List of publications

(a) Papers in refereed journals

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An investigation of the existence of solutions for diffusional flow in natural convection.
Tensor N.S., **28(2)**, 130–132.
2. Rahman, M. 1974
Some aspects of perturbation solutions arising in nonisothermal tubular chemical flow reactors.
Chem. Engg. Sci., **29(1)**, 2169–2176.
3. Rahman, M. & Marcotte, N. 1974
On thermal stratification in large bodies of water.
Water Resources Research, **10(6)**, 1143–1147.
4. Meadley, C.K. & Rahman, M. 1974
Laminar natural convection caused by diffusion and chemical reaction from a vertical plate.
Can. J. Chem. Engg., **52(5)**, 552–557.
5. Rahman, M. 1975
A note on the existence of solutions in steady adiabatic tubular reactor.
Tensor, N.S., **29(2)**, 107–113.
6. Rahman, M. 1975
On thermal stratification in large bodies of water: reply.
Water Resources Research, **11(5)**, 760–761.
7. Rahman, M. 1975
Longitudinal dispersion in a steady adiabatic tubular reactor
Chem-Ing-Tech., Microfiche No. **274**.
8. Rahman, M. 1975
Transient behavior of an isothermal tubular reactor for various dispersion effects.
Journal de Mecanique, **14(2)**, 339–357.
9. Rahman, M. 1975
Longitudinal dispersion in a steady adiabatic tubular reactor.
Chem-Ing-Tech., 47(17), 729.
10. Rahman, M. 1975
Transient development of an isothermal irreversible and reversible reactor.
Bull Cal Math Soc, 67, 147–163.

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Some observations on turbulent shear flows through a circular cylindrical pipe.
Tensor N.S., 30(1), 69–79.
12. Rahman, M. 1976
Similarity solutions of natural convection flow induced by diffusion and chemical reaction from a vertical plane surface.
Trans CSME, 4(3), 175–177.
13. Rahman, M. & Tahiani, C. 1977
Stability of turbulent shear flow through a circular cylindrical pipe.
Tensor N.S., 31, 64–70.
14. Rahman, M. 1977
Similar solutions of free convection flow induced by diffusion and chemical reaction.
Letters in Applied and Engg. Sci., 5, 273–285.
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A note on the solution of biharmonic equations arising in plate deflection theory.
J. Physical Society Japan, 43(2), 698–700.
16. Rahman, M. 1978
Temperature stratification in reservoir during winter season.
Water Resources Research, 14(2), 377–380.
17. Rahman, M. 1978
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J. Comp and Applied Math., 4, 289–293.
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Accurate calculations in two dimensional transport.
Proc. ASCE HY8, 1207–1209.
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Analytical investigation of thermal stratification in large bodies of water.
J. Hydraulic Research, 17(3), 207–215.
20. Rahman, M. 1979
Perturbation solutions arising in heat and mass transfer within a stream in a chemical flow reactor.
Tensor N.S., 33, 52–62.
21. Prandle, D. & Rahman, M. 1980
Tidal response in estuaries.
J. Physical Oceanography, 10(10), 1552–1573.
22. Rahman, M. 1981
Nonlinear wave loads on large circular cylinders: a perturbation technique.
Advances in Water Resources, 4, 9–19.

23. Debnath, L. & Rahman, M. 1981
A theory of nonlinear wave loadings on offshore structures.
Int. J. Math & Math Sci., 4, 589–613.
24. Rahman, M. & Chehil, D.S. 1981
Salt concentration in tidal estuaries.
Tensor N.S., 35, 86–90.
25. Rahman, M. 1981
Numerical response of harbor resonance.
Applied Mathematical Modelling, 5, 109–121.
26. Chakravartty, I.C. & Rahman, M. 1981
Heat and mass transfer through a rectangular reactor.
Tensor N.S., 35, 168–172.
27. Rahman, M. & Chakravartty, I.C. 1981
Hydrodynamic loading calculations for offshore structures.
SIAM J. Applied Math., 41, 445–458.
28. Chehil, D.S. & Rahman, M. 1981
Longitudinal vibrations of tapered bars including both inertia and shear effects.
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29. Rahman, M. & Chehil, D.S. 1982
Second order wave load on large vertical cylinders.
Acta Mechanica, 44, 127–136.
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Finite element analysis for axial flow with heat transfer in a square duct
Applied Mathematical Modelling, 6, 481-490.
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Int. J. Engg. Sci., 21(12), 1471-1482.
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Tensor, N.S., 40(3), 233-241.
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J. Physical Oceanography, 13(12), 2225-2235.

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Analytic solutions of secondary flow with heat transfer in a square duct
Int. J. Fluid Flow and Heat Transfer, 5(3), 167-177.
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Wave diffraction by large offshore structures: An exact second order theory
J. Applied Ocean Research, 6(2), 90-100.
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38. Rahman, M. 1985
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Engineering Analysis, 2, 146-149.
39. Rahman, M. 1985
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J. Applied Ocean Research, 7(1), 61-63.
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Fourier-Bessel integrals arising in wave loads on structures
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41. Rahman, M. 1986
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Applied Mathematical Modelling, 10(6), 401-408.
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43. Rahman, M. & Chakravartty, I.C. 1986
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Ocean Engineering, 14(1), 71-78.

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Ocean Engineering, 18, No. 4, 253-267.
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58. Rahman, M. & Bhatta, D. D. 1992
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Ocean Engineering, 19(3), 1992, 271-287.
60. Rahman, M., Satish, M.G., Perrie, W. & Zhu, J. 1992
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International Journal of Numerical Methods in Fluids, 15, 1992, 817-838.
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Estimation of added mass and damping coefficient of an oscillating circular cylinder
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63. Rahman, M. & Bhatta, D. D. 1993
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Canadian Applied Mathematics Quarterly, Vol. 1, No. 3, 1993, 343-382.
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74. Rahman, M. & Agrawal, G. 1996
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79. Rahman, M. & Bhatta, D.D. 1996
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Ocean Engineering, submitted.
80. Bhatta, D.D. & Rahman, M. 1996
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The radiation problem of a submerged sphere and the total force due to diffraction and radiation, submitted to IMA J. of Applied Mathematics.
88. Bora, S. N., Rahman, M. & Satish, M.G. 1997
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95. Rahman, M. 2000
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102. Mousavizadegan, S.H., Rahman, M. and Satish, M.G. 2003
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103. Rahman, M. 2004
Scattering of a submerged or floating sphere in finite depth, (under preparation).
104. Rahman, M. 2004
Dynamical loading on circular cylindrical shells interacting with fluids: Part I: Fluids outside the shells (under preparation).
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Dynamical loading on circular cylindrical shells interacting with fluids: Part II: Fluids inside the shells (under preparation).
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112. Mousavizadegan, S. H., Rahman, M. and Satish, M. G. 2004
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127. Rahman, M. 2007
A technical note on recent tsunamis in Indian Ocean, International Journal of Design and Nature, WIT Press, Vol. **1**, No. 1, 70-73, 2007.
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Applied dominant transfer and Fuzzy logic for the nonlinear wave-wave interactions problem, Int. J. Appl. Math. and Engg. Sci (IJAMES), Vol. **1**, No. 1, 11-25, January 2007.
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(b) *Theses*

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Stability of tubular chemical flow reactors
D. I. C. Thesis, Imperial College, London University, UK, 152 pages.
131. Rahman, M. 1969
Stability of tubular chemical flow reactors
M. Phil Thesis, Imperial College, London University, UK, 152 pages.
132. Rahman, M. 1973
Steady natural convection flow over a semi-infinite vertical plane induced by diffusion and chemical reaction
Ph.D. Thesis, University of Windsor, Ontario, Canada, 152 pages.
133. Rahman, M. 1992
The University of London has awarded a DSc in Engineering to Dr Rahman for his published work in **Hydrodynamics; particularly on the wave action of structures, and for fluid mechanics applications in civil and mechanical engineering**. This degree is regarded as a prestigious award from one of the acclaimed universities in the world and is a higher doctorate awarded only for high standard published work containing original contributions to the advancement of knowledge and learning, and which has gained the candidate distinction in their field.

(c) *Books*

134. Rahman, M. 1988
The Hydrodynamics of Waves and Tides, with Applications
Computational Mechanics Publications, Southampton UK and Boston USA, 334 pages, softcover, ISBN: 0-905451-71-6 CMP Southampton, ISBN: 0-931215-19-6 CMP Boston. ISSN: 0952-5300 Series. *Library of Congress Catalog Card number: 88-70754.*
135. Rahman, M. 1990 (Ed.)
Ocean Waves Mechanics, Computational Fluid Dynamics and Mathematical Modelling
Proc. Eleventh Annual International Conference of CAMS, Computational Mechanics Publications, Southampton UK, Boston USA, 968 pages, hardcover, ISBN: 1-85312-065-0 CMP Southampton, ISBN 0-945824-47-5 CMP Boston. *Library of Congress Catalog Card number: 90-081263.*
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 Applied Differential Equations for Scientists and Engineers
 Vol. 2: Partial Differential Equations, 350 pages; ISBN: 1-85312-125-8; 1-56252-058-X (US, Canada, Mexico), Hardback: Computational Mechanics Publications, Southampton UK, Boston USA. SET-ISBN: 1-85312-095-2; 1-56252-056-3 (US, Canada, Mexico), 1000 pages: Hardback: **Library of Congress Catalog Card Number: 91-76270.**
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 Water Waves: Relating Modern Theory to Advanced Engineering Applications
 350 pages, Hardcover, IMA Monograph Series, Oxford University Press, Walton Street, Oxford OX2 6DP, England, ISBN: 0 19 853478 7. **Library of Congress Catalog Card Number: 94-19734. Note: This book was reviewed in the SIAM reviews, and received an award from the Natural Sciences and Engineering Research Council of Canada (NSERC).The Oxford University Press has notified me that the book will be reprinted on *Print on Demand*. This book has been reprinted by OUP in 2003.**
141. Rahman, M. 1995 (Ed.)
 Potential Flow of Fluids, CMP, Southampton Boston, 264 pages, Hardcover. Volume in International Series on Advances in Fluid Mechanics, ISBN: 1-83512-356-0; 1-56252-279-5. *Library of Congress Catalog Card Number: 95-68891.*
142. Rahman, M. & Brebbia, C. A. 1996 (Ed.)
 Proc. Advances in Fluid Mechanics, CMP, Volume 9, 385 pages, First International Conference on Advances in Fluid Mechanics held in New Orleans from 11-13 June, 1996. ISBN: 1-83512-452-4; ISSN: 1-335-808 X Series. *Library of Congress Catalog Card Number: 96-83653.*
143. Rahman, M. 1996
 Complex Variables and Transform Calculus, Computational Mechanics Publications, Southampton UK, Boston USA, 350 pages, Hardcover. ISBN: 1-85312-491-5, December 1996. *Library of Congress Catalog Card Number: 96-086041. Note: This book received an excellent review as an exceptionally clear and orderly account from the reviewer published in the ASLIB BOOK GUIDE*
144. Rahman, M. 1997 (Ed.)
 Laminar and Turbulent Boundary Layers, CMP, Southampton UK, Boston USA, 196

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Integral Equations and their Applications, WIT Press, Southampton UK, 356 pages, Hardback, ISBN: 978-1-84564-101-6. **A Catalogue record for this book is available from the British Library.** This book has been reviewed by Tracy Charlton CMath MIMA, CSci. The review was published in *Mathematics Today*, August 2009, pp.190-191.

I am pleased to quote the reviews as follows:

What I have found very pleasurable from reading this book, is the author's fascination of integral equation. In a modern age when computers seem to hold all the answers this book helps the reader to appreciate that real understanding of the mathematics is required to avoid errors. This reinforces the importance and value of mathematics as a subject.

The author's passion for integral equations has allowed him to write a book which has a common footing for both pure mathematicians and applied mathematicians. Preferring applied mathematics myself I find this a refreshing change for a book to connect with both branches of mathematics, which sometimes to be so isolated from each other. The book provides enough theoretical development to keep pure mathematicians interested and these theories are illustrated also by practical examples to keep us applied mathematicians engaged. I personally found the work on ocean waves in chapter eight of the book very interesting indeed.
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Hydraulics Laboratory, NRC, Ottawa, Canada.
162. Rahman, M. & Moes, J. 1979
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Proc. Sixth CANCAM, Vancouver, B.C.
208. Rahman, M., Prandle, D., Spraggs, L. and Argintaru, V. 1980
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210. Rahman, M. 1981
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211. Debnath, L. & Rahman, M. 1981
 A theory of nonlinear wave loading on offshore structures
 Proc. 87th Annual Meeting, AMS, San Francisco.
212. Rahman, M. & Heaps, H.S. 1981
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 CAMES Annual Meeting, Univ. Quebec, Montreal.
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 Proc. 5th Can Symp Fluid Dynamics, Univ. Windsor, Ontario.
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 Proc. 4rth Int. Conf. Finite Element Water Resources, Hannover, West Germany.
215. Rahman, M. 1983
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 Proc. 4rth Int. Conf. Numerical Methods Laminar and Turbulent Flow, Swansea, United Kingdom.
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244. Satish, M. G., Lu, Q., Rahman, M. & Wai, O.W.H. 1999
A Three Dimensional Numerical Modelling of Tidal Circulation in Pearl River Estuary
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245. Rahman, M. 2000 (invited)
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246. Rahman, M. & Perrie, W. 2000 (invited)
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247. Rahman, M. 2001 (invited)
Effects of diffractions and radiations on a submerged sphere
Tenth Int. Conference on CMEM held at Alicante, Spain, 4-6 June 2001.
248. Rahman, M. 2001 (invited)
Waves and wave-structure interaction
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254. Rahman, M. and Mousavizadegan, S. H. 2004
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Research Projects: Dr M Rahman

- NSERC Funded Research Project (2006-20011)
- (I) Title: Waves and wave-structure interaction
- Synopsis:

Many theoretical studies have been made considering the diffraction and radiation of water waves by large offshore structures in the form of circular cylinders with vertical axis which extend throughout a fluid of infinite or finite depth. This problem has great practical significance, since many offshore platforms and other structures are supported by vertical columns of circular forms which are subject to wave loads. In recent years, this type of problems receive considerable attention among scientists and engineers because of its importance in the oil and natural gas recovery and production from the sea-bed; specially, in Atlantic Canada, this problem has great significance because of the discovery of oil and gas from the sea-bed off the coast of Nova Scotia and Newfoundland. Accurate prediction of wave loads is essential to design the structures such that under the severe wave conditions these structures will be able to withstand the wave loads exerted on them. Potential theory is applicable provided the wave height does not exceed a magnitude comparable to the diameter of the columns. The linear diffraction problem is well established nowadays. However, the nonlinear problem with second-order potential due to diffraction by a vertical cylinder has not been well established. The analytical solution is an important step in checking the

numerical method developed for arbitrary bodies. Many researchers have tried unsuccessfully to obtain an accurate analytical solution of this important problem. This research project is directed mainly along this line.

- (II) Title: Estimation of Ice-Floe Drift in Marginal Ice Zone.

- Synopsis:

Ice-floes are moving due to wind, wave and also the radiation effects. The air speed has the most dominant effect in ice-floe drift. The wave propagation in the marginal ice-zone depends on the concentration of the ice floes in sea and in many cases it may be possible to neglect the effect of the wind induced current and wave radiation. The equation of motion of an ice floe due to the wind is a nonlinear simultaneous partial differential equations. It can be simplified in different ways to make it linear and amenable to solution analytically. This project is an interesting one from the practical view point so far environmental aspects are concerned.

- (III) AIF Funded Research Project (2001-2006)

- Title: Mathematical Modelling of Inverse Problem for Reservoir Permeability

- Synopsis:

A precise knowledge of permeability is crucial and significant for accurate simulation of reservoir performance and to enhance reservoir management. At present permeability is measured by taking a core sample to a lab and then measure the flow rates; but this is very expensive and at the same time less accurate because there can be significant problems with measurement errors, and the value of permeability is measured only at one point of the sample. One of the efficient ways to resolve this problem is to obtain *in-situ* permeability with the aid of the reservoir characteristics by means of solving differential equations which govern the fluid flow in porous media. Knowing the behavior of the reservoir flow with initial conditions, the permeability of the reservoir is calculated by using the Adomian decomposition method. This problem is usually known as the **Inverse Problem**. Among different techniques, a matched technique is proposed to overcome the traditional complexity that arises in solving the inverse problem. This research is intended to gain some insight in the advancement of knowledge in reservoir characterization.