

**CURRICULUM VITAE  
OF  
KOSTADIN N. IVANOV, Ph.D.**

**PROFESSOR OF NUCLEAR ENGINEERING, NCSU, USA  
HEAD OF NUCLEAR ENGINEERING DEPARTMENT**

Professor Ivanov earned his Ph.D. degree in reactor physics from Bulgarian Academy of Sciences in 1990. Prior to joining the North Carolina State University (NCSU) in 2015, he held research and academic positions at the Pennsylvania State University (PSU), Research Center Rossendorf Inc. in Germany; Institute of Nuclear Research and Nuclear Energy in Sofia; Technical University of Sofia; and Kozloduy Nuclear Power Plants in Bulgaria. At PSU Dr. Ivanov has established Reactor Dynamics and Fuel Management Group (RDFMG) in order to address the current demands for more accurate and efficient analyses, which directly relate to safety and economic performance of current and next generations of nuclear systems. The research performed by RDFMG is in the area of developing methods and computer codes for multi-dimensional reactor core analysis. These developments include computational methods, numerical algorithms and iterative techniques, nuclear fuel management and reloading optimization techniques, reactor kinetics and core dynamics methods, cross-section generation and modeling algorithms for multi-dimensional steady-state and transient reactor calculations, and coupling three-dimensional (3-D) kinetics models with thermal-hydraulic codes. He has also led the development of multi-dimensional neutronics, in-core fuel management and coupled 3-D kinetics/thermal-hydraulic computer code benchmarks, multi-dimensional reactor transient and safety analysis methodologies as well as integrated analysis of safety-related parameters, system transient modeling of power plants, and in-core fuel management analyses. The effort has led to establishing Penn State as an international center for qualification of coupled 3-D kinetics/thermal-hydraulics codes. Dr. Ivanov's work has been published in over three hundred (300) papers in peer-reviewed journals and proceedings. He has graduated one hundred (100) MEng, sixty (60) MS and forty (40) PhD students. Dr. Ivanov has been able to maintain continuous diverse research support from international and national government agencies, national laboratories, industry, consulting companies, and other universities. He has been Principal Investigator and Co-Principal Investigator for more than ninety (90) externally supported projects in total of approximately ten million dollars of external funding. Dr. Ivanov has led ten (10) international programs supported by NEA/OECD, US NRC and US DOE. His activities in the area of teaching have been focused on introduction, improvement and teaching of undergraduate and graduate courses in the areas of nuclear reactor physics, analysis, design and safety, which are keystones of Nuclear Engineering education. He has taught in total one hundred (100) classes for resident students and forty (40) classes for continuing (distance) education over the last twenty (20) years. The curriculum for most of these classes was updated and complete lecture notes were prepared. Computer-based projects were introduced and teaching the theory was connected with computer simulation and analysis.

**PERSONAL DATA**

Date of Birth: April 20, 1956

Place of Birth: Dimitrovgrad, Bulgaria

US Citizen

**EDUCATION**

MEng (1982) – Nuclear Engineering, Moscow Institute of Power Engineering

Ph.D. (1990) – Reactor Physics, Institute of Nuclear Research and Nuclear

## **POSITIONS**

*August 16 2015 – present* – North Carolina State University, Department of Nuclear Engineering, Professor and Department Head.

*January 2012 – August 15 2015* - The Pennsylvania State University, Department of Mechanical and Nuclear Engineering, Nuclear Engineering Program, Distinguished Professor, Graduate Coordinator of Nuclear Engineering Program

*January 2011 - April 2012* – Karlsruhe Institute of Technology, Department of Mechanical Engineering, Visiting Professor - Chair of the Dynamics of Nuclear Systems Area and Head of Reactor Physics and Dynamics Group at the Institute for Neutron Physics and Reactor Technology.

*December 2007 - December 2011* - The Pennsylvania State University, Department of Mechanical and Nuclear Engineering, Nuclear Engineering Program, Distinguished Professor, Director of RDFMG

*July 2004 - November 2007* - The Pennsylvania State University, Department of Mechanical and Nuclear Engineering, Nuclear Engineering Program, Professor, Director of RDFMG

*August 1999 – June 2004* - The Pennsylvania State University, Department of Mechanical and Nuclear Engineering, Nuclear Engineering Program, Associate Professor

*August 1997 – July 1999* – The Pennsylvania State University, Department of Mechanical and Nuclear Engineering, Nuclear Engineering Program, Assistant Professor

*January 1996 - July 1997* – The Pennsylvania State University, Department of Nuclear Engineering, Research Associate

*June 1995 - January 1996* - Research Center Rossendorf Inc., Germany Institute for Safety Research, Department of Transient Analysis, Visiting Scientist

*1993 - 1995* – The Pennsylvania State University, Department of Nuclear Engineering, Visiting Research Scholar

*1987 - 1993* – Institute of Nuclear Research and Nuclear Energy, Sofia, Bulgaria, Department of Neutron and Reactor Physics, Senior Research Scientist

*1991 -1993* – Technical University of Sofia, Sofia, Bulgaria, Department of Nuclear Engineering, Assistant Professor

*1985 - 1987* - Institute of Nuclear Research and Nuclear Energy, Sofia, Bulgaria, Department of Neutron and Reactor Physics, Research Scientist

*1984 - 1985* – Kozloduy Nuclear Power Plants, Kozloduy, Bulgaria, Research Division, Physicist

*1982 - 1984* – Kozloduy Nuclear Power Plants, Kozloduy, Bulgaria, Operation Division, Nuclear Engineer

## **EXPERTISE**

Reactor physics; Development of methods and computer codes for multidimensional reactor core analysis; Nuclear fuel management and reloading optimization techniques; Reactor kinetics and core dynamics; Cross-section generation and modeling algorithms; Safety analysis and thermal-hydraulics; Coupling three-dimensional (3-D) kinetics models with thermal-hydraulic codes; Validation/verification of reactor core simulators, and uncertainty quantification and propagation.

## **TEACHING**

Basic Reactor Physics Courses, Senior Reactor Design Course, Nuclear Fuel Management, Reactor Kinetics and Dynamics, Monte Carlo Methods, Neutron Transport Theory, Fuel Performance, Verification, Validation in Scientific Computing, and Uncertainty Quantification in Multi-Physics Modeling and Simulations.

#### Description of New/Improved Courses

- Verification and Validation in Scientific Computing - Development of the curriculum and lecture notes of new graduate course
- NUCE 497I – Nuclear Fuel Performance – Development of the curriculum and lecture notes of new undergraduate elective and graduate course
- Adding global component to senior capstone design projects
- Nuclear Reactor Core Design Synthesis—Modifications of course content and updated lecture notes
- Advanced Reactor Design—Updated course content and prepared complete lecture notes
- Neutron Transport Theory—Updated course content and prepared complete lecture notes
- Nuclear Fuel Management - Updated course content and prepared complete lecture notes

New methods have been introduced in teaching graduate classes in order to familiarize students with advanced methods and computer algorithms for reactor analysis. Teaching theory and methods of advanced reactor analysis is combined with practical computer projects.

#### **PARTICIPATION AND LEADERSHIP IN INTERNATIONAL RESEARCH PROGRAMS**

1. NEA/OECD Rostov-2 VVER-1000 Multi-Physics Transient Benchmark - Member of Coordination Committee, 2018 – up to now
2. NEA/OECD TVA WB1 PWR Multi-Physics Multi-Cycle benchmark - Member of Coordination Committee, 2018 – up to now
3. Nuclear Science Committee (NSC) of the Nuclear Energy Agency (NEA), OECD, Member, 2018 – up to now.
4. Working Party on Scientific Issues of Reactor Systems (WPRS) at Nuclear Science Committee, Nuclear Energy Agency (NEA), OECD, Chair, 2018 – up to now.
5. NEA/OECD LWR UAM Scientific Board / Program Committee and Benchmark – Chair and Coordinator, 2007- up to now.
6. IAEA CRP on HTGR Reactor Physics, Thermal-Hydraulics and Depletion Uncertainty Analysis – Coordinator, 2012 – up to now.
7. Member of the NEA/OECD NSC Expert Group on Uncertainty Analysis in Modeling (UAM) – 2012 – up to now
8. Member of the NEA/OECD Expert Group on Multi-Physics Experimental data, Benchmarking and Validation (MPEBV), 2014 – up to now.
9. OECD/DOE HTR Prismatic Coupled Code Benchmark – Member of Coordination Committee, 2011 - 2015

10. OECD/NRC Oskarshamn-2 Stability Benchmark - Member of Coordination Committee, 2011-2015
11. OECD Kalinin-3 Coupled Code Benchmark – Member of Coordination Committee, 2009-2014
12. DOE International Nuclear Safety Program - Coordinator, 2000-2005
13. OECD/NRC BFBT Benchmark - Coordinator, 2004-2008
14. OECD PBMR-400 Coupled Code Benchmark - Member of Coordination Committee, 2005-2008
15. OECD/DOE/CEA VVER-1000 CT Benchmark - Coordinator, 2001-2006
16. EC/DOE CRISSUE-S Project on the State-of-the Art of the 3-D Coupled Methodologies, 2001-2003
17. OECD/NRC BWR TT Benchmark - Coordinator, 1999 –2003.
18. OECD/NRC PWR MSLB Benchmark - Coordinator, 1997 – 1999.
19. TRAC User’s Group, 1996 – 1999.
20. Cooperative Research Program Between PSU, USA and INRNE, Sofia, Bulgaria on Nuclear Reactor Transient and Accident Analysis, 1998 – 2000.
21. IAEA Research Coordinated Program on LWR Benchmark Definition for In-core Fuel Management Code Validation Related to Core Physics, 1989-1993.
22. IAEA Research Coordinated Program on Safe Core Management with Burnable Absorbers in VVER Reactors, 1989-1993.
23. International Scientific Cooperation AER on VVER Reactor Physics, 1986-1993.
24. Cooperative Research Programs Between INRNE, Sofia, Bulgaria and IPPE, Obninsk, Russia on Methods and Computer Codes for FBR Core Analysis and Numerical Investigations for Advanced FBR Core Design Optimization, 1986-1991.

## **HONORS AND AWARDS**

1. American Nuclear Society Fellow – June 2020.
2. NCSU Outstanding Global Engagement Award – April 2018.
3. Best Paper Award - Joint International Conference on Supercomputing in Nuclear Applications and Monte Carlo 2013 (SNA + MC 2013), Paris, France October 2013.
4. Renewal of Title of Distinguished Professor of Nuclear Engineering - 2012
5. US DOE Innovations in Fuel Cycle Research Award - 2010
6. Best Paper Award - International ANS Conference PHYSOR-2010, May 2010, Pittsburgh, PA, USA – 2010.
7. 2009 Penn State Engineering Society Premier Research Award
8. Title of Distinguished Professor of Nuclear Engineering, The Pennsylvania State University, 2007
9. Sabbatical Leave for the Fall Semester of 2006 - Sabbatical Leave at GRS and Technical University of Munich, Germany
10. ANS M&C 2003 Reviewer Award
11. 2003 Penn State Engineering Society Outstanding Research Award

12. 2002-2003 MNE Department Head's Outstanding Faculty Award
13. Best Paper Award, Joint International Conference on Mathematical Methods and Supercomputing for Nuclear Applications, Saratoga Springs, NY, 1997
14. Fulbright Fellowship, 1993
15. IAEA Fellowship, 1995
16. NATO Advanced Institute Fellowship, 1993

## **SERVICE TO THE PROFESSION**

Battelle Energy Alliance (BEA) Board of Mangers (BOM) and Science and Technology (S&T) Committee of Idaho National Laboratory  
Member, 2019 - present

Nuclear Engineering Department Head Organization (NEDHO)  
Member, 2015 – present  
Chair elect – 2019

Member of Advisory Board of the Department of Nuclear Engineering at Texas A&M University  
2017 – present

Member of Advisory Board of the Nuclear Engineering Program at University of Florida  
2019 – up to now

Member of NCSU COE Executive Committee  
August 2015 – present;

General Co-chair of the 2020 Best-Estimate Plus Uncertainty (BEPU) International Conference (BEPU-2020)  
2019 – present

Scientific Advisory Committee for the Laboratory for Reactor Physics and Systems Behavior at the Paul Scherrer Institute, Switzerland  
Member, 2012 – present;

Consultative Scientific Council on Energy Resources and Energy Efficiency at the Bulgarian Academy of Sciences, Bulgaria  
Member - September 2011- present;

Scientific Advisory Committee of Division of Nuclear Energy and Safety (NES) at the Paul Scherrer Institute, Switzerland  
Member, February 2017 – present;

NINE Senior Advisory Group of NINE - Nuclear and Industrial Engineering S.r.l., Lucca, Italy  
Member, 2017 - present

Editor-in-Chief  
International Journal of Nuclear Energy Science and Engineering (IJNESE)  
World Academic Publishing Company  
2012 – up to now.

Member of the Editorial Board  
Science and Technology of Nuclear Installations  
2006 – up to now.

Chair of Scientific Board of the OECD/NEA Expert Group on LWR UAM  
2007 - 2017

Member of International Expert Review Group on Attucha-2 Safety Analysis Report  
2008 - 2013

Coordinator of IAEA CRP on HTR UAM  
2012 – 2017

Member of OECD/NEA Working Party on Scientific Issues of Reactor Systems (WPRS),  
2010 - 2016

Member of ANS Reactor Physics Division Executive Committee  
2007 - 2010

Technical Co-Chair, PHYSOR-2010 Conference - Advances in Reactor Physics to Power the Nuclear Renaissance, Sheraton Station Square Hotel, Pittsburgh, Pennsylvania, USA, May 9-14, 2010.

Reviewer of DOE NEUP proposals in the area of multi-physics simulations;  
October 2010 - April 2012

Member of Scientific Advisory Committee for the Laboratory for Reactor Physics and Systems Behavior at the Paul Scherrer Institute, Switzerland;  
September 2012 – December 2017.

Member of Consultative Scientific Council on Energy Resources and Energy Efficiency at the Bulgarian Academy of Sciences, Bulgaria,  
September 2011- December 2016.

Expert Evaluator in Appointing an Associate Professor in Nuclear Reactor Safety at School of Engineering Science, Royal Institute of Technology, KTH, Sweden.  
September – November 2012.

## **INVITED GRADUATE COURSES AND LECTURES OUTSIDE PSU**

Presented Invited Lecture at the University of Pretoria, South Africa, March 2019;

Invited Presentation on NEM core model for VVER-1000 simulator, Generic Pressurized Water Reactor Simulator (GPWR) User's Group Meeting, August 2014, Center for Advanced Engineering & Research, Forest, VA.

Seminar on AP1000® Activities at PSU in Cooperation with Westinghouse Related to Undergraduate and Graduate Education, Training and Research at INRNE, Bulgaria, July 2014.

Seminar at the Karlsruhe Institute of Technology (KIT) on Non-linear Iterative Methodologies for Embedded Transport Calculations of Reactors, Karlsruhe, Germany, May 22, 2014.

One Week Course on LWR Core Design and Fuel Management, Areva Nuclear Professional School, Karlsruhe, Germany, May 2014.

Seminar on Multi-physics and Multi-scale Benchmarking and Uncertainty Quantification within NEA/OECD Framework, Argonne National Laboratory, April 23, 2014.

Seminar on SMR Core Design Optimization Methods, April 15, 2014, Holtec International, Marlton, NJ

Seminar on Advanced Deterministic and Stochastic Methods for Power Engineering Applications, Virginia Commonwealth University, February 10, 2014

Invited presentation at the Second National Congress on Physical Sciences and 41 National Conference on Physics Education Matters, Sofia, Bulgaria, 25 – 29 September, 2013.

One week course on Light Water Reactor core design and fuel management at the 2012 AREVA Nuclear Professional School, AREVA NP, Germany, December 2012.

One week course on Light Water Reactor (LWR) core feedback and transient response at the 2012 AREVA Nuclear Professional School, AREVA NP, Germany, December 2012.

One Week Course on LWR Core Design and Fuel Management within the AREVA Nuclear Professional School, AREVA NP, Germany, Fall 2011

One Week Graduate Course on Neutron Physics of Fission Reactors, Karlsruhe Institute of Technology, Germany, Fall 2011.

One Week Course on Cross-Section Generation and Nodal Core Modeling of VVER Reactors for Kozloduy NPP, Bulgaria at the Pennsylvania State University, Fall 2011.

One Week Graduate Course on Advanced Reactor Physics, North West University, South Africa, Fall 2011.

One Week Graduate Course on Reactor Physics and Theory, North West University, South Africa, Fall 2011.

One Week Graduate Course on Reactor Kinetics and Dynamics, Karlsruhe Institute of Technology, Germany, Spring 2011.

Invited Lecture on High-Fidelity Modeling for Nuclear Reactors, 2011 Frederik Joliot & Otto Hahn Summer School, Karlsruhe, Germany.

One Week Graduate Course on Advanced Reactor Physics, North West University, South Africa, Fall 2010.

One Week Graduate Course on Reactor Physics and Theory, North West University, South Africa, Fall 2010.

One Week Graduate Course on Multi-physics Multi-Scale Simulations, University of Polytechnic of Valencia, Spain, Summer 2010.

International Atomic Energy Agency (IAEA) Training Course on Neutronics, Thermal-Hydraulics and System Modeling Computer Codes, Ghana Atomic Energy Commission (GAES), National Nuclear Research Institute, Accra, Ghana, Fall 2010.

Short Course of Lectures on Reactor Physics Methods for Reactor Design and Safety Analysis, Siemens AG, Germany, Fall 2010.

Invited Lectures at the IAEA/ICTP Workshop on Nuclear Data for Advanced Reactor Technologies, Trieste, Italy, Fall 2010.

Graduate Course in High-Fidelity Multi-physics Simulations, University of Polytechnic of Valencia, Spain, Summer 2009.

Invited One Week of Lectures on Coupled Neutronics/Thermal-hydraulics Methodologies for Nuclear Reactor Design and Safety Analysis, NECSA, South Africa, Fall 2008

Invited 2 Lectures on Verification and Validation and Uncertainty Analysis in Multi-Physics Modeling, Verification and Validation for Nuclear System Analysis Workshop, INL, Summer 2008.

Graduate Course in Monte Carlo Methods and Applications in Nuclear Engineering, PBMR Ltd (Pty)/ESCOM, South Africa, Spring 2008

Graduate Course in Reactor Physics and Theory, Northwest University, South Africa, Spring 2008

Graduate Course in the Area of Reactor Kinetics/Dynamics and Uncertainty Analysis, PBMR Ltd (Pty), South Africa, Summer 2007

Graduate Course in Multi-physics Multi-scale Reactor Analysis, University of Polytechnic of Valencia,

Spain, Summer 2007.

Graduate Course in Monte Carlo Methods, Technical University of Munich, Germany, Fall 2006.

Invited Lecture on Coupled Neutronics/Thermal-Hydraulics Safety Analysis, 2006 Frederik Joliot & Otto Hahn Summer School, Cadarache, France.

Graduate Course in Coupled Best-Estimate Calculations and Associated Uncertainty Analysis, University of Polytechnic of Madrid, Spain, Summer 2006.

### **BOOKS & BOOK CHAPTERS**

M. Avramova, K. Ivanov, “*Design Basis Accident Analysis Methods for Light-Water Nuclear Power Plants*”, Chapter 11: LWR Reactivity Transients and Accidents, Modern Nuclear Energy Analysis Methods - Vol.3, Edited by R.P. Martin and C. Frepoli, World Scientific, Print ISSN: 25591-7854; Online ISSN: 2591-7862

### **JOURNAL PUBLICATIONS**

1. J. Hou, M. Avramova, K. Ivanov, “Best-Estimate Plus Uncertainty Framework for Multiscale, Multiphysics Light Water Reactor Core Analysis”, Science and Technology of Nuclear Installations Volume 2020, Article ID 7526864, 18 pages, <https://doi.org/10.1155/2020/7526864>.
2. I. Trivedi, J. Hou, G. Grasso, K. Ivanov, F. Franceschini, “Nuclear Data Uncertainty Quantification and Propagation for Safety Analysis of Lead-cooled Fast Reactors”, Science and Technology of Nuclear Installations Volume 2020, Article ID 3961095, 14 pages, <https://doi.org/10.1155/2020/3961095>.
3. K. Zeng, J. Hou, K. Ivanov, M. Jessee, “Uncertainty Quantification and Propagation of Multiphysics Simulation of the Pressurized Water Reactor Core”, Nuclear Technology, Published online: 25 March 2019, Volume 205, 2019 - Issue 12: Selected papers from the 2018 Best Estimate Plus Uncertainty International Conference (BEPU 2018).
4. G. Nyalunga, V. Naicker, K. Ivanov, “Quantification and propagation of neutronics uncertainties of the Kozloduy-6 VVER-1000 fuel assembly using SCALE 6.2.1 within the NEA/OECD benchmark for uncertainty analysis in modelling of LWRs”, Annals of Nuclear Energy, Volume 133, November 2019, Pages 732-749.
5. P. Rouxelin, G. Strydom, A. Alfonsi, K. Ivanov, “The IAEA CRP on HTGR uncertainties: Sensitivity study of PHISICS/RELAP5-3D MHTGR-350 core calculations using various SCALE/NEWT cross-section sets for Ex. II-1a”, Nuclear Engineering and Design, Volume 329, 1 April 2018, Pages 156-166.
6. L. Wang, J. Guo, F. Li, J. Hou and K. Ivanov, “Effect of Nuclear Data on Fuel Element Neutronic Characteristics of Pebble-bed High Temperature Gas-cooled Reactor,” Atomic Energy Science and Technology, 51, 9 (2017).
7. J. Hou, K. Ivanov, V. Boyarinov and P. Fomichenko, “OECD/NEA Benchmark for Time-Dependent Neutron Transport Calculations without Spatial Homogenization,” Nuclear Engineering and Design, vol 317, pp. 177-189 (2017).
8. M. Avramova and K. Ivanov, “Multi-physics modeling of nuclear reactors”, In AccessScience. McGraw-Hill Education. <https://doi.org/10.1036/1097-8542.YB150702>.
9. R. Pericas, K. Ivanov, F. Reventós, L. Batet, “Comparison of Best-Estimate Plus Uncertainty and Conservative Methodologies for a PWR MSLB Analysis Using a Coupled 3-D Neutron-Kinetics/Thermal-Hydraulic Code”, Nuclear Technology, Volume 198, 2017 - Issue 2.



10. E. Georgieva, Y. Dinkov, K. Ivanov, "Benchmarking the Real-Time Core Model for VVER-1000 Simulator Application on Asymmetric Core Load", *ASME Journal of Nuclear Rad Science* 3(3), 031005 (May 25, 2017).
11. J. Hou, K. Ivanov, V. Boyarinov, P. Fomichenko, "OECD/NEA benchmark for time-dependent neutron transport calculations without spatial homogenization", *Nuclear Engineering and Design*, Volume 317, June 2017, Pages 177-189.
12. J. Shi, S. Levine, K. Ivanov, "New techniques for designing the initial and reload cores with constant long cycle lengths", *Annals of Nuclear Energy*, Volume 99, January 2017, Pages 165-173.
13. R. Bratton, M. Jessee, W. Wieselquist, K. Ivanov, "Rod Internal Pressure Distribution and Uncertainty Analysis Using FRAPCON", *Nuclear Technology*, Volume 197, Number 1, January 2017, Pages 47-63.
14. A. Bennett, M. Avramova, K. Ivanov, "Coupled MCNP6/CTF code: Development, testing, and application", *Annals of Nuclear Energy*, Volume 96, October 2016, Pages 1-11.
15. S. Thompson, K. Ivanov, "Advances in the Pennsylvania State University NEM code", *Annals of Nuclear Energy*, Volume 94, August 2016, Pages 251-262 (2016).
16. R. Pericas, K. Ivanov, F. Reventós, L. Batet, "Code improvement and model validation for Ascó-II Nuclear Power Plant model using a coupled 3D neutron kinetics/thermal-hydraulic code", *Annals of Nuclear Energy*, Volume 87, Part 2, January 2016, Pages 366-374.
17. F. Bostelmann, G. Strydom, F. Reitsma, K. Ivanov, "The IAEA coordinated research programme on HTGR uncertainty analysis: Phase I status and Ex. I-1 prismatic reference results", *Nuclear Engineering and Design*, Volume 306, September 2016, Pages 77-88.
18. D. Sahin, K. Unlü, K. Ivanov, "Neutronic Analysis of the PSBR Using a Burnup-Coupled MCNP Simulation with MURE", *Nuclear Technology*, Volume 194, Pages, June (2016).
19. T. Ngeleka, K. Ivanov, S. Levine, "Examination and refinement of fine energy group structure for high temperature reactor analysis", Volume 80, June 2015, Pages 279-292.
20. M. Avramova, K. Ivanov, T. Kozłowski, I. Pasichnyk, K. Velkov, E. Royer, A. Yamaji, J. Gilford, "Multi-physics and Multi-Scale Benchmarking and Uncertainty Quantification within NEA/OECD Framework", *Annals of Nuclear Energy*, Special Issue on Multi-Physics Modelling of LWR Static and Transient Behavior, Invited paper, *Annals of Nuclear Energy* Volume 84, October 2015, Pages 178-196, (2015).
21. A. Ivanov, V. Sanchez, R. Stieglitz, K. Ivanov, "Large-scale Monte Carlo neutron transport calculations with thermal hydraulic feedback", *Annals of Nuclear energy* Volume 84, October 2015, Pages 204-219, (2015).
22. S. Levine, T. Blyth, K. Ivanov, "Effect of changing enrichments on core performance", *Annals of Nuclear Energy*, Volume 75, January 2015, Pages 139-145, (2015).
23. J. Hou, H. Choi, K. Ivanov, "Development of an iterative diffusion-transport method based on MICROX-2 cross section libraries", *Annals of Nuclear Energy*, Volume 77, March 2015, Pages 335-342, (2015).
24. A. Rosenkrantz, M. Avramova, K. Ivanov, R. Prinsloo, D. Botes, K. Elsekhawy, "Coupled 3D Neutronics/Thermal Hydraulics Modeling of the SAFARI-1 MTR", *Annals of Nuclear Energy*, 73, pp. 122-130 (2014).
25. E. Georgieva, Y. Dinkov, K. Ivanov, "A cycle-specific cross-section update for real-time simulation of VVER-1000 core", *Progress in Nuclear Energy*, Volume 74 (2014), pp. 222-231, (2014).

26. A. Ivanov, V. Sanchez, R. Stieglitz, K. Ivanov, "Internal multi-scale multi-physics coupled system for high fidelity simulation of light water reactors", *Annals of Nuclear Energy*, Volume 66, April 2014, Pages 104-112.
27. R. Bratton, M. Avramova, K. Ivanov, "Benchmark for Uncertainty Analysis in Modeling (UAM) for LWRs - Summary and Discussion of Neutronics Cases (Phase I)", *Nuclear Engineering and Technology (NET)* Vol. 46 No.3 June 2014, pp. 313-349, Special Issue on Neutronics Sensitivity and Uncertainty Analysis, Invited paper, (2014).
28. T. Kozłowski, A. Wysocki, I. Gajev, Y. Xu, T. Downar, K. Ivanov, J. Magedanz, M. Hardgrove, J. March-Leuba, N. Hudson, W. Ma, "Analysis of the OECD/NRC Oskarshamn-2 BWR stability benchmark", *Annals of Nuclear Energy*, Volume 67 (2014), pp. 4-12, (2014).
29. J. Hou, H. Choi, K. Ivanov, "Self-shielding models of MICROX-2 code: Review and updates", *Annals of Nuclear Energy* 64 (2014) 256–263.
30. J. Hou, H. Choi, K. Ivanov, "Assessment of MICROX-2 code with new ENDF/B-VII Release 0 master libraries", *Nuclear Technology*, Vol. 186, June 2014, pp. 305-316, (2014).
31. S. Ghrayeb, A. Ougouag, M. Ouisloumen, K. Ivanov, "Multi-group formulation of the temperature-dependent resonance scattering model and its impact on reactor core parameters", *Annals of Nuclear Energy* 63 (2014) 751–762.
32. K. Ivanov, C. Parisi, O. Cabellos, "Uncertainty Analysis in Reactor Physics Modeling", *Hindawi Publishing Corporation Science and Technology of Nuclear Installations Volume 2013*, Article ID 697057, <http://dx.doi.org/10.1155/2013/697057>, (2013).
33. A. Ivanov, V. Sanchez, R. Stieglitz, K. Ivanov, "High fidelity simulation of conventional and innovative LWR with the coupled Monte-Carlo thermal-hydraulic system MCNP-SUBCHANFLOW", *Nuclear Engineering and Design*, 262 (2013), 264 – 275.
34. M. Ellis, J. Watson, K. Ivanov, "Progress in the Development of an Implicit Steady State Solution in TRACE and PARCS", *Progress of Nuclear Energy*, 66 (2013) 1-12.
35. F. Puente Espel, M. Avramova, K. Ivanov, S. Misu, "New Developments of the MCNP/CTF/NEM/NJOY Code System - Monte Carlo Based Coupled Code for High Accuracy Modeling", *Annals of Nuclear Energy* 51 (2013), 18-26.
36. I. Clifford, K. Ivanov, M. Avramova, "A multi-scale homogenization and reconstruction approach for solid material temperature calculations in prismatic high temperature reactor cores", *Journal of Nuclear Engineering and Design*, 256 (2013) 1-13.
37. S. Levine, T. Blyth, K. Ivanov, "Understanding using the Haling Power Depletion (HPD) as a guide for designing PWR cores", *Annals of Nuclear Energy*, 53 (2013) 120-128.
38. L. Mercatali, K. Ivanov, V. Sanchez, "SCALE modeling of selected neutronics test problems within the OECD UAM LWR's benchmark", *Journal of Science and Technology of Nuclear Installations*, Hindawi Publishing Corporation, Volume 2013, Article ID 573697, 11 pages, <http://dx.doi.org/10.1155/2013/573697>.
39. C. Arenas, R. Bratton, F. Reventos, K. Ivanov, "Uncertainty Analysis of Light Water Reactor Fuel Lattices", *Journal of Science and Technology of Nuclear Installations*, Hindawi Publishing Corporation, Volume 2013, Article ID 437409, 10 pages, <http://dx.doi.org/10.1155/2013/437409>.
40. A. Gomez-Torres, V. Sanchez-Espinoza, K. Ivanov, R. Macian-Juan, "DYNSUB: A high fidelity coupled code system for the evaluation of local safety parameters – Part I: Development, implementation and verification", *Annals of Nuclear Energy* 48 (2012) 108-122.

41. A. Gomez-Torres, V. Sanchez-Espinoza, K. Ivanov, R. Macian-Juan, "DYNSUB: A high fidelity coupled code system for the evaluation of local safety parameters – Part II: Comparison of different temporal schemes", *Annals of Nuclear Energy* 48 (2012) 123–129.
42. J. Watson, K. Ivanov, "Demonstration of Implicit Coupling of TRACE/PARCS Using Simplified One-Dimensional Problems", *Nuclear Technology*, Volume 180, Number 2, November 2012, Pages 174-190.
43. K. Fazel, Q. Li, K. Ivanov, "Effects of Superconductor Electron Screening on Fusion Reaction Rates", *Fusion Science and Technology*, Volume 61, Number 1T, January 2012, Pages 469-474, 2012.
44. B. Tyobeka, A. Pautz, K. Ivanov, "Application of Time-Dependent Neutron Transport Theory to High-Temperature Reactors of Pebble Bed Type", *Nuclear Science and Engineering*: **168**, 1–22, 2011.
45. F. Puente Espel, C. Tippayakul, K. Ivanov, S. Misu, "MCOR – Monte Carlo depletion code for reference LWR calculations", *Annals of Nuclear Energy* 38 (2011) 731–741.
46. R. Mphahlele, A. Ougouag, K. Ivanov, H. Gougar, "Spectral Zones Determination for Pebble Bed Reactor Cores", *Annals of Nuclear Energy*, 38 (2011) 80–87.
47. S. Ghrayeb, M. Ouisloumen, A. Ougouag, K. Ivanov, "Deterministic modeling of higher angular moments of resonant neutron scattering", *Annals of Nuclear Energy* 38 (2011) 2291-2297.
48. S. Ghrayeb, K. Ivanov, S. Levine, E. Loewen, "Burnup Performance of Sodium-Cooled Fast Reactor by Utilizing Thorium-Based Fuels", *Nuclear Technology*, Vol. 176, Number 2, 188-194 (2011).
49. N. Kriangchaiporn, K. Ivanov, A. Haghghat, and C. F. Sears, "Transport Model based on Three-Dimensional Cross-Section Generation for TRIGA Core Analysis", *Annals of Nuclear Energy*, 37 (2010) 1254–1260.
50. M. Avramova and K. Ivanov, "Verification and Validation and Uncertainty Quantification in Multi-Physics Modeling for Nuclear Reactor Design", *Progress in Nuclear Energy*, 52 (2010) 601-614.
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#### **PATENTS, COPYRIGHTS, AND SOFTWARE SYSTEMS DEVELOPED**

"NCSU Advanced Thermal-Hydraulic Subchannel Code CTF" which was disclosed to the NCSU Office of Technology Transfer under Software Disclosure 16-249, 2016.

#### **SOFTWARE SYSTEMS DEVELOPED**

1. CTF/MCNP-6—Coupled sub-channel thermal-hydraulics/Monte Carlo neutronics code system – 2014.
2. MICXN – lattice physics code for fast gas cooled reactors - 2013
3. Coupled DeCART/COBRA-TF/BISON multi-physics analysis tool for high-fidelity calculations – 2013.
4. ITTM code – Iterative Transport ( $P_n$ ) Transport (MOC) Software for prismatic HTR core analysis – 2013.
5. Hierarchical multi-level CFD-based solver for HTR applications using OpenFOAM platform - 2013.
6. ITDM code - Iterative diffusion transport software - code for multi-group heterogeneous transport calculations – 2012.
7. MOC Code - 2-D Method of Characteristics code for lattice physics calculations – 2011.

8. RSM Code - Resonance scattering modeling for multi-group deterministic codes – 2011.
9. Diffusion/SP<sub>3</sub> OpenFoam coupled code - OpenFOAM framework as a tool for HTR multi-physics analysis – 2010.
10. MCNP/CTF/NEM/NJOY - Coupled code system for high-fidelity reference core calculations - 2010.
11. MCOR – Monte Carlo Based Depletion code for LWRs – 2010.
12. ML/TL Generator Code - Software for development of 3-D cross-section master and transient libraries for LWRs – 2008.
13. PSU-FEM - Finite Element Method Diffusion and SP<sub>3</sub> High-Fidelity Neutronics Code – 2008.
14. DORT-TD/THERMIX - A Time-Dependent Neutron Transport Theory Code Coupled with Thermal Hydraulics Code THERMIX – 2007.
15. CTF/NEM - Coupled COBRA-TF/NEM Code for Multi-Physics and Multi-Scale Reactor Analysis – 2007.
16. AFMANCC/MDLP Code Package - Code Package for Three-Dimensional Out-of-Phase Stability Analysis – 2006.
17. TRIGSIMS - Improved Monte Carlo based code package for core depletion calculations of the PSU TRIGA research reactor – 2006.
18. GARCO - Genetic Algorithm optimization package for loading pattern and burnable poison placement optimization – 2006.
19. PSU-COBRA-TF - Thermal-hydraulics sub-channel code for standalone and coupled calculations – 2005.
20. Coupled NEM/THERMIX-DIREKT computer code system - Developed for coupled safety calculations of advanced HTGRs – 2004.
21. NEM/BEM SP<sub>3</sub> code - The code couples the high-order transport model BEM with the nodal multi-group core simulator NEM for analysis of MOX cores and advanced reactors – 2004.
22. ADMARC-H - Hexagonal multi-dimensional nodal fuel management code. Developed at PSU in 1995.
23. HEXAB-3D - advanced three-dimensional few-group reactor analysis code, based on an innovative non-linear nodal method in 3D hexagonal geometry and an efficient solution scheme. Developed at INRNE, Sofia, Bulgaria in 1991.

## **SYNERJISTIC ACTIVITIES**

American Nuclear Society, 1993-Present

American Society of Mechanical Engineers, 1998-Present

European Nuclear Society, 1991-Present

New York Academy of Sciences, 1994-Present

## **RECORD IN PARTICIPATION IN SEMINARS AND WORKSHOPS**

Thirteen Workshop on	May 2019	OECD/NEA	Organizer,
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Nuclear Energy Agency/Organization for Economic Cooperation and Development (NEA/OECD) Uncertainty Analysis in Modeling (UAM-13) Benchmark, ORNL, USA			Presenter
Fourth Workshop on Nuclear Energy Agency/Organization for Economic Cooperation and Development (NEA/OECD) Time- Dependent Neutron Transport (C5-G7-TD) Benchmark Meeting	May 2019	OECD/NEA	Organizer, Presenter
EGMPEBV, NEA/OECD Kick-off Workshop on TVA WB1 Multi-Physics Multi-Cycle Benchmark, ORNL, USA	May 2019	OECD/NEA	Organizer, Presenter
EGMPEBV, NEA/OECD Second Multi-Physics Model Validation Workshop, GRS, Germany	June 2019	OECD/NEA	Organizer, Presenter
First Expert Group on Multi-physics Experimental Data, Benchmarking and Validation (EGMPEBV) Meeting	September 2014	OECD/NEA	Presenter
Prismatic Coupled Neutronics/Thermal Fluids Transient of the MHTGR-350 MW Core Design – Second Workshop	November 2014	OECD/NEA	Presenter
OECD UAM-8 Benchmark Workshop	May 2014	OECD/NEA	Organizer Presenter
OECD/NRC Oskarshamn-2 BWR Stability Third Benchmark Workshop	May 2014	OECD/NEA	Presenter
Second IAEA CRP Meeting on HTR UAM,	December 2014	IAEA	



Vienna, Austria			Presenter
First IAEA CRP Meeting on HTR UAM, Vienna, Austria	September 2013	IAEA	Presenter
Seminar at HOLTEC International on PSU activities in reactor physics and multi-physics	April 2013	HOLTEC	Presenter
Seminar at ORNL, USA on Uncertainty Analysis in Modeling	April 2013	ORNL	Organizer Presenter
OECD UAM-7 Benchmark Workshop	April 2013	OECD/NEA	Organizer Presenter
OECD Kalinin-3 Fifth Benchmark Workshop	April 2013	OECD/NEA	Organizer Presenter
OECD/NRC Oskarshamn-2 BWR Stability Second Benchmark Workshop	April 2013	OECD/NEA	Organizer Presenter
Seminar at NECSA, South Africa on ITDM Methodology	March 2013	NECSA, South Africa	Presenter
Seminar at KTH on Introduction to PSU activities in reactor physics and multi-physics	December 2012	KTH, Sweden	Presenter
Seminar at Westinghouse, Vasteras with 3 lectures on State-of-the-art in Coupled Reactor Simulations, Uncertainty Quantification in Reactor Analysis, and Next Generation Methods for Reactor Design	December 2012	Westinghouse, Vasteras, Sweden	Presenter
Invited Presentation at the Scientific Session devoted to 40 years INRNE, BAS, Bulgaria – Multi-Physics and Multi-Scale Benchmarking and Uncertainty Quantification for LWR Design and Safety	October 2012	Bulgarian Academy of Sciences	Presenter

Analysis

Seminar at Chalmers University on High Fidelity Calculations in Reactor Analysis, Sweden	September 2012	University of Chalmers	Presenter
Seminar at University Polytechnic of Catalonia, Spain - Multi-Physics Simulations with Uncertainty Quantification in Support of LWR Analysis	June 2012	University Polytechnic of Catalonia	Presenter
Invited Lecture on Coupled Neutronics/Thermal-Hydraulic Codes at THICKET-3 Seminar on Transfer of Competence, Knowledge and Experience Gained through CSNI Activities in the Field of Thermal-Hydraulics	June 2012	NEA/OECD	Presenter
OECD UAM-6 Benchmark Workshop	May 2012	OECD/NEA	Organizer Presenter
OECD Kalinin-3 Fourth Benchmark Workshop	May 2012	OECD/NEA	Organizer Presenter
OECD/NRC Oskarshamn-2 BWR Stability First Benchmark Workshop	May 2012	OECD/NEA	Organizer Presenter
Kick-of IAEA CRP Meeting on HTR UAM, ORNL, Oak Ridge, USA	April 2012	IAEA, ORNL	Organizer Presenter
Seminar at GRS, Germany on Iterative High-Order Low-Order Reactor Analysis Methodologies	December 2011	GRS, Germany	Presenter
OECD Kalinin-3 Third Benchmark Workshop	April 2011	OECD/NEA	Organizer Presenter
OECD UAM-5 Benchmark Workshop	April 2011	NEA/OECD	Organizer Presenter

OECD/NRC Oskarshamn-2 BWR Stability Start-up Benchmark Meeting	April 2011	NEA/OECD	Organizer Presenter
IAEA 3rd Consultancy Meeting to prepare for the CRP on HTGR Reactor Physics, Thermal-Hydraulics and Depletion Uncertainty Analysis, Vienna, Austria	July 2011	IAEA	Organizer Presenter
IAEA 2nd Consultancy Meeting to prepare for the CRP on HTGR Reactor Physics, Thermal-Hydraulics and Depletion Uncertainty Analysis, Prague, Czech Republic	October 2010	IAEA	Organizer Presenter
Seminar at NASA, Argentina on the Generation of Cross- section Libraries for Atucha-2 NPP Transient Simulations	August 2010	NASA, Argentina	Presenter
IAEA 1st Consultancy Meeting to prepare for the CRP on HTGR Reactor Physics, Thermal-Hydraulics and Depletion Uncertainty Analysis, Vienna, Austria	June 2010	IAEA	Organizer Presenter
Second International Verification and Validation for Nuclear Systems Analysis Workshop, Myrtle Beach, South Carolina	May 2010	Center of Advance Energy Studies; Idaho National Laboratory; Idaho State University; North Carolina State University	Presenter
OECD Kalinin-3 Second Benchmark Workshop	May 2010	OECD/NEA	Organizer Presenter
OECD UAM-4 Benchmark Workshop	May 2010	NEA/OECD	Organizer Presenter
OECD Kalinin-3 First Benchmark Workshop	April 2009	NEA/OECD	Organizer Presenter
OECD UAM-3	April 2009	NEA/OECD	Organizer

Benchmark Workshop			Presenter
Seminar at University of Pisa, Italy on Validation of Cross-Section Generation for Atucha-2	November 2008	University of Pisa	Presenter
Seminar at NECSA, South Africa on Coupled Core Methods	November 2008	NECSA	Presenter
Seminar at AREVA NP, Lynchburg on Multi-Scale Coupled Simulations	November 2008	AREVA NP	Presenter
Seminar at AREVA NP, Erlangen on Neutronics Related Activities at RDFMG	October 2008	AREVA NP	Presenter
Two Invited Presentations at the INL/DOE V&V of Nuclear System Analysis Workshop	July 2008	INL/DOE	Presenter
Invited Presentation at the 2008 German Annual Meeting of Nuclear Technology on Multi-physics Simulations	May 2008	German Nuclear Society	Presenter
PBMR/ESKOM Capacity Building Short Course on Monte-Carlo Methods and Applications	May 2008	PBMR (Pty) Ltd, South Africa	Lecturer
Seminar at the University of Karlsruhe on Multi-physics Multi-scale Methodologies	May 2008	University of Karlsruhe, Germany	Presenter
OECD UAM-2 Benchmark Workshop	April 2008	NEA/OECD	Organizer and Lecturer
OECD/NRC BFBT-5 Benchmark Workshop	April 2008	US NRC and NEA/OECD	Organizer and Lecturer
Fourth OECD PBMR-400 Coupled Code Benchmark Workshop (PBMR-4)	January 2008	NEA, OECD	Presenter
Seminar at NA-SA/ARN Meeting, Buenos Aeries, Argentina on Cross-	December 2007	NA-SA	

Section Generation for Atucha-2 NPP			Presenter
Seminar at Westinghouse, Vasteras, Sweden on NEM/CTF system	November 2007	Westinghouse	
Seminar at AREVA NP, Erlangen, Germany on Coupled Monte Carlo/COBRA-TF Calculations	November 2007	AREVA NP	Presenter
Seminar at GRS, Munich on Embedded Transport Calculations	November 2007	GRS	Presenter
Seminar on Uncertainty and Sensitivity Analysis	July-2007	PBMR (Pty) Ltd, South Africa	Presenter
One-week Seminar within the UPV, Valencia, Spain PhD Program entitled "Nuclear Technology and Safety"	June 2007	Ministry of Education and Science (MEC), Spain	Lecturer
PBMR Capacity Building Short Course on Reactor Kinetics and Dynamics	August 2007	PBMR (Pty) Ltd, South Africa	Lecturer
Invited Key Note Presentation for Track 11 at ICAPP-2007 Conference	May 2007	Conference Technical Committee	Presenter
OECD/DOE/CEA V1000CT-5 Benchmark Workshop	January 2007	OECD, US DOE and CEA	Organizer and Lecturer
OECD Uncertainty Analysis in Modeling Workshop (UAM-1)	May 2007	NEA, OECD	Organizer and Lecturer
OECD/NRC BFBT-4 Benchmark Workshop	May 2007	US NRC and NEA, OECD	Organizer and Lecturer
VVER-440 Cross-Section Workshop	April 2007	US DOE	Organizer and Lecturer Presenter
Seminar at CEA-Saclay on Data for Coupled code Systems	January 2007	CEA	
Seminar at FZK, Karlsruhe on High-	November 2007	FZK	Presenter

fidelity Multi-level  
Methods for Nuclear  
Reactor Analysis

Third OECD PBMR-400 Coupled Code Benchmark Workshop (PBMR-3)	January 2007	NEA, OECD	Organizer and Lecturer
Seminar at AREVA NP, Erlangen, Germany	November 2006	AREVA NP	Presenter
Seminar at GRS, Munich, Germany	October 2006	GRS	Presenter
Seminar at Technical University of Munich, Germany	October 2006	TUM	Presenter
2006 Frederik Joliot & Otto Hahn Summer School, Cadarache, France	August 2006	CEA, France and FZK, Germany	Lecturer
One-week Seminar within the UPM PhD Program entitled "Science and Technology of Nuclear Energy"	May 2006	Ministry of Education and Science (MEC), Spain	Lecturer
OECD/DOE/CEA V1000CT-4 Benchmark Workshop	April 2006	OECD, US DOE and CEA	Organizer and Lecturer
OECD/NRC BFBT-3 Benchmark Workshop	April 2006	US NRC and NEA, OECD	Organizer and Lecturer
OECD Uncertainty Analysis in Modeling Workshop (UAM-2006) Workshop	April 2006	NEA, OECD	Organizer
PSU Nuclear Engineering Seminar	December 2005	Department of Mechanical and Nuclear Engineering, PSU	Presenter
Second OECD PBMR- 400 Coupled Code Benchmark Workshop (PBMR-2)	January 2006	NEA, OECD	Organizer and Lecturer
Workshop on RELAP-3D Capability	August 2005	US DOE	Organizer and Lecturer
First OECD PBMR-400 Coupled Code	June 2005	NEA, OECD	Organizer and Lecturer

Benchmark Workshop  
(PBMR-1)

OECD/NRC BFBT-2 Benchmark Workshop	June 2005	US NRC NEA, OECD	Organizer and Lecturer
OECD/DOE/CEA V1000CT-3 Benchmark Workshop	April 2005	OECD, US DOE and CEA	Organizer and Lecturer
PBMR-268 Coupled Code Benchmark Workshop	March 2005	NRG/PBMR/PSU	Organizer and presenter
OECD/DOE/CEA V1000CT-2 Benchmark Workshop	April 2004	OECD, US DOE and CEA	Organizer and Lecturer
FISA Workshop on EC- US Cooperation in Nucl. Education and Safety Research	November 2003	EC	Organizer and Lecturer
UC/OSU Nuclear Engineering Seminar	October 2003	OSU	Presenter
3 <sup>rd</sup> CRISSUE-S Meeting	June 2003	EC/DOE	Presenter
VVER Cross-Section Workshop	May 2003	ANL/DOE, INSP	Organizer and Lecturer
14 <sup>th</sup> Meeting on the Physics of Pu Fuels and Innovative Fuel Cycles	May 2003	OECD/NEA	Presenter
1 <sup>st</sup> DOE/OECD/CEA V1000CT Workshop	May 2003	OECD/DOE/CEA	Organizer and Lecturer
5 <sup>th</sup> OECD/NRC BWR TT Workshop	January 2003	OECD/NRC	Organizer and Lecturer
Department of NE University of Illinois at Urbana-Champaign Seminar	November 2002	University of Illinois at Urbana-Champaign	Presenter
4 <sup>th</sup> OECD/NRC BWR TT Workshop	October 2002	OECD/NRC	Organizer and Lecturer
NEA/OECD 2 <sup>nd</sup> CRISSUE-S Meeting	September 2002	EC/DOE	Presenter
INRNE, Sofia US DOE VVER Safety Meeting	August 2002	US DOE	Organizer and Lecturer

Starter OECD/DOE VVER Workshop	May 2002	OECD/DOE	Organizer and Lecturer
3 <sup>rd</sup> OECD/NRC BWR TT Workshop	May 2002	OECD/NRC	Organizer and Lecturer
Westinghouse ABB Seminar	May 2002	Westinghouse ABB	Presenter
Polytechnic of Turin Seminar	February 2002	Polytechnic of Turin Departimento Nucleare	Presenter
University of Pisa, Italy CRISSUE-S Meeting	February 2002	EC/DOE	Presenter
FZK, Karlsruhe Seminar	October 2001	Institute for Safety Research	Presenter
2 <sup>nd</sup> OECD/NRC BWR TT Workshop	October 2001	OECD/ NRC	Organizer and Lecturer
CEA, Sac lay, France Seminar	October 2001	CEA	Presenter
First Cook NPP, USA Seminar	December 2001	First Cook NPP	Presenter
ANL- East Seminar	June 2001	ANL	Presenter
Department of NE, Purdue University Seminar	February 2001	Purdue University	Presenter
1 <sup>st</sup> OECD/NRC BWR TT Workshop	November 2000	OECD/ NRC	Organizer and Lecturer
4 <sup>th</sup> OECD/NRC MSLB Workshop	January 2000	OECD/ NRC	Organizer and Lecturer
3 <sup>rd</sup> OECD/NRC MSLB Workshop	March 1999	OECD/ NRC	Organizer and Lecturer
Ad-Hoc Meeting on MSLB Benchmark	September 1999	OECD/ NRC	Organizer and Lecturer
TRAC Users' Meeting Allentown, PA, USA	June 27-30, 1999	TRAC User Group	Organizer and Lecturer
2 <sup>nd</sup> OECD/NRC MSLB Workshop	June 1998	OECD/ NRC	Organizer and Lecturer
1 <sup>st</sup> Kinetics Workshop Parsippany, NJ	March 1997	TRAC User Group	Organizer and Lecturer



1 <sup>st</sup> OECD/NRC MSLB Workshop	April 1997	NRC/ OECD	Organizer and Lecturer
Department of NE, PSU Seminar	December, 1996	NE Department, PSU	Presenter

### **Service to the Disciplines and to the Profession**

#### 1. Organizing conferences, service on conference committees

Program Committee of the 3rd International OECD/NRC MSLB Benchmark Workshop, Garching by Munich, Germany, Member, Spring 1999 January 1999 - May 1999

Special Session of the International Conference ICONE8 Advanced Coupled Three-Dimensional-Kinetics Thermal-Hydraulics Methodologies, Organizer, November 1999-March 2000 November 1999 - March 2000

Program Committee of the 4th International OECD/NRC MSLB Benchmark Workshop, Paris, France, Member, Spring 2000 January 2000 - March 2000

Program Committee of the PSYSOR-2000 International Conference, Pittsburgh, PA, USA, Member, Spring 2000 January 2000 - May 2000

Program Committee of the 1st International OECD/NRC BWR TT Benchmark Workshop, Philadelphia, PA, USA, Co-Chair, Fall 2000. August 2000 - December 2000

Special Session of the 2001 ANS Annual Meeting and subsequent Special Issue of Nuclear Technology entitled: Numerical and Computational Aspects of the coupled 3-D Core/Plant Simulations: OECD/NRC PWR MSLB Benchmark, Organizer and Editor. September 2000-August 2001. September 2000 - August 2001

ICONE 10 International Conference, Reviewer for Track 7 Thermal-Hydraulics, Fall 2001 September 2001 - November 2001

Program Committee of the 2nd International OECD/NRC BWR TT Benchmark Workshop, PSI Switzerland, Co-Chair, Fall 2001 September 2001 - November 2001

Special Session at PHYSOR 2002 and subsequent Special Issue of Nuclear Technology entitled: Numerical and Computational Aspects of the coupled 3-D Core/Plant Simulations: OECD/NRC BWR TT Benchmark, Organizer and Editor. October 2001- November 2002 October 2001 - November 2002

Program Committee of the PSYSOR-2002 International Conference, Seoul, Korea, Member, 2001-2002 November 2001 - October 2002

PHYSOR 2002 International Conference, Reviewer for Areas Reactor Dynamics and Coupled Neutronics/Thermal-Hydraulics, January-February, 2002 January 2002 - February 2002

ANS Annual Meeting 2002, Reviewer for Reactor Physics Sessions, January-February, 2002 January 2002 - February 2002

Program Committee of the 3rd International OECD/NRC BWR TT Benchmark Workshop, Dresden, Germany, Co-Chair, Spring 2002 January 2002 - May 2002

Program Committee of the 5th International OECD/NRC BWR TT Benchmark Workshop, Barcelona, Spain, Co-Chair, Fall 2002-Spring 2003 September 2002 - February 2003

Program Committee of the 1st International OECD/DOE/CEA V1000CT Benchmark Workshop, Saclay, France, Co-Chair, Spring 2003 January 2003 - May 2003

Technical Program Committee of the ANS ANFM 2003 Conference, Member, Spring-Summer 2003  
March 2003 - August 2003

Technical Program Committee of the PHYSOR 2004 Conference, Member, Summer 2003-Spring 2004  
August 2003 - April 2004

Special Session "Coupled Neutronics/Thermal-Hydraulics Code Development and Application to Advanced Reactor Designs" at the Annual 2004 ANS Meeting, Organizer and Chair January 2004 - June 2003

Second OECD/DOE/CEA V1000CT Benchmark Workshop, Sofia, Bulgaria, Co-Chair of Organizing and Technical Committee, January 2004 - May 2004

Program Committee of the 3D SUNCOP Seminar, University Park, PA, USA, Co-Chair, Spring 2004  
January 2004 - May 2004

Third PBMR-268 Benchmark Workshop, University Park, PA, USA, Co-Chair of Organizing and Technical Committee, Summer 2004 January 2004 - June 2004

Special Session on the OECD/NRC BFBT Benchmark at NUTHOS-6 Conference, Nara, Japan, Organizer and Co-Chair, January 2004 - October 2003

First OECD/NRC BFBT Benchmark Workshop, Nara, Japan, Co-Chair of Organizing and Technical Committee, June 2004 - October 2004

Fourth PBMR-268 Benchmark Workshop, Petten, NRG, Netherlands, Co-Chair of Organizing and Technical Committee, January 2005 - March 2005

Third OECD/DOE/CEA V1000CT Benchmark Workshop, Munich, Germany, Co-Chair of Organizing and Technical Committee, January 2005 - April 2005

First OECD PBMR-400 Benchmark Workshop, Paris, France, Co-Chair of Organizing and Technical Committee, January 2005 - June 2005

Second OECD/NRC BFBT Benchmark Workshop, University Park, PA, USA, Co-Chair of Organizing and Technical Committee, January 2005 - July 2005

M&C 2005 Conference, Member of Technical Committee, Session Chair and Reviewer, January 2005 - October 2005

Workshop on RELAP-3D Capability, (on the results of Ukraine VVER Special Transient Analysis Project) Kyiv, Ukraine 1-5 August 2005, Co-Chair of Organizing and Technical Committee, May 2005 - August 2005

Second OECD PBMR-400 Benchmark Workshop, Paris, France, Co-Chair of Organizing and Technical Committee, October 2005 - February 2006

Fourth OECD/DOE/CEA V1000CT Benchmark Workshop, Co-Chair of Organizing and Technical Committee, Pisa, Italy January 2006 - April 2006

Third OECD/NRC BFBT Benchmark Workshop, Co-Chair of Organizing and Technical Committee, Pisa, Italy January 2006 - April 2006

OECD UAM-2006 Workshop, Co-Chair of Organizing and Technical Committee, Pisa, Italy January 2006 - April 2006

PHYSOR-2006 Conference, Member of Technical Committee, Session Chair and Reviewer, January 2006 - September 2006

ICAAP-2007 Conference, Member of Technical Committee, Session Chair and Reviewer, September 2006 - May 2007

Third OECD PBMR-400 Benchmark Workshop, Paris, France, Co-Chair of Organizing and Technical Committee, September 2006 - February 2007

NURETH-12 Conference, Member of Technical Committee, Session Chair and Reviewer, October 2006 - September 2007

US DOE VVER-440 Reactor Workshop, Chair of the Program and Organizing Committee, January 2007 – April 2007.

Fifth OECD/DOE/CEA V1000CT Benchmark Workshop, Co-Chair of Organizing and Technical Committee, Paris, France January 2007 - May 2007

Fourth OECD PBMR-400 Benchmark Workshop, Paris, France, Co-Chair of Organizing and Technical Committee, September 2007 - January 2008

PHYSOR-2008 Conference, Member of Technical Committee and Track Leader for Track 7 “NPP Transients”, September 2007 – September 2008

Fifth OECD/NRC BFBT Benchmark Workshop, Co-Chair of Organizing and Technical Committee, Garching near Munich, Germany, January 2008 -April 2008

OECD UAM-2 Workshop, Co-Chair of Organizing and Technical Committee, Garching near Munich, Germany, January 2008 - April 2008

Fifth OECD PBMR-400 Benchmark Workshop, Interlaken, Switzerland, Co-Chair, July 2008 - October 2008

OECD UAM-3 Workshop, Co-Chair, State College, PA, USA January 2009 - April 2009

Sixth OECD/NRC BFBT Benchmark Workshop, Co-Chair, University Park, PA, USA January 2009 - April 2009

OECD Kalinin-3 First Workshop, Co-Chair, State College, PA, USA January 2009 - April 2009

M&C 2009 Conference, Session Organizer and Member of the Organizing and Technical Committee, April 2008 to May 2009

NURETH-13 Conference, Member of the Organizing and Technical Committee, September 2008 to September 2009

ANFM-IV Conference, Member of the Organizing and Technical Committee, June 2008 to April 2009

OECD UAM-4 Workshop, Co-Chair, Pisa, Italy, January 2010 - April 2010

OECD Kalinin-3 Second Workshop, Co-Chair, Pisa, Italy January 2010 - April 2010

Technical Co-Chair, PHYSOR-2010 Conference - Advances in Reactor Physics to Power the Nuclear Renaissance, Sheraton Station Square Hotel, Pittsburgh, Pennsylvania, USA, May 9-14, 2010.

Verification and Validation for Nuclear Systems Analysis, DOE/INL Workshop II, Member of the Organizing and Technical Committee, May 24-28, 2010, Beach Cove Resort, North Myrtle Beach, SC, October 2009 - May 2010

Track Leader and Member of Technical Committee of the HTR 2010 International Conference, Prague, Czech Republic, October 18-20, 2010.

OECD Kalinin-3 Third Workshop, Co-Chair, Stockholm, Sweden January 2011 - April 2011

OECD UAM-5 Workshop, Co-Chair, Stockholm, Sweden January 2011 - April 2011

OECD/NRC Oscarshamn-2 BWR Stability Start-up Benchmark Meeting, Co-Chair, Stockholm, Sweden January 2011 - April 2011

Track Leader and Member of Technical Committee of the International Conference on Mathematics and Computational Methods applied to Nuclear Science and Engineering (MC 2011), May 8-12, 2011, Rio de Janeiro, Brazil.

OECD Kalinin-3 Fourth Workshop, Co-Chair, Karlsruhe, Germany, January 2012 - May 2012

OECD UAM-6 Workshop, Chair, Karlsruhe, Germany, January 2012 - May 2012

OECD/NRC Oscarshamn-2 BWR Stability First Benchmark Workshop, Co-Chair, Karlsruhe, Germany, January 2012 - May 2012

Track Leader, Member of Technical Committee, Session Organizer and Chair, and Reviewer of the PHYSOR 2012 conference "Advances in Reactor Physics - Linking Research, Industry, and Education", Knoxville, Tennessee, USA, April 15-20, 2012

Member of Technical Committee of the HTR 2012 International Conference, Tokyo, Japan, October 28 - November 1, 2012.

Member of International Technical Program Committee of the M&C 2013 Conference, Sun Valley Resort in Sun Valley, Idaho, May 5-9, 2013.

Member of Technical Program Committee, Workshop Organizer, and Reviewer of the 15th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-15), Pisa, Italy, May 12-16, 2013.

OECD Kalinin-3 Fifth Workshop, Co-Chair, Paris, France, January 2013 - April 2013

OECD UAM-7 Workshop, Chair, Paris, France, January 2013 - April 2013

OECD/NRC Oscarshamn-2 BWR Stability Second Benchmark Workshop, Co-Chair, Paris, France, January 2013 - April 2013

Member of International Technical Program Committee of the PHYSOR-2014 international conference "The Role of Reactor Physics towards Sustainable Future", 28 September – 4 October, 2014, Kyoto, Japan.

Track Leader of Track # 9 "Transient and Safety Analysis" and Member of Technical Committee, PHYSOR-2014 international conference "The Role of Reactor Physics towards Sustainable Future", 28 September – 4 October, 2014, Kyoto, Japan.

Member of Technical Committee, Advances in Nuclear Fuel Management V (ANFM 2015) Conference Hilton Head Island, South Carolina, USA, March 29 – April 1, 2015

Member of Technical Committee, ANS MC2015 - Joint International Conference on Mathematics and Computation (M&C), Supercomputing in Nuclear Applications (SNA) and the Monte Carlo (MC) Methods, Nashville, Tennessee, April 19–23, 2015.

OECD UAM-8 Workshop, Chair, Garching, Germany, January 2014 - May 2014

OECD/NRC Oscarshamn-2 BWR Stability Third Benchmark Workshop, Co-Chair, Garching, Germany, January 2014 - May 2014

Technical Co-Chair of the ANS BEPU2018 Conference, Lucca, Italy, 2018.

General Co-Chair of the ANS BEPU2020 Conference, Sicily, Italy, 2020.

## 2. Participation in professional and learned societies

Reviewer of the DOE NERI and NEUP Proposals - from 2001 up to now

Reviewer for the Nuclear Science and Engineering – from 2002 up to now

Reviewer of Annals of Nuclear Energy – from 2006 up to now

Reviewer of Nuclear Technology – from 2004 up to now

Reviewer of Nuclear Engineering and Design - from 2007 up to now

Reviewer of Progress in Nuclear Energy – from 2008 up to now

Member of the Technical Program Committee, Reactor Physics Division, American Nuclear Society, 2000-2003

Member of the Executive Committee, Reactor Physics Division, American Nuclear Society, 2007 - 2010

Editor of Special Issue of Nuclear Technology Journal on OECD/NRC PWR MSLB Benchmark, 2002 - 2003

Editor of Special Issue of Nuclear Science and Engineering Journal on OECD/NRC BWR TT Benchmark, 2004

Editor of Special Issue of Progress of Nuclear Energy Journal on OECD/DOE/CEA V1000CT Benchmark May 2005 - April 2006

Editor of Special Issue of Nuclear Engineering and Design Journal on OECD/NRC BFBT Benchmark September 2007 – May 2011

Editor of Special Issue of Science and Technology of Nuclear Installations Journal on Phase I of the OECD LWR UAM Benchmark – March 2012- December 2012.

Editor of Special Issue of Annals of Nuclear Energy on LWR Multi-physics, August 2013 – December 2014.