

Curriculum Vitae - Pavel Povinec

(1) General

Year and place of birth: 1942, Ochodnica, Slovakia

Affiliation: Comenius University (CU), Faculty of Mathematics, Physics and Informatics (FMPI), Department of Nuclear Physics and Biophysics, Mlynská dolina F-1, 84248 Bratislava, Slovakia; **Phone:** 421 260 295544; pavel.povinec@uniba.sk

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Websites: povinec/CENTA.sk; [povinec/GOOGLE SCHOLAR](http://povinec/GOOGLE%20SCHOLAR); [povinec/RESEARCH GATE](http://povinec/RESEARCH%20GATE); SCIENTEDIRECT (Povinec); WOS (Povinec)

Education: **MSc:** Physics/Nuclear Physics, 1965, CU; **PhD:** 1973; **Assoc. Prof.:** 1977; **DrSc.:** 1983; **Professor of Physics:** 1984.

Work posts: 2005-till now: Faculty of Mathematics, Physics and Informatics (FMPI) of CU (Prof. of Physics, Head of CENTA)

1993-2005: International Atomic Energy Agency (IAEA), Monaco (Head of the Marine Radioactivity Laboratory)

1965-1992: Faculty of Natural Sciences (FNS) of CU, Faculty of Mathematics and Physics (FMP) of CU (Assistant Prof., Assoc. Prof., Professor, Head of Department of Nuclear Physics, Vice-Dean of FMP of CU.

Academic positions: Member of the Scientific Board (SB) of CU, Member of the SB of the FMPI of CU, Member of the SB of FMP of CU, Member of the SB of FNS of CU.

Fellowships and scientific visits (selected, 1-3 months/year):

1969-1970 Tata Institute of Fundamental Research, Bombay, India - fellowship

1981-1989 Joint Institute of Nuclear Research (JINR), Dubna – ARES, HYPERON and MIS projects, Head of the Bratislava group

1982-1984 Inst. of Geochemistry (GEOKHI), Moscow, Soviet Union – LUNA-16, -20, and -24 projects, Head of the Slovakia group

1990-1992 European Organization for Nuclear Research (CERN), Geneva, Switzerland – DELPHI project, Head of the Bratislava group

1990-1992 Austrian Academy of Sciences (HEPHY), Vienna, Austria – AUSTRON and DELPHI projects, Head of the Slovakia group

2000-2004 Meteorological Research Institute, Tsukuba - SHOTS project, Head of the IAEA group.

Governmental positions: Member of the Slovak Governmental Board for Science and Education, Member of the Slovak Commissions for Scientific Degrees, Member of the Project Evaluation Committee at the Science Grant Agency (VEGA), Member of the Governmental Committee for Assessment of Impacts of Nuclear Power Plants, Member of the Project Evaluation Committee at the Agency for Structural Funds of EU (ASFEU), Member of the Project Evaluation Committee at the Agency for Research and Development (APVV).

Visiting professorships (1-2 months/year): University of Tbilisi, Georgia (1975-1988); Physical-Technical Institute; Leningrad (1980-1985); University of Bologna (1990-1992); University of Roma Tre (1992); University of Heidelberg (1992); University of Padua (1991); University of Nice (1995-2005).

Membership in professional organizations: European Academy of Sciences and Arts; World Council on Isotopes; European Energy Association; IHU Commission for groundwater-seawater interactions (Vice-president, 2000-2005); International Union of Pure and Applied Chemistry (Member of the Reference Materials Committee); Slovak Physics Section (presently Slovak Physical Society) (Chairman, 1982-1990); European Physical Society (Member of the Board, 1982-1990); International Union of Pure and Applied Physics (Representant of Slovakia, 1990-1992); Union of Slovak Mathematicians and Physicists (Vice-President, 1990-1992).

Membership in international evaluation committees: EU panel on the consequences of the Fukushima accident; IAEA team for the European TC projects; IAEA team for evaluation of environmental aspects of the Fukushima accident; International team for evaluation of Fukushima projects (Japan); International team for evaluation of radioactivity of food (S. Korea); International team for evaluation of the scientific program of the Institute of Nuclear Physics of the Czech Academy of Sciences, Řež near Prague.

Honours and Awards: Slovak Republic Award Pribina Cross 1st Class, 2018; Hevesy Medal Award, 2017 (Springer, USA); Science Award of the Slovak Physical Society, 2017; Scientist of Slovakia, 2016; Award of the Slovak Literary Fond for the best citation record, 2016; PROSE Award of American Science Publishers, New York, 2014; Award of the Slovak Literary Fond for the best Scientific Book, 2014; Medal of the Slovak Physical Society, 2012; Commemorative Medal of CU, 2012; Gold Medal of the CU, 2007; Nobel Prize for Peace, Member of the IAEA team, 2005; Awards of the International Atomic Energy Agency, Vienna, 2000, 2004; Award of the Science and Technology Agency of Japan, Tokyo, 2004; Medal of the University of Tbilisi, 2003; Medal of the Food and Agricultural Organization, Rome, 2002; Award of the Commission l'Énergie Atomique, Paris, 2002; Medal of the Union of Slovak Mathematicians and Physicists, 1992; Gold Medal of the FMP of CU, 1985; Medal of the FNS of CU, 1985; Medal of the Electro-Technical Faculty of the STU, 1985; Medal of the Faculty of Nuclear and Physical Engineering of the CTU, Prague, 1985.

(2) Scientific activities

Internationally recognized expert in nuclear sciences with main scientific achievements in:

Nuclear Physics: rare nuclear processes, investigations of double beta-decays, underground nuclear physics; first determination of the half-life limit for ¹³⁶Xe double beta-decay using multielement detector (in collaboration with University of Milano), determinations of half-lives of double beta-decay of several isotopes (NEMO collaboration), investigations of decay characteristics of long-lived radionuclides, determinations of rare particle decays using accelerators.

Astrophysics: cosmogenic radionuclides in meteorites and lunar samples, determination of pre-atmospheric dimensions of meteoroids, determination of radiation ages of meteorites, studies of lunar samples from LUNA-16, LUNA-20 and LUNA-24 missions and from APOLLO-11 expedition, establishment of limits on time variations of solar cosmic-rays (CR) and time and space variations of galactic CR, search for dark matter particles, determination of first limits on masses (<2 GeV/c²) of dark matter particles (CRESST collaboration).

Environmental physics: radionuclides as tracers of environmental processes, atmosphere-hydrosphere-biosphere interactions, isotope archives for climate change studies, radioecology, environmental impacts of nuclear weapons tests, nuclear accidents; discovery of the 11-yr solar cycle of ¹⁴C in wines, establishment of the third world longest continuous ¹⁴CO₂ record in the atmosphere and its use in climate studies, assessment of the impact of Slovak nuclear power plants on the total environment (including humans), assessment of impacts of Chernobyl and Fukushima accident on the total environment, assessment of impacts of nuclear weapons tests carried out in Novaya Zemlya, Bikini and Mururoa on the total environment, applications of isotopes in groundwater studies for better understanding groundwater vulnerability and its potential utilization in the future.

Isotope oceanology: marine radioactivity, tracing seawater currents in oceans and seas, seawater-sediment and seawater-biota interactions, radionuclide contamination of oceans; worldwide marine radioactivity studies – establishment of background radionuclide levels in seawater, sediment and biota (crucial information for assessment of the Fukushima impact on the marine environment), climate change studies in the world ocean – SHOTS project (IAEA-Japan-Slovakia collaboration), submarine groundwater discharge studies for limiting groundwater losses to the sea, development of the IAEA Marine Radioactivity Information System (<https://maris.iaea.org>).

Radioanalytics: development of new low-background gas proportional counting methods (“Povinec counting method”, “Povinec multielement detector”), development of the radiocarbon dating laboratory and applications in archaeological and environmental sciences, development of multidimensional gamma-spectrometry, first *in situ* underwater gamma-spectrometry with Ge detectors for dynamic radionuclide mapping and continuous measurements with satellite data transmission, development of the underground laboratory in IAEA Monaco, as well as development of accelerator based systems (first accelerator mass spectrometry (AMS) applications in marine radioactivity studies), and recently the development of the CENTA laboratory for the state-of-the-art AMS and IBA investigations.

All the above-mentioned investigations have a common base in the development and applications of highly sensitive radiometric and mass spectrometry analytical techniques.

Supervision of recent research projects: EU (4 projects on the development of the tandem accelerator IBA and AMS laboratory), IAEA (7 projects on the environmental radioactivity), APVV (1 project on rare nuclear decays, and 1 project on the radionuclide standardization), VEGA (4 projects on radioactivity of meteorites, e.g. recent falls of Košice and Chelyabinsk meteorites, but also meteorites from the Mars and the Moon), Environmental radioactivity impact of the Fukushima accident (bilateral Japan-Slovakia), ^{14}C in sediments around dumped chemical weapons in the Baltic Sea (bilateral Lithuania-Slovakia); Isotope tracers in groundwater systems (bilateral Slovenia-Slovakia).

Ongoing participation in international underground experiments and other projects (Head of the Slovakia group):

Supernemo: search for neutrinoless double beta-decay of ^{82}Se and other isotopes (the best half-life limit of 10^{24} yr) using tracking-calorimetry techniques in the Modane (France) underground laboratory, www.supernemo.org;

LEGEND: search for neutrinoless double beta-decay of ^{76}Ge using 200 kg and 1000 kg of Ge detectors in the Gran Sasso (Italy) and SNOLab (Canada) underground laboratories (the biggest global experiment with the expected best half-life limit of 10^{26} yr), www.legend-exp.org;

CRESST: cryogenic rare event search for dark matter particles using superconducting thermometers in the Gran Sasso underground laboratory (the best limit for masses $<2 \text{ GeV}/c^2$), <https://www.lngs.infn.it/cresst>;

BETA-Zr: Investigations of single beta-decay of Zr-96 and double beta-decays of ^{94}Zr and ^{96}Zr in the HADES (Geel, Belgium) underground laboratory – bilateral collaboration between EC and Comenius University in Bratislava;

CELLAR: Collaboration of European low-level underground laboratories.

Ring of Five (RoF) – European network for atmospheric radioactivity (coordinated by CRNS, Paris).

Supervision of national participation in past international projects: Fukushima marine radioactivity assessment and food control (EC, Brussels), Experiment EURECA for dark matter search (KIT, Karlsruhe), Single and double beta decay Q-value measurement of ^{96}Zr (Univ. Muenster), South Hemisphere Ocean Tracer Studies – SHOTS (MRI, Tsukuba), AUSTRON - An Interdisciplinary Research Centre, Central European Initiative (Austrian Academy of Sciences, Vienna), Experiment XENON on double beta-decay search in ^{136}Xe (Gran Sasso Underground Laboratory, Univ. Milano), Experiments DELPHI and EAGLE/ATLAS (CERN, Geneva), Experiment SDC (LBL, Berkeley), Experiments ARES, HYPERON and MARS in JINR, Dubna.

Supervision of Radioactivity assessment projects in IAEA Monaco: Arctic Seas, Radioactive Dump Sites in Far Eastern Seas and in the Sea of Japan, NE Atlantic Dump Site, Radiological assessment of the Atolls of Mururoa and Fangataufa Atols.

Supervision of IAEA Co-ordinated Research Projects: El Niño and climate change studies, Submarine groundwater discharge studies, Worldwide marine radioactivity studies, Marine radioactivity doses from consumption of seafood.

Supervision of IAEA Collaboration Projects: ATOMS-Med, UN Atlas of Oceans.

Supervision of the development of IAEA Reference Materials: 13 projects on radionuclides in seawater, sediment and marine biota.

Supervision of IAEA participation in oceanic cruises: SGD in Mauritius, BEAGLE Global Ocean Expedition, SGD in Brazilian coastal waters, Southern Ocean ANTARES IV expedition, Indian Ocean transect, Arabian Sea, NE Atlantic dumping sites, IAEA/97 Pacific Ocean expedition, IAEA/CEA Mururoa/Fangataufa expedition, Japanese-S. Korean-Russian expedition to the dumping sites in the Far Eastern Seas.

IAEA expert: environmental radioactivity, radiometric techniques, mass spectrometry techniques, development of reference materials, development of databases (expert missions to 22 countries).

Publications: 410 papers listed in WOS (Sept. 2021), 5470 citations (without auto-citations), $h = 44$; 366 papers listed in SCOPUS (Sept. 2021), 8160 citations, $h = 46$; over 800 papers listed in Google Scholar, 12 450 citations (without CERN publications), $h = 57$.

List of books

1. Povinec, P. P., Hirose, K., Aoyama, M., Y. Tateda: Fukushima Accident: 10 years after, Elsevier, New York, 2021, 559p.
2. Povinec, P. P., Hirose, K., Aoyama, M. Fukushima Accident: Radioactivity Impact on the Environment, Elsevier, New York, 2013, 385p.
3. Povinec, P.P. (Ed.): Analysis of Environmental Radionuclides, Elsevier, Amsterdam, 2008, 532p.
4. Povinec, P.P. et al.: Worldwide Marine Radioactivity Studies (WOMARS). *Radionuclide Levels in Oceans and Seas*. IAEA, Vienna, 2005, 186p.
5. Povinec, P.P., Gayol, J., Togawa, O., Honda, T.: *Global Marine Radioactivity Database (GLOMARD)*. IAEA, Vienna, 2001, 51p.
6. Povinec, P.P. et al., *Radioactivity in the Arctic Seas*. IAEA, Vienna, 1999, 71p.
7. Gonzales, A., ..., Povinec, P.P. et al.: *The Radiological Situation of the Atolls of Mururoa and Fangataufa*. IAEA, Vienna, 1998, 282p.
8. Povinec, P.P. et al.: *The Radiological Situation of the Atolls of Mururoa and Fangataufa. Radionuclide Concentrations Measured in the Aquatic Environment of the Atolls*. Vol. 2, IAEA, Vienna, 1998, 118p.
9. de Geer, L.-E., ..., Povinec, P.P. et al.: *The Radiological Situation of the Atolls of Mururoa and Fangataufa. Inventory of Radionuclides Underground at the Atolls*. Vol. 3, IAEA, Vienna, 1998, 94p.
10. Fairhurst, C., ..., Povinec, P.P. et al.: *The Radiological Situation of the Atolls of Mururoa And Fangataufa. Releases to the Biosphere of Radionuclides from Underground Nuclear Weapons Tests at the Atolls*. Vol. 4, IAEA, Vienna, 1998, 270p.

11. Mittelstaedt, E., ...**Povinec, P.P.** et al.: *The Radiological Situation of the Atolls of Mururoa And Fangataufa. Transport of Radioactive Material in the Marine Environment*. Vol. 5. IAEA, Vienna, 1998, 140p.
12. Levins, D.M.... **Povinec, P.P.** et al.: *The Radiological Situation of the Atolls of Mururoa and Fangataufa. Doses Due to Radioactive Materials Present in the Environment or Released from the Atolls*. Vol. 6, IAEA, Vienna, 1998, 52p.
13. Sjöblom, K., ..., **Povinec, P.P.**, et al.: *Radiological Conditions of the Western Kara Sea*. IAEA, Vienna, 1998, 124p.
14. **Povinec, P.P.** et al. *Sources of Radioactivity in the Marine Environment and their Relative Contribution to Overall Dose Assessment from Marine Radioactivity* (MARDOS). IAEA, Vienna, 1995, 54p.

List of book chapters:

1. Hong G.H., **Povinec P.P.**: The Oceans—Formation and Global Climate Change. In: The Elsevier Encyclopaedia on Nuclear Energy, Ed. E. Greenspan, Elsevier, New York, 2021.
2. Hong G.H., **Povinec P.P.**: The Oceans—Implications of Manmade Radiation. In: The Elsevier Encyclopaedia on Nuclear Energy, Ed. E. Greenspan, Elsevier, New York, 2021.
3. **Povinec P.P.**, M. Eriksson, J. Scholten, M. Betti: Marine Radioactivity Analysis. In: Handbook of Radioactivity Analysis, Ed. M. Annunziata, Academic Press, New York, 2020, pp. 315-392.
4. Jeřšovský M., Kaizer J., Kontuř I., Lujaniene G., Mullerová M., **Povinec P.P.**: Analysis of environmental radionuclides. In: Handbook of Radioactivity Analysis, Ed. M. Annunziata, Academic Press, New York, 2020, pp. 137-261.
5. **Povinec P.P.**, K. Hirose: Radionuclides as Tracers of Ocean Currents. In: Encyclopaedia of Sustainability of Science and Technology, Springer, New York, 2020.
6. **Povinec, P.P.**: Indian Ocean. In: Encyclopaedia of Inorganic Chemistry. Radionuclides in the Environment, Wiley, New York, 2010.
7. Burnett, W.C., ..., **Povinec PP** et al., Quantifying submarine groundwater discharge in the coastal zone via multiple methods. In: Nuclear and Isotope Techniques for the Characterization of Submarine Groundwater Discharge in Coastal Zones. IAEA-TECDOC-1595, Vienna, 9-66, 2008.
8. Sanchez-Cabeza, J.A., ...**Povinec, P.P.** et al. Analyses at Marine Environmental Laboratories (IAEA-MEL) in Monaco. In: Blue Earth Global Expedition 2003 (BEAGLE2003), Vol. 3, JAMSTEC, Yokosuka, 27-36, 2007.
9. Aoyama, M. ...**Povinec, P.P.** et al. Preliminary results of ¹³⁷Cs and Pu isotopes in surface waters. In: Blue Earth Global Expedition 2003 (BEAGLE2003), Vol. 3, JAMSTEC, Yokosuka, 40-43, 2007.
10. Dovlete, C., **Povinec, P.P.** Quantification of uncertainty in gamma-spectrometric analysis of environmental samples. In: Quantifying uncertainty in nuclear analytical measurements. IAEA, Vienna, 107-140, 2004.
11. De Regge, P., **Povinec, P.P.** Sample preparation for radionuclide analysis and nuclear analytical techniques in sediments and soils in the IAEA laboratories. In: Collection and preparation of bottom sediment samples for analysis of radionuclides and trace elements. IAEA, Vienna, 95-121, 2003.

IAEA and international reports: 60

Associate Editor of international journals: Radiocarbon (Cambridge Univ. Press), J. Analytical Science and Technology (Springer).

Member of editorial boards of international journals: Scientific Reports/Nature, Journal of Environmental Radioactivity (Elsevier), TheScientificWorldJournal (Hindavi), Frontiers in Energy (Springer), Helion (Elsevier).

Editor of books and IAEA Reports: 11

Editor of Special Issues of journals: 16

Organization of international conferences: 18 (including ENVIRA, IAEA conferences, Nucl. Physics, Low Radioactivities, etc.)

Organization and chairing of sessions at international conferences: 19

Member of Scientific Boards of international conferences: 26

Invited talks at international conferences: 48

Editor of Conference Proceedings: 17

Organization of IAEA Research Coordination Meetings: 24

(3) Pedagogical activities

University courses for undergraduate and graduate studies in Nuclear physics and in Environmental physics: Nuclear physics – Physics of radioactive nuclei; Rare nuclear processes; Low-radioactivity measurement techniques; Applied nuclear physics; Radioanalytical methods; Environmental radioactivity; Environmental physics; Isotope tracers in the environment; Physics and ecology; Protection of the total environment; Diploma seminar; Nuclear physics seminar; English physics seminar.

Training schools/courses:

Training Course on Modelling Marine Radiotracers, Tunis (Tunisia), 2005.

Climate Variability Studies in the Ocean: Response of Oceans and Seas to Climate Change, ICTP Trieste (Italy), 2004 (together with F. Molteni and A. Bracco, ICTP Trieste).

Climate Variability Studies in the Ocean: Tracing and Modelling the Ocean Variability, ICTP Trieste (Italy), 2003 (together with F. Molteni, ICTP Trieste).

International School on the Use of Isotope Techniques in Marine Environmental Studies, Athens (Greece), 1996.

Nuclear Energy and the Environment, Bratislava, Comenius University, 1980-1984.

Thesis supervision: 26 PhD students supervised, thesis completed and defended (at the Comenius University and at the University of Nice), 2 in progress; **20 diploma works** (MSc) supervised, completed and defended.

Supervision of postdoctoral fellows (2), visiting scientists (5) and IAEA trainees (15).

Chairman and member of committees for defence of PhD (CSc.) and MSc thesis at the Comenius University (Physics, Nuclear physics, Applied physics, Radiochemistry, Environmental physics).

Chairman and member of committees for defence of DrSc. thesis in Czechoslovakia and Slovakia: Experimental physics, Applied physics, Radiochemistry).

Member of committees for defence of PhD at foreign universities: Univ. of Nice, Univ. of Jyväskylä, Czech Tech. Univ. in Prague, Josef Stefan Inst., Ljubljana, Univ. of Padova, Univ. of Roma, etc.

Member of committees for defence of Assoc. Professor and Professor Thesis: Comenius University, Slovak Technical University in Bratislava, University of Arizona at Tucson (USA), University of Honolulu (USA), Technical University of Denmark, Czech Technical University in Prague, Josef Stefan Institute in Ljubljana, etc.