

# Guest Editorial

## Professor Igor Leonardovich Pioro on His 65th Birthday



**Professor Igor Leonardovich Pioro**

(IETHPh) and the National Academy of Sciences of Ukraine (NASCU).

After three years, he graduated with a Ph.D. thesis entitled “Maximum Heat Fluxes at Boiling of Fluids in Two-Phase Thermosyphons,” his supervisor being Academician Professor V.I. Tolubinskiy. Dr. I. Pioro then worked in various positions including junior scientist, scientist, senior scientist, and from 1986 till 1992, was a Scientific Secretary of the IETHPh. In 1992, Dr. I. Pioro successfully defended his Doctor of Technical Sciences degree entitled “Maximum Heat Transfer in Two-Phase Thermosyphon Heat Exchangers,” later leading to the publication of several new texts on this and related topics.

As a result of this new work, Dr. Pioro was invited to establish research on two-phase thermosyphons at the University of Ottawa, Canada, and in 2000, he started work at the Chalk River Laboratories, Atomic Energy of Canada Ltd. (AECL). His original researches included supercritical heat-transfer and fluid-flow analysis and experiments; while also helping to develop new international collaborations and technical exchanges with Russia, China, the EU, and Ukraine under the Canadian Generation-IV research program. Wishing to pursue more basic studies and teaching, in 2006, Dr. Pioro then joined the newly established University of Ontario Institute of Technology (UOIT) (Oshawa, Canada), Faculty of Energy Systems and Nuclear Science (FESNS) as an Associate Professor. His successful and important career at the UOIT includes serving as the first Director of the Graduate Program, Associate Dean, and, currently, as a Professor, leading research on nuclear-energy systems, having mentored his many graduate and undergraduate students (see below) to always seek new perspectives and contribute new results.

Professor I. Pioro is a member of the major professional societies, such as the ASME (from 1996), ANS (2004), Canadian NS (2010), Canadian SME (2012) and, also, he is a Fellow of the

ASME (2012), CSME (2012), and Engineering Institute of Canada (2013). In 2008, he became a Professional Engineer (Ontario), and, in 2021, was elected as a Foreign Fellow of the National Academy of Sciences of Ukraine. During 2006–2013, he was a member of the Executive Committee of the ASME Nuclear Engineering Division (NED), and within 2011–2012, he was the Chair of the Executive Committee of the ASME NED and Chair of the 20th International Conference On Nuclear Engineering (ICONE20-POWER2012). As a key contribution and professional task, he was the Founding Editor of the ASME *Journal of Nuclear Engineering and Radiation Science*, which was established in 2014 with the first issue published in January of 2015. He has propelled this Journal to become a premier publication and, currently, he is an Editor-in-Chief, having overseen the entire work, enforced standards for quality and reviews, and coordinated the publication of hundreds of high-quality papers and articles.

In addition to his many achievements and activities, during his more than 42 years of professional career, Professor Pioro has published in total more than 500 publications including: 12 technical books, 36 chapters in encyclopedias, handbooks, and books, ~100 papers in refereed journals, ~300 papers in refereed proceedings of international and national conferences and symposiums, 26 patents and inventions, and ~50 major technical reports. Of these, the book “Heat Transfer and Hydraulic Resistance at Supercritical Pressures in Power Engineering Applications” not only was the first ASME and world text on this topic, but it has also become internationally a standard reference and source. “Handbook of Generation IV Nuclear Reactors” by Elsevier published in 2016 in which Dr. I. Pioro was an editor, appeared to be the first handbook in the world fully dedicated to the next generation reactors and related topics. He pioneered and produced some key recent papers (see publications listing) on the status and directions of nuclear energy globally and of modern nuclear systems worldwide, which have been among the most read and referenced works in the field.

Also, as a professor, he has prepared 3 Ph.D., 18 M.A.Sc., and 4 M.Eng. students with projects, 15 design-project groups of five undergraduate students in each (in total: about 75 students), and hundreds of undergrad students. His former students successfully worked in various positions in the Canadian nuclear industry and abroad. Professor I. Pioro can be proud of his students, two of them became the winners of the J.S. Boyce Award (UOIT) (2020 and 2012); one Ph.D. student has received the 2018 Outstanding Doctoral Thesis; three times his students were awarded the Akiyama Medal for the best student paper at ICONE-22 (2014, Prague, Czech Republic), ICONE-20 (2012, Anaheim, CA), and ICONE-17 (2009, Brussels, Belgium). Several of his students were awarded the Canadian NS (CNS) R.E. Jervis Award (2016, 2015, 2012, and 2013); his design-project student (fourth year) has received the 2012–2013 Roy G. Post-Foundation Scholarship (USA).

Professor Igor Pioro is a well-known promoter of nuclear power around the world. He gave lectures/seminars/presentations in

many world universities, institutes, research organizations, agencies, companies, etc., including National Research Nuclear University MEPhI (Moscow, Russia) (2021 and 2020); University of Pisa (Italy) (2021); Moscow State University (Russia) (2019); Institute of Eng. Thermophysics Chinese Academy of Sciences (2019); University of Cambridge (UK) (2018); Xi'an Jiao Tong University (China) (2018); IRSN (Saclay, France) (2018); Shanghai Jiao Tong University (China) (2017); NPIC (Chengdu, China) (2017 and 2010); Westinghouse Headquarters (USA) (2015); Budapest University of Technology and Economics (BME) (Hungary) (2014); J. Stefan Institute (Slovenia) (2014); University of Ljubljana (Slovenia) (2014); Technische Universität München (Germany) (2014); Universität Stuttgart (Germany) (2014); MIT (USA) (2013); Imperial College of Science, Technology and Medicine (London, UK) (2013); Technical University of Dresden (Germany) (2012); GRS (Munich, Germany) (2012); Technical University of Vienna (Austria) (2012); Fukui University of Technology (Japan) (2011); ICTP (Trieste, Italy) Politecnico di Milano (Italy) (2011); GRNSPG (Pisa, Italy) (2011); Nuclear Research Center Rez (Czech Republic) (2011); Czech Technical University in Prague (2011); etc.

In addition, Professor I. Pioro gave a number of mass-media interviews including a video “The Chernobyl Conspiracy” on the 1986 Chernobyl NPP accident which aired on the Science Channel (SWR Media; Discovery Channel Documentary) (2019); Interview for the ASME (press on ASME J. NERS<sup>1</sup>) (2018); and others.

For his achievements within the area of nuclear engineering, he has received many awards and certificates of appreciation including Harold A. Smith Outstanding Contribution Award from CNS (2017); Honorary Doctor of the National Technical University of Ukraine “Kiev Polytechnic Institute” (2013); The CNS Education and Communication Award (2011); ICONA Award from the ASME (2009); Medal of the National Academy of Sciences of Ukraine for the best scientific work of a young scientist (1990); Badge “Inventor of the USSR” for implementation of inventions into the industry (1990), etc.

More details on Dr. I. Pioro biography is provided on the link.<sup>2</sup> The most significant scientific publications of Dr. I. Pioro are listed in the [Appendix](#) at the end of this greeting.

On the occasion of his 65th birthday, on behalf of the Journal Board, his colleagues, friends, and students all over the world, we wish Professor Igor Pioro a continuous active life in happiness and good health, and further scientific achievements!

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<sup>1</sup><http://videos.asme.org/category/videos/journals>

<sup>2</sup><https://nuclear.ontariotechu.ca/people/faculty/dr-igor-pioro.php>

## Appendix: The Most Significant Scientific Publications of Dr. I. Pioro

1. Handbook of Generation IV Nuclear Reactors, 2022, 2nd ed., I. L. Pioro, ed., Elsevier – Woodhead Publishing (WP), Duxford, UK, 1100 pages.
2. Handbook of Generation IV Nuclear Reactors, 2016, 1st ed., I. L. Pioro, ed., Elsevier – Woodhead Publishing (WP), Duxford, UK, 940 pages, accessed Oct. 26, 2021, [https://www.gen-4.org/gif/jcms/c\\_9373/publications](https://www.gen-4.org/gif/jcms/c_9373/publications); <https://www.sciencedirect.com/book/9780081001493/handbook-of-generation-iv-nuclear-reactors>
3. Pioro, L. S., Pioro, I. L., Soroka, B. S., and Kostyuk, T. O., 2010, *Advanced Melting Technologies With Submerged Combustion*, RoseDog Publication Company, Pittsburg, PA, 420 pages.
4. Pioro, I. L., and Duffey, R. B., 2007, *Heat Transfer and Hydraulic Resistance at Supercritical Pressures in Power Engineering Applications*, ASME Press, New York, 334 pages.
5. Pioro, L. S., and Pioro, I. L., 1997, *Industrial Two-Phase Thermosyphons*, Begell House, New York, 288 pages.
6. Pioro, I., Duffey, R. B., Kirillov, P. L., and Pioro, R., 2021, “Pros and Cons of Commercial Reactor Designs, Section 2: Chapter. Part 1. Current Status of Electricity Generation in the World and Selected Countries,” *Encyclopedia of Nuclear Energy*, 1st ed., E. Greenspan, ed., Elsevier, UK, pp. 263–287 (3656 pages).
7. Pioro, I., Duffey, R. B., Kirillov, P. L., and Pioro, R., 2021, “Pros and Cons of Commercial Reactor Designs, Section 2: Chapter. Part 2. Current Status and Future Trends in the World Nuclear-Power Industry and Technical Considerations of Nuclear-Power Reactors,” *Encyclopedia of Nuclear Energy*, 1st ed., E. Greenspan, ed., Elsevier, UK, pp. 288–303 (3656 pages).
8. Duffey, R. B., Pioro, I., and Pioro, R., 2021, “World Energy Production and the Contribution of PHWRs, Chapter 1. Introduction,” *The Book*, 1st ed., Vol. 7, J. Riznic, ed., Elsevier, UK, 400 pages.
9. Pioro, I., Duffey, R. B., Kirillov, P. L., and Dort-Goltz, N., 2020, “Current Status of Reactors Deployment and SMRs Development in the World,” *ASME J. Nucl. Eng. Radiat. Sci.*, **6**(4), 24 pages (One of five the most read papers in J. NERS in 2021).
10. Pioro, I. L., 2019, “Current Status of Research on Heat Transfer in Forced Convection of Fluids at Supercritical Pressures,” *Nucl. Eng. Des.*, **354**(13), 14 pages.
11. Pioro, I., Duffey, R. B., Kirillov, P. L., Pioro, R., Zvorykin, A., and Machrafi, R., 2019, “Current Status and Future Developments in Nuclear-Power Industry of the World,” *ASME J. Nucl. Eng. Radiat. Sci.*, **5**(2), 27 pages (One of five the most read papers in J. NERS in 2021 and the most accessed in 2020).
12. Pioro, I., and Duffey, R., 2015, “Nuclear Power as a Basis for Future Electricity Generation,” *ASME J. Nucl. Eng. Radiat. Sci.*, **1**(1), 19 pages (One of five the most cited papers in J. NERS).
13. Gupta, S., Saltanov, E., Mokry, S. J., Pioro, I., Trevani, L., and McGillivray, D., 2013, “Developing Empirical Heat-Transfer Correlations for Supercritical CO<sub>2</sub> Flowing in Vertical Bare Tubes,” *Nucl. Eng. Des.*, **261**, pp. 116–131.
14. Mokry, S., Pioro, I., Farah, A., King, K., Gupta, S., Peiman, W., and Kirillov, P., 2011, “Development of Supercritical Water Heat-Transfer Correlation for Vertical Bare Tubes,” *Nucl. Eng. Des.*, **241**(4), pp. 1126–1136.
15. Pioro, I., and Mokry, S., 2011, “Thermophysical Properties at Critical and Supercritical Conditions, Chapter 22 in Book “Heat Transfer,” *Theoretical Analysis, Experimental Investigations and Industrial Systems*, A. Belmiloudi, ed., Intech, Rijeka, Croatia, pp. 573–592, accessed Oct. 26, 2021, <http://www.intechopen.com/books/heat-transfer-theoretical-analysis-experimental-investigations-and-industrial-systems/thermophysical-properties-at-critical-and-supercritical-pressures>
16. Pioro, I. L., Rohsenow, W., and Doerffer, S., 2004, “Nucleate Pool-Boiling Heat Transfer—I. Review of Parametric Effects of Boiling Surface,” *Int. J. Heat Mass Transfer*, **47**(23), pp. 5033–5044.
17. Pioro, I. L., Rohsenow, W., and Doerffer, S., 2004, “Nucleate Pool-Boiling Heat Transfer—II. Assessment of Prediction Methods,” *Int. J. Heat Mass Transfer*, **47**(23), pp. 5045–5057.
18. Pioro, I., Duffey, R., and Dumouchel, T., 2004, “Hydraulic Resistance of Fluids Flowing in Channels at Supercritical Pressures (Survey),” *Nucl. Eng. Des.*, **231**(2), pp. 187–197.
19. Pioro, I. L., Groeneveld, D. C., Leung, L. K. H., Doerffer, S. S., Cheng, S. C., Antoshko, Y. V., Guo, Y., and Vasić, A., 2002, “Comparison of CHF Measurements in Horizontal and Vertical Tubes Cooled With R-134a,” *Int. J. Heat Mass Transfer*, **45**(22), pp. 4435–4450.
20. Pioro, I. L., Groeneveld, D. C., Doerffer, S. S., Guo, Y., Cheng, S. C., and Vasić, A., 2002, “Effects of Flow Obstacles on the CHF in a Vertical Tube Cooled With Upward Flow of R-134a,” *Int. J. Heat Mass Transfer*, **45**(22), pp. 4417–4433.
21. Pioro, I. L., Groeneveld, D. C., Cheng, S. C., Doerffer, S., Vasić, A. Ž., and Antoshko, Y. V., 2001, “Comparison of CHF Measurements in R-134a Cooled Tubes and the Water CHF Look-Up Table,” *Int. J. Heat Mass Transfer*, **44**(1), pp. 73–88.
22. Pioro, I. L., Cheng, S. C., Vasić, A. Ž., and Felisari, R., 2000, “Some Problems for Bundle CHF Prediction Based on CHF Measurements in Simple Flow Geometries,” *Nucl. Eng. Des.*, **201**(2–3), pp. 189–207.
23. Pioro, I. L., 1999, “Experimental Evaluation of Constants for the Rohsenow Pool Boiling Correlation,” *Int. J. Heat Mass Transfer*, **42**(11), pp. 2003–2013.
24. Pioro, I. L., Cheng, S. C., Vasić, A. Ž., and Salah, I., 1999, “Experimental Evaluation of the Limiting Critical Quality Values in Circular and Non-Circular Geometries,” *Nucl. Eng. Des.*, **190**(3), pp. 317–339.
25. Pioro, I. L., Cheng, S. C., Groeneveld, D. C., Vasić, A. Ž., Pinchon, S., and Chen, G., 1999, “Experimental Study of the Effect of Non-Circular Flow Geometry on the Critical Heat Flux,” *Nucl. Eng. Des.*, **187**(3), pp. 339–362.