# CURRICULAM VITAE


**Name** : Dr. M. Perumal

**Date of Birth** : 17-10-1954

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**ACADEMIC BACKGROUND**

| Period | | Name of Institution | Country | Degree |
|---|---|---|---|---|
| From | To | | | |
| 1989 | 1996 | University of Roorkee | India | Ph. D (Civil) (on part-time registration) |
| 1979 | 1981 | National University of Ireland | Ireland | M. Sc (Engg. Hydrology) |
| 1976 | 1978 | Indian Institute of Technology Kanpur, Kanpur | India | M. Tech (Hydraulics and Water Resources Eng.) |
| 1971 | 1976 | Madras University | India | B.E. (Civil) |

Title of Ph. D Thesis : Variable parameter flood routing using hydrodynamic principles.
Title of M. Sc Thesis : Stochastic modelling of daily flows.
Title of M. Tech Thesis: Studies on oblique impinging jets.

**SCHOLARSHIPS, FELLOWSHIPS AND OTHER AWARDS RECEIVED**

| Name of the award | Value | Type | Location of tenure | Period |
|---|---|---|---|---|
| Leverhulme Trust Post Doctoral Fellowship | British Pounds 23000 | International | Water Resource Systems Research Laboratory, Dept. Civil Engineering, U. Newcastle, Newcastle upon Tyne NE1 7RU UK | 10 /1997 to 09/1998 |
| Central Board of Irrigation and Power (CBIP) Best paper award | Copper shield + Indian Rs 500 | National | For the paper presented in the 53rd R&D Session of CBIP | 05/1986 |
| Irish Government Fellowship for M.Sc | Irish Pounds 3600 + no tuition fee | International | Dept of Engineering Hydrology, University College Galway, Ireland | 10/1979 to 09/1980 + one year for thesis |

**ACADEMIC, RESEARCH AND OTHER RELEVANT WORK EXPERIENCE**

| Position held and nature of work | Organisation | Supervisor | Period |
|---|---|---|---|
| **Professor**<br>I.I.T. Roorkee<br>Roorkee-247 667 | Department of Hydrology | Head,<br>Department of Hydrology,<br>I.I.T Roorkee,<br>Roorkee-247 667,<br>INDIA | Nov. 2009<br>to<br>till date |
| **Associate Professor**<br>Indian Institute of Technology.<br>Roorkee – 247 667 | Department of Hydrology | Head,<br>Department of Hydrology,<br>I.I.T Roorkee,<br>Roorkee-247 667,<br>INDIA | 02-2003<br>to<br>Nov. 2009 |
| **Associate Professor**<br>(Lecturing on hydraulics and hydrology to working engineers, supervising Master's thesis and organising continuing engineering courses) | Centre for Continuing Education, Indian Institute of Technology Roorkee,<br>Roorkee, India | Head,<br>Centre for Continuing Education | 04/1996<br>To<br>02/2003 |
| **Post-Doctoral Fellow**<br>(*sabbatical from UOR*) Flood analysis using simplified hydraulic models | Department of Civil Engineering, University of Newcastle Newcastle upon Tyne NE1 7RU, UK | Prof. P.E. O'Connell | 10/1997<br>to<br>09/1998 |
| **Reader**<br>(Teaching hydraulics and hydrology to working engineers, and organising continuing education courses) | Centre for Continuing Education, University of Roorkee, India | Director,<br>Centre for Continuing Education | Nov, 1989<br>to<br>Apr, 1996 |
| **Research Associate**<br>(research on unsteady flow in open channels) | Department of Civil Engineering, University of Roorkee, India | Prof. K.G Ranga Raju | Aug, 1988<br>to<br>Nov, 1989 |
| **Scientist**<br>(Research and training of engineers) | National Institute of Hydrology<br>Roorkee, India | Director | June, 1981<br>to<br>June, 1988 |

**Projects Completed (8)**

1. Flood plain demarcation study of the selected site of the proposed 2*250 MW thermal power plant to be set up by the Himachal EMTA Power Ltd. at Raniganj, Dist. Bardhaman, West Bengal.(January 2011)
2. Water Availability Study at the proposed Intake Pump House installation of the project on river Damodar for 2x250 MW power plant of Himachal EMTA Power Ltd. at Raniganj, Dist. Bardhaman, West Bengal. (June 2010)
3. Accuracy of Estimation of Discharge by Rating Curves- A sponsored research project by the Environment Agency, Northwest Region, U.K. Worked in collaboration with Mr. David Archer, Visiting Research Fellow, Department of Geography, University of Newcastle, Newcastle upon Tyne, U.K. (1998)
4. Flood Routing Studies for Tyne River - a collaborative research project between the Departments of Civil Engineering, University of Roorkee, India and University of Newcastle, U.K. (1995)
5. Dam-Break Analysis for Jamrani Dam, Uttar Pradesh, India (1993)
6. Dam-Break Analysis for Machhu - II Dam, Gujarat, India (1986)
7. Design Flood Estimation for Sardar Sarovar Dam, Gujarat, India (1982-83)
8. Prepared a report on Review of Major Existing Real-Time Hydrological Forecasting Systems Integrated with SCADA - Prepared for Slobodan P.SIMONOVIC Consulting Ltd., London, Ontario on contract basis, 4th February, 2001.

**Theses Supervised**

**M. Tech/M.E. Theses**: [Completed =**18**]

| S.N. | Thesis Title | Student | Year |
|---|---|---|---|
| 1 | Evaluation of converting stage to discharge using normal rating curve for flood routing studies | Mr. K.B. Shrestha | March, 2000 |
| 2 | A case study on dam failure analysis | Mr. H. Mohanty | June, 2004 |
| 3 | A critical appraisal of flood forecasting models | Mr. G.B. Pattanaik | June, 2004 |
| 4 | Simulation of flow and transport through fractured porous media | Mr. A.R. Sathe | June, 2005 |
| 5 | Establishment of rating curve at an ungauged river site | Mr. S. K. Jha | June, 2005 |
| 6 | A mathematical model for stream-aquifer interaction | Mr. Kailash Yadav | June, 2006 |
| 7 | Application of HEC-HMS model for rainwater harvesting | Mr. Prince Mathur | June, 2007 |
| 8 | A method for gradually varied flow profile estimation and its evaluation using HEC-RAS model | Mr. Deshraj Singh | June, 2007 |
| 9 | Evaluation of two simplified flood routing methods using HEC-RAS model | Ms. Vani Dubey | June, 2008 |
| 10 | Study of glacial lake outburst flood for Punatsanchhu hydroelectric project | Mr. N. N. Rai | Oct., 2008 |
| 11 | Backwater study for Almatti Reservoir on Krishna River | Mr. A. K. Goyal | Nov., 2008 |
| 12 | Possible regional hydrological impacts of climate variability and urbanization on surface and groundwater resources | Mr. Juddy N. Okpara JP | June, 2008 |
| 13 | Improved channelization of Mithi River for drainage decongetion in Mumbai | Mr. U. B. Patil | Oct., 2008 |
| 14 | Evaluation of the conceptual basis of the Clark and Nash models | Mr. P. J. Jainet | June, 2009 |
| 15 | A generlised variable parameter Muskingum routing method for trapezoidal channels | Mr. Prakash Singh | June, 2009 |
| 16 | Two-dimensional overland flow modelling | Mr. Muhammed Raneef | June, 2010 |
| 17 | Performance evaluation of dam failure analysis models | Mr. Aravind V | June, 2010 |
| 18 | Evaluation of two parameter estimation techniques of the Muskingum method | Mr. A. Naren | June, 2010 |

**Ph.D. Theses**: [Completed = **3**, Ongoing = 4]

| S.N. | Thesis Title | Student | Year |
|---|---|---|---|
| 1 | Simplified methods for pollutant dispersion modelling of rivers under unsteady flow conditions | Dr. S. Balaprasad | Sept., 2001 |
| 2 | Variable parameter flood routing methods for hydrological analyses of ungauged basins | Dr. B. Sahoo | Aug., 2007 |
| 3 | Overland flow modelling using Approximate Convection-Diffusion equations | Mr. R. V. Kale | Aug., 2010 |
| 4 | Routing reservoir releases along a river using VPMD and VPMS methods | Mr. H. Mohanty | ongoing |
| 5 | Hydrometric data based flood forecasting models using simplified routing techniques | Mr. M. S. Rao | ongoing |
| 6 | Physically based river network modelling for runoff computation | Mr. Aravind V. | ongoing |
| 7 | Large Scale Hydrological Modelling | Mr. Ajay Ahirwar | ongoing |

**Contribution in edited books**:

Perumal, M., and Sahoo, B. (2010) Real-time flood forecasting by a hydrometric data-based technique, Chapter-9 in *Natural and Anthropogenic Disasters-Vulnerability, preparedness and mitigation* (Ed.) M.K. Jha, Capital Publishing Company, New Delhi, pp. 169-196.

**Papers published in refereed journals (25)**

1) Perumal, M., Moramarco T, Barbetta,S, Melone,F., and Sahoo,B (2011) Real-time flood stage forecasting by variable parameter Muskingum stage hydrograph routing method, Hydrology Research,42.2-3, IWA Publishing doi:10.2166/nh.2011.063, 150-161.

2) Perumal, M., Moramarco, T., Sahoo, B., and Barbetta, S.(2010), On the practical applicability of the VPMS routing method for rating curve development at ungauged river sites, Water Resour. Res., 46, W03522, doi:10.1029/2009WR008103

3) Perumal, M., Sahoo, B. (2009) Simplified flood routing methods in applied hydrology, Journal of Hydrological Research and Development, Vol. 24, Publication of Indian National Committee on Hydrology (INCOH), National Institute of Hydrology, Roorkee, pp. 37-88 (Invited Paper).

4) Perumal, M., and Sahoo, B., Moramarco, T., and Barbetta, S. (2009), Multilinear Muskingum method for stage-hydrograph routing in compound channels, *Journal of Hydrologic Engineering*, ASCE, April, Vol.14(7), 663-670.

5) Perumal, M., and Sahoo, B. (2008), Volume conservation controversy of variable parameter Muskingum-Cunge method, *Journal of Hydraulic Engineering*, ASCE, April, Vol. 134(4), 475-485.

6) Perumal, M. and Ranga Raju, K.G. (2007) Variable parameter Muskingum routing considering downstream effects. *Journal of Hydraulic Engineering*, ASCE, Vol. 133(11), 1249-1260.

7) Perumal, M. and Sahoo, B. (2007), Limitations of real-time models for forecasting river flooding from monsoon rainfall, *Natural Hazards*, Springer Verlag Publishers, The Netherlands, Vol. 42(2), doi:10.1007/s11069-006-9082-1, 415-422.

8) Perumal, M., Moramarco, T., and Melone, F. (2007), A caution about the multilinear discrete lag-cascade model for flood routing, *Journal of Hydrology*, Elsevier Publications, Vol. 338, doi:10.1016/j.jhydrol.2007.02.022, 308-314.

9) Perumal, M., and Sahoo, B. (2007), Applicability criteria of the variable parameter Muskingum stage and discharge routing methods, *Water Resources Research*, American Geophysical Union (AGU), Vol. 43(5), W05409, doi: 10.1029/2006WR004909, 1-20.

10) Perumal, M., Moramarco, T., Sahoo, B., and Barbetta, S. (2007) A methodology for discharge estimation and rating curve development at ungauged river sites, *Water Resources Research*, American Geophysical Union, Vol. 43(2), W02412, doi: 10.1029/2005WR004609, 1-22.

11) Perumal, M., Shrestha, K.B., and Chaube, U.C. (2004) Reproduction of hysteresis in rating curves. *Journal of Hydraulic Engineering*, ASCE 130(9), 870-878.

12) Perumal, M., O'Connell, P.E., and Ranga Raju, K.G. (2001) Field applications of a variable-parameter Muskingum method. *Journal of Hydrologic Engineering*, ASCE 6(3):196-207.

13) Perumal, M. and Ranga Raju, K.G. (1999) Approximate convection-diffusion equations. *Journal of Hydrologic Engineering*, ASCE. 4(2): 161-164

14) Perumal, M. and Ranga Raju,K.G. (1998) Variable-parameter stage-hydrograph routing method II : Evaluation. *Journal of Hydrologic Engineering*, ASCE. 3(2): 115-121

15) Perumal, M.and Ranga Raju,K.G. (1998) Variable-parameter stage-hydrograph routing method I: Theory, *Journal of Hydrologic Engineering*, ASCE. 3(2): 109-114

16) Perumal,M. (1994) Hydrodynamic derivation of a variable parameter Muskingum method- Part 2: Verification. *Hydrological Sciences- Journal of IAHS*. 39(5): 443-458

17) Perumal, M. (1994) Hydrodynamic derivation of a variable parameter Muskingum method- Part 1:Theory and solution procedure. *Hydrological Sciences-Journal of IAHS*. 39(5):431-442.

18) Perumal, M. (1994) Multilinear discrete cascade model for channel routing. *Journal of Hydrology.* 158: 135-150

19) Dooge, J.C.I., M.Perumal and Q.J.Wang. (1993). Step function response of a Muskingum reach. *Journal of Irrigation and Drainage Engineering*, ASCE. 119(2): 410-415

20) Perumal, M. (1992) The cause of negative initial outflow with the Muskingum method. *Hydrological Sciences-Journal of IAHS*. 37(4): 391-401

21) Perumal, M. (1992) Multilinear Muskingum flood routing method. *Journal of Hydrology*. 133: 259-272

22) Perumal, M. (1992) Simulation of dam break flood waves. *Jalvigyan Sameeksha* - a publication of Indian National Committee on Hydrology. VII(1)

23) Perumal, M. (1989) Unification of Muskingum difference schemes. *Journal of Hydraulic Engineering*, ASCE. 115(4): 536-543

24) Perumal, M. (1985) Flood routing- hydrologic methods. *Hydrology Review*: Publications of High Level Technical Committee on Hydrology, National Institute of Hydrology, Roorkee, India. II: 121-142.

25) Perumal, M. (1985) Stability analysis of Muskingum difference schemes. *Hydrology Journal of Indian Association of Hydrologists*. VIII (4).

**Refereed contributions (22)**

1. Perumal, M., Singhal, D.C., Arya, D.S., Srivastava, D.K., Goel, N.K., Mathur, B.S., Joshi, H., Singh, R. and Nautiyal (2005), Proceedings of Hydrological perspectives for sustainable development (HYPESD), *International Conference on HYPESD-2005*, Department of Hydrology, Indian Institute of Technology Roorkee, India, (February 23-25, 2005), Allied Publ. Pvt. Ltd., New Delhi, Vol. I, 1-544. (ISBN: 81-7764-786-5).

2. Perumal, M., Singhal, D.C., Arya, D.S., Srivastava, D.K., Goel, N.K., Mathur, B.S., Joshi, H., Singh, R. and Nautiyal (2005), Proceedings of Hydrological perspectives for sustainable development (HYPESD), *International Conference on HYPESD-2005*, Department of Hydrology, Indian Institute of Technology Roorkee, India, (February 23-25, 2005), Allied Publ. Pvt. Ltd., New Delhi, Vol. II, 545-1096. (ISBN: 81-7764-786-5).

3. Perumal, M. (2004) A non-iterative method of computing gradually varied flow profiles. Proceedings of International Conference on Hydraulic Engineering: Research and Practice, Oct. 26-28, 2004.

4. Perumal, M. (2003) Removing some anomalies of the Muskingum method. *Proceedings of International Conference on Water and Environment*, Bhopal, Dec.15-18, 2003.

5. Perumal, M. (2003) Discussion on Wave speed- discharge relationship from cross-section survey, *Journal of Water & Maritime Engineering, Institution of Civil Engineers* (London), Vol.156(3).

6. Perumal, M., Shreshtha, K.B., and Chaube, U.C. (2002) Evaluation of the use of normal rating curve for flood routing studies. *Proceedings of National Conference on Hydraulics, Water Resources and Ocean Engineering (HYDRO-2002)*, I.I.T. Bombay, Dec.16-17, 2002.

7. Perumal, M. (2000) Multilinear discrete cascade model for stage hydrograph routing. *Proceedings of International Conference on Integrated Water Resources Management for Sustainable Development*, 19-21 December, New Delhi, India

8. Perumal, M. (1997) Verification of linear variation of water surface assumption of the approximate convection-diffusion equations. *Proceedings of the International Seminar on Emerging Trends in Hydrology*, 25-27 September, Roorkee, India

9. Dooge, J.C.I., Perumal, M., and Wang, Q.J. (1994) Closure of "Step function response of a Muskingum reach." *Journal of Irrigation and Drainage Engineering*, ASCE. 120(3): 697-701.

10. Perumal, M. (1993) Comparison of two variable parameter Muskingum methods. *Proceedings of the International Symposium of Extreme Hydrological Events: Precipitation, Floods and Droughts*, Yokohama, Japan, IAHS pub. no. 213: 129-138.

11. Perumal, M. (1993 ) Discussion on "Numerical solution of Muskingum equation", *Journal of Hydraulic Engineering*, ASCE, 119(9), 1073-1076.

12. Perumal,M. (1992) Discussion on "The kinematic wave controversy" *Journal of Hydraulic Engineering*, ASCE,118(9),1335-1337.

13. Perumal, M. (1992), Comments on "New perspectives on Vedernikov number" by V. M. Ponce, Water *Resour. Res.*, 28(6), 1733-1734.

14. Perumal,M. (1992) The matched diffusivity technique applied to kinematic cascades: Model description and validation- comment. *Journal of Hydrology*. 136: 389-392.

15. Perumal,M. (1991) Discussion on "Response of Muskingum equation to step input." *Journal of Irrigation and Drainage Engineering*, ASCE. 605-606.

16. Perumal, M., and Ranga Raju, K.G. (1990) An approximate one-dimensional stage hydrograph routing method. *Proceedings of the International Conference on River Flood Hydraulics*, 17-20, September. (ed: W.R.White), Hydraulics Research Limited, John Wiley and Sons Ltd., U.K..

17. Perumal, M. (1990) Discussion on "Improved fitting for three-parameter Muskingum procedure. *Journal of Hydraulic Engineering*, ASCE: 1056.

18. Perumal, M., Singh, R.D., and Seth, S.M. (1987) Flood frequency analysis using Box-Cox transformation based Gumbel EV-I distribution. *Proceedings of the International symposium on Flood Frequency and Risk Analysis* (ed: V.P. Singh) D. Reidel publishing Co., U.S.A., 163-172

19. Perumal, M. and Seth, S.M. (1987) Discussion on "Negative outflows from Muskingum flow routing." *Journal of Hydraulic Engineering*, ASCE, 1083-1085.

20. Singh, R.D., Perumal, M., and Seth, S.M. (1986) Integer Nash model for run-off computation. *Proceedings of the 53rd Annual Research and Development Session of Central Board of Irrigation and Power*, Bhubaneswar, India, 8-10,May (research at NIH) (**Award winning paper**).

21. Perumal, M. and Seth, S.M. (1984) On the mathematics of storage routing-a comment. *Journal of Hydrology*. 73: 389-394.

22. Perumal, M. (1981) Discussion on "Least squares estimation of BOD parameters." *Journal of Environmental Engineering*, ASCE: 1330-1331.

**Conference/seminar/workshop presentations (19)**

1. Perumal, M., Moramarco, T., Sahoo, B., Barbetta, S., Melone, F.( 2010) Multilinear diffusion analogy model for stage hydrograph routing. *Modelling of Dangerous Phenomena and Innovative Techniques for Hazard Evaluation, Mapping and Mitigation*, Session –S03, Proceedings of the conference "*Modelling for Environment's Sake*", iEMSs-2010, 5-8,July, Ottawa, Canada

2. Perumal, M., and Sahoo, B. (2009), Approximate convection-diffusion equations and their applications in hydrology, Proceedings of the Workshop, Organized by Northern-Ganga Division of Central Water Commision, Dehradun, March, 6 2009.

3. Perumal, M., Moramarco, T., Barbetta, S., Melone, F., and Sahoo, B. (2009), Real-time flood forecasting using Muskingum stage-hydrograph routing method, Proceeding of the International Conference on Water, Environment, Energy, and Society (WEES -2009), Organized by Ministry of Water Resources (National Institute of Hydrology Roorkee), Government of India in association with Texas A&M University, USA, (January 12-16, 2009), New Delhi, India.

4. Perumal, M., Moramarco, T., Sahoo, B., and Barbetta, S. (2008), Multilinear diffusion analogy model for real-time streamflow forecasting, Proceedings of iEMSs 2008 International Congress on Environmental Modelling and Software Society (iEMSs), Barcelona, Spain, July 7-10.

5. Perumal, M., and Sahoo, B. (2007), A critical evaluation of two variable parameter Muskingum routing methods, *Proceedings of the 18th International Association of Science and Technology for Development (IASTED) Conference on Modeling and Simulation (MS 2007)*, Ed. R. Wamkeue, *ACTA Press*, ISBN: 978-0-88986-663-8, May 30-June 1, 2007, Montreal, Quebec, Canada, 355–360.

6. Perumal, M. and Sahoo, B. (2006), Evaluation of criteria for the choice of flood routing methods, *The 15$^{th}$ Congress of APD-IAHR and the International Symposium on Maritime Hydraulics (ISMH)*, Department of Ocean Engineering, Indian Institute of Technology Madras, Chennai, India, (August 7-10, 2006), Vol. I, 559-565.

7. Perumal, M., and Moramarco, T. (2005) A reappraisal of discharge estimation methods using stage hydrographs. *Proceedings of International Conference on Hydrological Perspectives for Sustainable Development (HYPESD-2005)*, Indian Institute of Technology, Roorkee, Feb.23-25, 2005, pp.104-116

8. Perumal, M. (2004), A non-iterative method of computing gradually varied flow profiles, *International Conference on Hydraulic Engineering: Research and Practice (ICON-HERP-2004)*, Department of Civil Engineering, Indian Institute of Technology Roorkee, Oct. 26-28, 2004, Vol. 2, 657-664.

9. Perumal, M. (2000) Variable parameter flood routing methods- Improved tools For floodplain management studies. *Proceedings of the Workshop on Flood Management in Uttar Pradesh, Organised by Institution of Engineers (India)*, 6-7 March, Lucknow, 128-142

10. Perumal, M., and Ranga Raju, K.G. (1999) Comparative evaluation of three variable parameter Muskingum methods. *Proceedings of the National Workshop on Hydrologic and Hydraulic Routing in Alluvial Streams*, Indian Association of Hydrologists, Roorkee, November 26-27, 11-18 (**Invited paper**)

11. Chandra, S., and Perumal, M. (1988) Dam break analysis for Macchu dam -II. *Proceedings of the 54th Annual Research and development session of the CBIP*, Ranchi,30th April- 3rd May (project work at NIH)

12. Chandra, S., and Perumal, M. (1987) Present practices and future strategies for floodplain management. *Proceedings of the National Water Convention, Sponsored by Central Water Commission and CBIP*, 12-14, November, New Delhi (**Invited paper** prepared at NIH)

13. Chandra, S., and Perumal, M. (1986) Probability concept in flood damage assessment. **Theme paper** presented in the Workshop on Flood Damage Assessment, Sponsored by CBIP, 28-30, October, New Delhi

14. Perumal, M., and Seth, S.M.(1986). "Comparative study of Muskingum, and lag and route flood routing methods. *Proceedings of the 53rd Annual Research and Development session of CBIP*, Bhubaneshwar, India.8-10,May

15. Perumal, M., Seth, S.M., and Datta, B. (1985) Tentative spillway design flood estimation for Sardar Sarovar project- A case study. *Proceedings of the National seminar on Flood Frequency Analysis* .Sponsored by National Institute of Hydrology (NIH) and co-sponsored by Central Board of Irrigation and Power(CBIP), New Delhi,30th September

16. Perumal, M., and Seth, S.M. (1985) Regional flood frequency analysis using power transformation - A case study. *Proceedings of the National seminar on Flood Frequency Analysis* .Sponsored by National Institute of Hydrology (NIH) and co-sponsored by Central Board of Irrigation and Power(CBIP),30th September, New Delhi

17. Perumal, M., Nirupama, P., and Seth, S.M. (1985) Some studies on parameter Estimation methods of Gumbel EV-I distribution using Monte Carlo test. *Proceedings of the National seminar on Flood Frequency Analysis*. Sponsored by National Institute of Hydrology (NIH) and co-sponsored by Central Board of Irrigation and Power (CBIP),30th September, New Delhi

18. Perumal, M., and Seth, S.M. (1985) Need for uniform procedure of flood frequency analysis. *Proceedings of the National seminar on Flood Frequency Analysis*. Sponsored by National Institute of Hydrology (NIH) and co-sponsored by Central Board of Irrigation and Power(CBIP),30th September, New Delhi

19. Perumal, M., Singh, R.D., and Seth, S.M. (1984) Real time forecasting using discrete linear cascade model. *Proceedings of the National Seminar on Real Time Hydrological forecasting*, Central Water Commission, 31stOct.-1st Nov., New Delhi.

**Reports prepared while serving at the National Institute of Hydrology, Roorkee (14)**

1. "Hydrologic Forecasting" Technical Report of Training, UNDP Project (IND/74/045), 1984.
2. "Flood frequency analysis using power transformation". Documentation of Program, DP-1
3. "Hydrologic flood routing including data requirements." Review Note, RN-8
4. "Hydrologic flood routing", User's Manual, UM-11
5. "Data requirement and data preparation for dam-break analysis using DAMBRK model", Technical Note, TN-22
6. "Regional flood frequency analysis", Case Study, CS-9.
7. "Dam-break analysis for Machhu Dam-II", Case Study, CS-16.
8. "Flash flood studies", Review Note, RN-30.
9. "Cause of negative outflow in the Muskingum method", Technical Report, TR-1
10. "Suitability of power transformation based Gumbel EV-1 distribution", Technical Report, TR-2
11. "Techniques for flood frequency analysis", User's Manual, UM-24
12. "Development of a variable parameter simplified hydraulic flood routing model for rectangular channel" Technical Report, TR-13
13. "Development of a variable parameter simplified hydraulic flood routing model for trapezoidal channel" Technical Report, TR-21
14. "Comparison of some variable parameter simplified hydraulic flood routing models", Technical Report, TR-27.

**Other professional activities and recognition**

- Attended five months training programme at the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California under UNDP scheme of the National Institute of Hydrology, Roorkee, India (Copy of the certificate enclosed)
- Reviewer of Hydrological Sciences Journal of International Association of Hydrological Sciences, Journal of Hydrology (Elsevier Publications), Journal of Hydraulic Engineering, ASCE, Journal of Hydrologic

Engineering, ASCE, Advances in Water Resources (Elsevier publications) and the Hydrology Journal of Indian Association of Hydrologists, Roorkee.

**Activities on Continuing Engineering Education**

- Organised and taught in many training programmes including on the topics of Flood Frequency Analysis, Flood Routing and Flood Forecasting, and Design Flood Estimation.
- Organising Secretary of the National Conference on "Role of Continuing Engineering Education in Industrial Restructuring", 4-5, February, 1995. Organised at the Centre for Continuing Education, University of Roorkee (now Indian Institute of Technology), India.
- Principle Investigator for the project funded by the All India Council for Technical Education, New Delhi in 1996 for modernising the infrastructure facilities at the Centre for Continuing Education, University of Roorkee , India. Sanctioned grant was Rs. 350,000/( Equivalent to Can$ 12,000)
- One of the Co-ordinators of the International Training Programme on " Appropriate Low cost Water Treatment Options for Rural Water Supply" 17$^{th}$ Sep.- 13$^{th}$ Oct., 2001. This programme was organised for the Sri Lankan Engineers and Nepal Engineers at the Centre for Continuing Education, Indian Institute of Technology, Roorkee and sponsored by the Asian Development Bank.
- Organising Secretary of a one-day workshop on " Sector Reform Implementation in Uttaranchal State" 17$^{th}$ January, 2002, Centre for Continuing Education, Indian Institute of Technology, Roorkee. It was an awareness workshop on the implementation of rural water supply schemes with the participation of the community as per the latest guidelines of the World Bank for granting aid to developing countries for implementing rural water supply schemes.

**Recent Activity**

- Collaborative project under progress for preparing a State-of-the-art report on Flood Routing methods with Prof. Roland Price, Emeritus Professor, UNESCO-IHE with the funding support of UNESCO-New Delhi Office
- Organisation of Indo-Italian Workshop on Impact of Climate Change and Anthropogenic Activities on Soil and Water Resources, 22nd & 23rd Oct., 2010 at Department of Hydrology, I.I.T. Roorkee
- Organised an International Conference on Hydrological Perspectives for Sustainable Development (HYPESD-2005), 23-25, February, 2005 at the Department of Hydrology, I.I.T. Roorkee, Roorkee, INDIA. I organised in the capacity of Organising Secretary. This Conference was attended by 144 participants from abroad and India.

**Research**

- Regular Visiting Scientist to Institute for Geo-Hydrological Protection Research (CNR-IRPI), National Reseach Council, Perugia, ITALY from October 10-21, 2005, December 04-15, 2006 , 09 – 24, July, 2008 and 19 – 28, September, 2009 for working in a cooperative research program in the area of "Hydrologic and hydraulic Modeling" in general and "River flow modeling and Forecasting" in particular.
- Visited IHE Delft, Netherlands from December 18-19, 2006.