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**Summary of Accomplishments**

Steady and sustained R&D contributions to nuclear reactor thermal hydraulics and safety; innovative and skillful practice and applications of art, science and technology of thermal hydraulics with a direct impact on nuclear industry and education programs and services to international thermal hydraulics community and to the public after the Fukushima nuclear disaster.

**Education:**

- BA in Pure and Applied Sciences, the University of Tokyo, 1970.04
- MS in Nuclear Engineering, the University of Tokyo, 1972.03
- Rotary International Fellow Student at Nuclear Engineering Department of MIT, 1972.09-73.06
- Dr. of Engineering in Nuclear Engineering, the University of Tokyo, 1972.04-1977.03

**Job Experiences:**

- 1977-80 Tokyo Electric Power Co..  
He worked in BWR core management and then in the Japan Demonstration Fast Breeder Reactor Development Project.
- 1980-93 O-arai Engineering Center (OEC), Power Reactor and Nuclear Fuel Development Cooperation  
He was engaged in LMFBR thermohydraulics and safety analysis.
  - 1982/83 Visiting Scientist at Argonne National Laboratory in COMMIX code development
  - 1986/87 Visiting Scientist at Los Alamos National Laboratory in SIMMER-AFDM code development
  - From 1987, he was responsible for LMFBR safety R&D programs as section manager and later as Deputy Director of Safety Engineering Division of OEC.
- 1993 to 2012.03 Professor at Research Laboratory for Nuclear Reactors, Tokyo Institute of Technology. He has supervised 20 Ph.D. and 23 MS students in 16 years.
- 2012.04 Appointed as Professor at Dipartimento di Energia, Politecnico di Milano, Italy

He teaches nuclear reactor design and safety courses. Current topics of his work include LWR and LMFBR safety and core design, computational fluid dynamics and subchannel analysis for nuclear fuel bundle thermohydraulics, and risk-informed design of innovative nuclear reactors.

**Professional Activities:**

- Advisor on nuclear reactor safety for Japanese government including the Ministry of

Economy, Trade and Industry (METI) ~2012, Ministry of Education, Culture, Sports, Science and Technology (MEXT) ~2012, and Fire and Disaster Management Agency (FDMA).

- Chair of the International Nuclear Societies Council (INSC) for 2013-2014.
  - Associate member of Science Council of Japan.
  - Member of American Nuclear Society (ANS), Atomic Energy Society of Japan (AESJ), International Association for Hydro-Environment Engineering and Research (IAHR) and Japan Society of Mechanical Engineers (JSME).
    - **ANS Commitment:** Board of Directors (2006-2009); Chair of the ANS Thermal Hydraulics Division (THD) (2010-2011). Also he is a past member of ANS Honors and Award Committee and currently a member of International Committee and Special Committee on the Japanese Fukushima Accident. He is a past chairman of the ANS Japan Section.
    - **AESJ Commitment:** He is Chair of the International Advisory Board of Journal of Nuclear Science and Technology, Taylor & Francis.  
He was a member of the Board of Directors of AESJ from 2005 to 2007. He served Thermal Hydraulics Division and Computational Science and Engineering Division as Chairman, 2002/2003 and 2003/2004, respectively.
    - **IAHR Commitment:** He served IAHR as Section Head of Fluid Phenomena in Energy Exchanges (1995-2001) and as Chairman of Applied Hydraulics Division (2001-2005).
  - Professional Meetings: He has been and is active in leading a number of international professional societies. He has presided and/or participated in organizing:
    - Series of international seminar on subchannel analysis (ISSCA);
    - Series of International Symposia on Global Environment and Nuclear Energy System (GENES-I to IV);
    - IAHR Symposium on Flow Modeling and Turbulence Measurement;
    - Japan-Korea Nuclear Thermal Hydraulics and Safety conferences (NTHAS series) either as Technical Program Committee (TPC) Chair or as Organizing Committee Chair. He served NTHAS-8 (2012) and will do NTHAS-9 (2014) as Honorary Chair.  
He has been deeply involved in organizing the following ANS Topical Meetings on
      - Nuclear Reactor Thermal Hydraulics (NURETH); and
      - Nuclear Reactor Thermal Hydraulics, Operation and Safety (NUTHOS) as a General Organizing Committee Co-Chair of NUTHOS-6 in Nara (2004), TPC Chair of NURETH-13 in Kanazawa (2009) and General Co-Chair of NUTHOS-9 in Taiwan (2012), a member of the International Steering Committees of NUTHOS-7 in Seoul (2008) and NUTHOS-8 in Shanghai (2010), NURETH-11 in Avignon (2005), NURETH-12 in Pittsburgh (2007), NURETH-14 in Toronto (2011). He will be General Chair of NUTHOS-10 (2014) in Okinawa, Japan and General Co-Chair of NURETH-16 in Chicago, USA (2015).
    - Other conferences
- Also he has been regularly organizing a forum and sessions in ASME Fluid Engineering Division Summer Meetings (FSDM series) and giving lectures in ICONE CFD Seminars.

#### **Honors and Awards:**

- 1984 and 1986 LMBWG VSOP Best Paper Awards from Liquid Metal Boiling Working Group (JRC Ispra, KfK, CEA, UKAEA and PNC)
- 1996 Best Paper Award and FBR Award, AESJ
- 1997 Harold Jan Schoemaker Award, IAHR
- 2005 Best Paper Award, ANS THD
- 2006 Technical Contribution Award, AESJ THD
- 2008 Technical Achievement Award, AESJ CSED
- 2009 ANS Fellow
- 2010 Best Paper Award, ANS THD
- 2011 Technical Achievement Award, AESJ THD
- 2012 ANS Technical Achievement Award in Thermal Hydraulics, ANS
- 2013 NURETH Fellow, ANS and the NURETH-15 Organizing Committee

## Technical Achievement in Nuclear Thermal Hydraulics Analysis

### ■ Summary of Professional Accomplishments

Prof. Ninokata specializes in nuclear reactors thermal hydraulics (T&H) and safety with over 400 publications (including more than 100 in international journals) to his credit, advancing the state-of-the-art across a large spectrum of nuclear reactors T&H areas.

He has contributed in particular to advances in subchannel analysis and computational fluid dynamics for rod bundle thermal hydraulics (T&H) in both LMFBRs and LWRs, clarifying mechanisms of phenomena relevant to safety, with his robust methods of subchannel analysis of BWRs boiling transition, sodium boiling two-phase flows, wire-spacer modeling and advanced applications of computational fluid dynamics (CFD) for flows in tight-lattice and novel fuel bundle configurations. Also he has developed a simple neutronics-T&H coupled method for evaluation of the neutronics safety characteristics of large LMFBRs. The method is useful in enhancing passive neutronics safety features, typically expressed in terms of the self-controllability concept.

His contributions in the T&H areas are represented by development of subchannel analysis methodology for LMFBRs with the SABENA code for low pressure sodium boiling two-phase flows and for BWRs with the NASCA code, by development of the distributed resistance wire-spacer model and by recent investigations into the global flow pulsation mechanism of flows in non-symmetric channels with the use of DNS/LES/RANS.

He has contributed to advances in design-by-analysis by combining the approaches of lumped parameter plant system analysis, subchannel analysis and computational fluid dynamics (CFD); confirmed that natural circulation sodium boiling can safely remove the decay heat of LMFBRs during protected loss of heat sink accidents with the core remaining intact; and has made contributions to development of integral design Small/Medium Reactors (SMRs) including the International Reactor, Innovative and Secure (IRIS) project.

He has directed a ten year development program of the advanced subchannel analysis code NASCA from 1995 through the joint effort of two BWR vendors, BWR owners utility companies, and six universities in Japan. By featuring a generalized Boiling Transition (BT) model for a wide variety of BWR fuel bundle geometry, the code is one of the first in the world that has been able to calculate BT and post BT phenomena.

He has been invited to participate in leadership positions in organizing many of the most important T&H professional conferences organized or sponsored by ANS, ASME, AESJ, IAHR, IAEA, OECD/NEA. He has provided numerous keynote and invited lectures, seminars, and plenary sessions presentations and has chaired/co-chaired sessions in many of these international conferences. In addition, he has volunteered to initiate and preside and/or organize international forums and workshops such as ISSCA (Int. Seminar on Subchannel Analysis), IAHR Workshops on Advanced Nuclear Reactors T&H, IAHR Symposia on Refined Flow Modeling and ASME Symposium on Applications of CFD in the Fluid Engineering Division Summer Meetings.

He served or is serving as senior advisor to Nuclear Safety Commission (NSC), Japan Nuclear Industry Safety Agency (NISA), Japan Nuclear Energy Safety Organization (JNES), and Fire and Disaster Management Agency (FDMA), Japan Atomic Energy Agency (JAEA), CRIEPI, KAERI and is a member of the independent review and advisory panel for the PIRT development project of the 4S Fast Reactor of TOSHIBA. He has served IAEA as Technical Expert.