Curriculum Vitae

Name: Dr. Ashish Mani Mishra (Ph.D)   **Email:** ashishmanimishra@gmail.com

Post-doc Fellow: Tel Aviv University   **Mobile:** +91-9869816620

Home Page: http://home.iitb.ac.in/~ashishmanimishra/   **Date of Birth:** 5th July 1988

Research Interest: Thermal Engineering, Fluid Mechanics, Energy Optimization, Ordinary and Partial Differential Equation, Two-Phase flow, Nonlinear Dynamics, Thermal Hydraulics

Academic Details

Examination	University	Institute	Year	CPI*/%
Ph.D.	IIT Bombay	IIT Bombay	2016	7.55*
M.Sc.	IIT Bombay	IIT Bombay	2011	7.55*
B.Sc (Phy & Maths)	Allahabad Univ.	Ewing Christian College	2009	65.11

Employment

- **Post-Doc Fellow (March. 2017-Cont.):** Working on two-phase flow modelling and simulations in a porous medium. The research work is primarily focused on carrying out simulations of flow of CO2 and water in porous media (samples are taken from oil reservoirs). The purpose of this work is to see behaviour of CO2 when sequestrated into large reservoirs.
- **Research associate (Sep. 2016-fab. 2017.):** Developed a mathematical model for thermal hydraulics of nuclear reactor and neutron kinetics. Further these two systems are coupled as a unit for predicting the thermal performance of the system.
- **Teaching Assistant (July 2009-2016):** Took various thermal engineering courses and labs on: Energy Systems Modelling and Analysis, Solar Energy Lab, Introduction to Nuclear Engineering, etc.)

Ph.D Project (Jan. 12-Oct. 2016)

Stability Analysis of Two-phase Flow in Multiple Uniformly Heated parallel Channels

Nuclear power plant often suffer with a problems like dry-out in nuclear reactor core due to imbalance burnout, mechanical failure due to vibrations, physical burnout of the material due to high heat flux, etc. The major reasons for these failures are large density and pressure wave oscillations. The objective of this work was to analyze the causes for these density and pressure variations, and propose efficient solutions for the safe operation of the plant. Apart from nuclear reactor this study can be used for other thermal systems like steam generators, two-phase flow systems, heat exchangers, etc. The mathematical model (ODEs and PDEs) for the system was developed in MATLAB. The objectives of the work can be broadly classified as:

- **Single channel with natural and forced circulation**: Developed a semi-analytical thermal hydraulic model to investigate pressure drop as well as density wave oscillations in two-phase flow system. Accordingly the optimal operating parameters range were identified for stable operation of the system.
- **Multiple inclined channel with forced circulation**: A non-linear dynamic analysis was carried out with uniform heat flux. The model developed was based on realistic assumptions in comparison to the work existing in literature. Key parameters controlling the stability of the systems were identified. Result showed vertical channel seems more stable in comparison to horizontal channel.

- **Multiple channel with natural circulation loop**: Homogenous equilibrium model was developed for natural circulation loop. Non-linear stability analysis for the system was carried out and the effects of various operating parameters were studied.

Other Projects

- **Research Seminar (July-Dec. 2011):** *Development of Method to Analyse Stability of Coupled Partial Differential Equations*
  Detailed analysis for the stability of single heated channel operating at constant pressure was developed.
- **Course Project:** *Modeling of Parabolic Trough Collector (Solar Thermal System)*
  Studied performance and characteristics of Parabolic Trough Concentrator as a function of output temperature with varying solar radiation.

Publications

Journal Papers
J1. **Ashish Mani Mishra**, Suneet Singh, "Subcritical and Supercritical bifurcations for two phase flow in a Uniformly Heated Channel with different Inclinations", International journal of Heat and Mass Transfer, 93 (2016), 235-249.
J2. **Ashish Mani Mishra**, Suneet Singh, "Non Linear Stability Analysis of Uniformly Heated Parallel Channels", Applied Thermal Engineering, 98 (2016), 1189-1200.
J3. **Ashish Mani Mishra**, Suneet Singh, "Non Linear Stability Analysis of Parallel Channels with Natural Circulation", Nuclear Eng. and Design, 309(2016), 136-150.

Conferences papers
C1. **Ashish Mani Mishra**, Subhanker Paul, Vikas pandey, Suneet Singh, "Two-Phase Flow Instability and Bifurcation Analysis of Inclined Multiple Uniformly Heated Horizontal Channels", 2015 International Congress on Advances in Nuclear Power Plants, Nice (France); 05/2015.
C2. **Ashish Mani Mishra**, Subhanker Paul, Vikas pandey, Suneet Singh, "A Comparative study of Two-Phase Flow Instability analysis of Uniformly Heated Channel having different Inclinations", 10th International Topical Meeting on Nuclear Thermal Hydraulics, Operation and Safety (NUTHOS-10); 12/2014.
C3. **Ashish Mani Mishra**, Subhanker Paul, Vikas pandey, Suneet Singh , "Two Phase Flow stability analysis of multiple horizontal uniformly heated channel", 5th International and 41st National Conference of fluid Mechanics and Fluid Power 12th-14th December, 2014, IIT Kanpur, India; 12/2014.
C4. **Ashish Mani Mishra**, Subhanker Paul, Vikas Pandey and Suneet Singh, "Two-Phase Flow Instability Analysis of Horizontal Channel using Weighted Residual Procedure", In Proc. International Congress on Advances in Nuclear Power Plants-ICAPP, Jeju Island, South Korea, Apr-2013.

Book Chapter
B1. Ashish Mani Mishra, Subhanker Paul, Vikas pandey, Suneet Singh. (2016). "Two-phase Flow Stability Analysis of Multiple Horizontal Uniformaly Heated Channel". Saha, A.K., Das, D., Srivastava, R., Panigrahi, P.K., Muralidhar, K.Fluid Mechanics and Fluid Power – Contemporary Research: Proceedings of the 5th International and 41st National Conference on FMFP 2014. : 232-235. Revision Requested, Springer proceeding

Relevant Courses

- Conduction and Radiation Heat Transfer
- Two Phase flow and Heat Transfer
- Convective Heat Transfer
- Computational Methods in Thermal & Fluid Eng.

- Analytical Methods in Engineering Applications
- Nuclear Reactor Theory
- Energy Systems Modeling and Optimization
- Nuclear Reactor Thermal Hydraulics & Safety

Presentations in Conferences

P1. An N-Node Weighted Residual Procedure for Analysis of Density Wave Oscillation in Heated
`   Channel. 5th International and 41st National Conference of fluid Mechanics and Fluid Power, Kanpur, India, 2014.
P2. Non-Linear Stability Analysis of Mathematical Models of BWR Structure. 5th International and 41st National Conference of fluid Mechanics and Fluid Power, Kanpur, India, 2014.
P3. Two Phase flow stability analysis of multiple horizontal uniformly heated channel. 5th International and 41st National Conference of fluid Mechanics and Fluid Power, Kanpur, India, 2014.
P4. A Density Fit Model for Stability Analysis of Heated Channel. In Proc. International Congress on Advances in Nuclear Power Plants-ICAPP, Jeju Island, Republic of Korea, 2013.
P5. Two-Phase Flow Instability Analysis of Horizontal Channel using Weighted Residual Procedure. In Proc. International Congress on Advances in Nuclear Power Plants-ICAPP, Jeju Island, Republic of Korea, 2013.
P6. Detailed Parametric Bifurcation Analysis of Advanced Heavy Water Reactor. In Proc. International Congress on Advances in Nuclear Power Plants-ICAPP, Jeju Island, Republic of Korea, 2013.

Conferences/Workshop Attended

- Attended Nuclear Security Training Series (NSTS-2015), Organized by WINS and funded by US Department of state at four prestigious places of USA.
- International Congress on Advances in Nuclear Power Plants & 28th KAIF/KNS Annual Conference-2013 (ICAPP-2013), at Jeju Island, South Korea.
- Advanced Nuclear Security Workshop, 6th-9th January, 2015 at PDPU Gandhi Nagar, Gujrat, India
- Indo-U.S. nuclear energy safety summit 2011 organized by ANS and Nuclear energy companies, Mumbai, India, 2011.
- Symposium on Framework for Indo-US nuclear education cooperation Organized by ANS India section in association with Department of Mechanical Engineering at Indian Institute of Technology Bombay (IITB), Mumbai, India, 2011.
- 23rd Annual Conference of Indian Nuclear Society (INSAC-2012) on "Safety in Design, Construction and Operation of Nuclear Power Plants" at Nabhikiya Urja Bhavan, Anushakti Nagar, Mumbai, India
- 24th Annual Conference of Indian Nuclear Society (INSAC-2013) on "Advances in Radiation Technology for Societal Benefits" at Nabhikiya Urja Bhavan, Anushakti Nagar, Mumbai, India
- Advance Training Programme in the Linear Algebra and Analysis-2008, at BHU, Uttar Pradesh, India

Awards and Achievements

- Received Best Office Bearer award in hostel-12 for year 2012-13 for best work as Council Member.
- Got special mention for working in Research scholar Forum at IIT Bombay, India
- Received Roll of Honor award in hostel-12 for year 2012-13 for work in hostel-12.

Computer Skills

- Software's   : Fluent, Python, Scilab, MATLAB, MATHEMATICA, MAPLE, MATCONT, EXCEL etc.
- Languages : C/C++
- OSs: Windows, Linux, Ubuntu

Position of Responsibility

- Team member of ICAER-2011 & 2013 at IITB.
- PhD representative of department 2013-1014.
- Team member of GLOBAL-TECH, 2011 IITB.
- Coordinator in the Techfest, 2012 & 2010 at IITB.

Extra-Curricular Activities and Achievements

- Won general championship for cricket in the year 2012, IIT Bombay.
- Won many awards PG sports (Athletics, Cricket, Cycling, Tennis, TT, Chess).
- Interested in trekking and photography.

Referee

1. Prof. Suneet Singh, PhD Supervisor, IIT Bombay, Phone: +91-22-2576-7843, Email: suneet.singh@iitb.ac.in

2. Prof. Rangan Banerjee, Head of the Department, IIT Bombay, Phone: +91-22-2576-7883, Email: rangan@iitb.ac.in

3. Prof. Manaswita Bose, PhD Examiner, IIT Bombay, Phone: +91-22-2576-7847, Email: manaswita.bose@iitb.ac.in

4. Prof. Arun K. Sridharan, PhD Examiner, IIT Bombay, Phone: +91-22-25767580, Email: arunsri@iitb.ac.in