Biographical Sketch of the PI: Amitabh Narain

Professor, Department of ME-EM
Michigan Technological University, Office Phone: (906) 487-2555
Houghton,MI-49931 Office Email: narain@mtu.edu

a. PROFESSIONAL PREPARATION

Indian Institute of Technology	Kharagpur, India	Aero. Engg.	B. Tech. 1978
University of Minnesota	Minneapolis, MN	Aero. Engg. and Mechanics	M.S. 1980
University of Minnesota	Minneapolis, MN	Aero. Engg. and Mechanics	Ph.D. 1983

b. APPOINTMENTS

2006 -	Professor with tenure at Michigan Technological University
1990 - 2006	Associate Professor with tenure at Michigan Technological University
1988 - 1989	Visiting Assistant Professor at University of Minnesota
1983 - 1990	Assistant Professor at Michigan Technological University
1978 - 1983	Research/Teaching Associate, Department of Aerospace Engineering and Mechanics, University of Minnesota, Minneapolis

c. PRODUCTS

(i) *Most Relevant and Recent Publications*:

1. Kivisalu, M. T., Gorgitrattanagul, P., and **Narain, A.**, "Results for High Heat-Flux Flow Realizations in Innovative Operations of Milli-Meter Scale Condensers and Boilers." *International Journal of Heat and Mass Transfer*. 2014, **75**, pp. 381-398. Read More
2. Ranga Prasad, H., **Narain, A.**, Bhasme S., and Naik, R., "Shear-driven Annular Flow-boiling in Millimeter-scale channels: Direct Numerical Simulations for Convective Component of the Overall Heat Transfer Coefficient." Accepted: *International Journal of Transport Phenomena*. 2017. Invited paper, final version submitted Nov. 2, 2016. Read More
3. Naik., R., **Narain, A.,** and Mitra, S., "Steady and Unsteady Simulations for Annular Internal Condensing Flows, Part I: Algorithm and its Accuracy." *Numerical Heat Transfer, Part B: Fundamentals*. 2016, **69**(6), pp. 473-494. Read More
4. Naik, R., and **Narain**, **A.**, "Steady and Unsteady Simulations for Annular Internal Condensing Flows, Part II: Instability and Flow Regime Transitions." *Numerical Heat Transfer, Part B: Fundamentals*. 2016, **69**(6), pp. 495-510. Read More
5. **Narain, A.,** Ranga Prasad, H., and Koca, A., "Internal Annular Flow-boiling and Flow-condensation: Context, Results, and Recommendations." *Handbook of Thermal Science and Engineering. Francis A. Kulacki. Springer*. Invited. Final draft submitted on Nov 1, 2016. Read More

(ii) *Other Significant Publications/ Products*:

6. Mitra, S., **Narain, A.**, Naik, R., and Kulkarni, S. D., "A Quasi One-Dimensional Simulation Method and its Results for Steady Annular/Stratified Shear and Gravity Driven Condensing Flows." *International Journal of Heat and Mass Transfer*. 2011, **54**(15), pp. 3761-3776. Read More
7. **Narain, A.**, Naik, R.R., Ravikumar, S., and Bhasme, S.S., "Fundamental assessments and new enabling proposals for heat transfer correlations and flow regime maps for shear driven condensers in the annular/stratified regime." *Journal of Thermal Engineering*. 2015, **1**(4), pp. 307-321. Read More
8. Kivisalu, M.T., Gorgitrattanagul, N., **Narain, A.**, Naik. R., and Hasan, M., "Sensitivity of Shear-Driven Internal Condensing Flows to Pressure Fluctuations and its Utilization for Heat Flux Enhancements." *International Journal of Heat and Mass Transfer*. 2013, **56**(1-2), pp. 758-774. Read More

9. **Narain, A.**, Ajotikar, N., Kivisalu, M., Rice, A., Zhao, M. and Shankar, N., "Obtaining Time-Varying Flow-Rates for Pulsatile Gas Flows - with Assistance from Dynamic Pressure-Difference and Mean Mass Flow-Rate Measurements." *Journal of Fluids Engineering*, Vol. 135, No. 4, 2013, pp. 041101-1 to -19. Read More

d. SYNERGISTIC ACTIVITIES

- Technical Reviewer for Grants:
  - NSF Panels: CBET (4 times)
- Symposia Organization, Session Organizer/Track Chair, Technical Committee Activities:
  - Lead Organizer for international symposium on Gas- Liquid and Phase-Change Flows at Macro- and Micro-Scales for ASME's 2009 (Orlando, FL), 2008 (Boston, MA), 2007 (Seattle, WA) and 2005 (Orlando, FL) International Mechanical Engineering Congress and Exposition conferences.
  - ASME IMECE and Summer HTD Sessions' Organizer/Track Chair: Several
  - Member: Multi-Phase Flow Committee of the ASME's Fluids Engineering Division; K-8 and K-12 committees of ASME's Heat Transfer Division; Fluid Mechanics Technical Committee ASME's Applied Mechanics Division.
  - ASME Heat Transfer Division, Theory and Fundamental Research (K8 Committee), Chair (2017) and Vice-Chair (2014-2017).
  - ASME Applied Mechanics Division, Fluid Mechanics Technical Committee, Chair (2000-2003) and Vice-Chair (1998-2000).
- MTU's Mechanical Engineering Department Activities:
  - Director of Energy and Thermo-Fluids Area
  - Member, MEEM Executive Committee
- Academic and Industrial Outreach Activities:
  - Paid consultancy for a specific production line at Procter and Gamble (January to March 2006).
  - Facilitator/Researcher as PI with industrial leaders at: Fernstrum Corp., MI, 2003- '05; EMP Inc., MI, 2005- '06); and as Co-PI with industrial leaders at: General Motors, 1999-2003.
  - Institutional Seminar/ Invited Speaker: IITs, ASME 2014, ENTECH 2014 in Istanbul, ICAME 2016 in Istanbul, etc.
  - International Short Courses (Invited): Sept. 6 – 14, 2016 at IIT-Kanpur via GIAN series of Government of India.
- Editorial and Reviewer Activities:
  - JHT Associate Editor (since)
  - Reviewer for: International Journal of Heat and Mass Transfer, International Journal of Thermal Sciences, International Journal of Non-Linear Mechanics and Analysis, Theoretical and Computational Fluid Mechanics, Chemical Engineering Communications, Journal of Heat Transfer, Journal of Applied Mechanics, Journal of Fluids Engineering, More than 40 papers for ASME Conference Proceedings and Interdisciplinary Transport Phenomena Conferences.

e. HONORS

- B. Tech. (1978), IIT-Kharagpur, First Rank Award in Aero. Engg. for each of the five years during 1973-1978. At graduation, awarded the Institute's Silver Medal for Aero. Engg.
- Fellow of ASME, 2006.
- 2013 Best Paper Award for the conference paper (co-author) in 2013 COMSOL Conference, October 9 - 11, 2013, Boston.
- Several keynote and invited presentations at international conferences and invited seminars and/or short courses at other academic institutions.