

CURRICULUM VITAE

Family name: **Toivonen**
 First name: **Harri**
 Date of birth: **23.11.1952**
 Nationality: **Finnish**
 Civil status: **Married**

Education:

Institution	Degree(s) or Diploma(s) obtained:
Technical University of Helsinki, 1976-1980	PhD (DTech, nuclear physics)
Technical University of Helsinki, 1971-1976	MSc (nuclear physics)

Language skills (1 - excellent; 5 - basic):

Language	Reading	Speaking	Writing
Finnish	1	1	1
English	1	1	1
German	2	3	3
Swedish	2	3	3
Russian	4	5	5

Membership of professional bodies:

Year	Specification
2013 -	Radiological and Nuclear Threats to Critical Infrastructure, ERNCIP Thematic Group, European Commission, Leader of "Remote expert support of field teams"
2011-2012	Member of the Steering Committee of the SUOJA/CBRNE Network led by the Finnish Defence Forces
2010 -2014	Chair of EU ESARDA WG for Novel Approaches and Novel Technologies
2007-2011	Contact person in the Framework Partnership Agreement between European Commission and STUK in programme "Prevention and Fight against Crime", 2007-2011.
2007	Advisor of the International Atomic Energy Agency (IAEA). Security related field mission in Rio de Janeiro, 2007.
1995-1997	Verification of the Comprehensive Nuclear Test-Ban Treaty (CTBT). Member of the Finnish delegation in Treaty negotiations, 1995 - 1996.

Other skills:

Reachback services, Linux, Matlab.

Present position:

CEO

HT Nuclear Ltd, since 2015

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Years within the firm: 0 (35 for STUK)

Key qualifications:

- nuclear security
- nuclear security detection architecture
- analysis of nuclear threats
- emergency preparedness
- reachback services: databases and communication
- mobile radiation detection
- R&D of novel technologies for security and safeguards
- analysis algorithms in spectrometry

Specific experience:

Country	Date: from (month/year) to (month/year)
Task Leader ERNICIP thematic group for radiological and nuclear threats to critical infrastructure	2013 – 2015 (*)
Consultant to IAEA for the preparation of Nuclear Security Series publications (NSS15, NSS18, NSS21, etc)	2006 - 2015
Nordic Countries	Several joint R&D programmes and field exercises, Neutron measurement campaigns, 2013 -2414

(*) Major Publication:

Remote expert support of field teams - Reachback services for nuclear security

<https://erncip-project.jrc.ec.europa.eu/download-area/viewcategory/9-radiological-and-nuclear-threats>

Professional Experience Record:

Date	Location	Company	Position	Description
2015-	Hyvinkää	HT Nuclear	CEO	Security Consulting
2014-2015	Helsinki	STUK	Senior Expert	Security Technology
2007-2014	Helsinki	STUK	Head of Laboratory	Security Technology
2002-2006	Helsinki	STUK	Head of Laboratory	Airborne Radioactivity
1997-2002	Vienna	CTBTO	Evaluation Officer	Treaty Verification
1992-1997	Helsinki	STUK	Head of Laboratory	Airborne Radioactivity
1989-1991	Helsinki	STUK	Advisor of Director General	Administration
1986-1988	Helsinki	STUK	Senior scientist	Radiobiology
1985-1986	Chilton	NRPB, UK	Visiting scientist	Aerosol Physics
1983-1984	Helsinki	Helsinki University Hospital	Hospital physicist	Clinical Work and Research
1976-1983	Helsinki	STUK	Scientist	Radiobiology

Peer Reviewed Publications (Scopus):

1. Sand, J., Ihantola, S., Peräjärvi, K., Toivonen, H., Toivonen, J.
[Imaging of alpha emitters in a field environment](#)
(2015) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 782, pp. 13-19.
2. Holm, P., Peräjärvi, K., Ristkari, S., Siiskonen, T., Toivonen, H.
[A capture-gated neutron spectrometer for characterization of neutron sources and their shields](#)
(2014) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 751, pp. 48-54.
3. Peräjärvi, K., Turunen, J., Ihantola, S., Sipilä, H., Toivonen, H.
[Feasibility of conversion electron spectrometry using a Peltier-cooled silicon drift detector.](#)
(2014) *Journal of Radioanalytical and Nuclear Chemistry* 299 (1), pp. 229-234
4. Sand, J., Ihantola, S., Peräjärvi, K., Toivonen, H., Toivonen, J.
[Radioluminescence yield of alpha particles in air](#)
(2014) *Source of the Document New Journal of Physics* 16, 053022
5. Peräjärvi, K., Eronen, T., Gorelov, D., Turunen, J., Äystö, J.
[Production of pure ^{133m}Xe for CTBTO](#)
(2014) *Hyperfine Interactions* 223 (1-3), pp. 239-243
6. Ihantola, S., Toivonen, H., Moring, M.
[La-140/Ba-140 Ratio Dating of a Nuclear Release](#)
(2014) *Journal of Radioanalytical and Nuclear Chemistry. Nuclear Chemistry 2013*. DOI: 10.1007/s10967-013-2504-0
7. Ihantola, S., Sand, J., Peräjärvi, K., Toivonen, J., Toivonen, H.
[Fluorescence-assisted gamma spectrometry for surface contamination analysis](#)
(2013) *IEEE Transactions on Nuclear Science*, 60 (1), art. no. 6414615, pp. 305-309.
8. Holm, P., Peräjärvi, K., Sihvonen, A.-P., Siiskonen, T., Toivonen, H.
[Neutron detection with a NaI spectrometer using high-energy photons](#)
(2013) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 697, pp. 59-63.
9. Peräjärvi, K., Eronen, T., Cagniant, A., Gorelov, D., Hakala, J., Jokinen, A., Kankainen, A., Kettunen, H., Kolhinen, V.S., Laitinen, M., Moore, I.D., Penttilä, H., Rissanen, J., Saastamoinen, A., Toivonen, H., Turunen, J., Äystö, J.
[Production of pure samples of ^{131m}Xe and ¹³⁵Xe](#)
(2013) *Applied Radiation and Isotopes*, 71 (1), pp. 34-36.
10. Ihantola, S., Sand, J., Peräjärvi, K., Toivonen, J., Toivonen, H.
[Principles of UV-gamma coincidence spectrometry](#)
(2012) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 690, pp. 79-84.
11. Turunen, J., Ihantola, S., Peräjärvi, K., Toivonen, H.
[Comprehensive radioassays of samples using the PANDA device](#)
(2012) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 678, pp. 78-82.
12. Peräjärvi, K., Eronen, T., Gorelov, D., Hakala, J., Jokinen, A., Kettunen, H., Kolhinen, V., Laitinen, M., Moore, I.D., Penttilä, H., Rissanen, J., Saastamoinen, A., Toivonen, H., Turunen, J., Äystö, J.
[Production of pure ^{133m}Xe for CTBTO](#)
(2012) *Hyperfine Interactions*, pp. 1-5. Article in Press.
13. Pöllänen, R., Siiskonen, T., Ihantola, S., Toivonen, H., Pelikan, A., Inn, K., La Rosa, J., Bene, B.J.
[Determination of ²³⁹Pu/ ²⁴⁰Pu isotopic ratio by high-resolution alpha-particle spectrometry using the ADAM program](#)
(2012) *Applied Radiation and Isotopes*, 70 (4), pp. 733-739.
14. Konki, J., Greenlees, P.T., Jakobsson, U., Jones, P., Julin, R., Juutinen, S., Ketelhut, S., Hauschild, K., Kontro, R., Leppänen, A.-P., Lopez-Martens, A., Mattila, A., Nieminen, P., Nyman, M., Peräjärvi, K., Peura, P., Rahkila, P., Ruotsalainen, P., Sarén, J., Scholey, C., Sorri, J., Toivonen, H., Turunen, J., Uusitalo, J.
[Comparison of gamma-ray coincidence and low-background gamma-ray singles spectrometry](#)

(2012) *Applied Radiation and Isotopes*, 70 (2), pp. 392-396.

15. Pöllänen, R., Siiskonen, T., Ihantola, S., Toivonen, H., Pelikan, A., Inn, K., La Rosa, J., Bene, B.
[Activity determination without tracers in high-resolution alpha-particle spectrometry](#)
(2011) *Journal of Radioanalytical and Nuclear Chemistry*, 290 (3), pp. 551-555. .
16. Ihantola, S., Pelikan, A., Pöllänen, R., Toivonen, H.
[Advanced alpha spectrum analysis based on the fitting and covariance analysis of dependent variables](#)
(2011) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 656 (1), pp. 55-60.
17. Turunen, J., Ihantola, S., Peräjärvi, K., Pöllänen, R., Toivonen, H., Hrncek, E.
[Collection and behaviour of radon progenies on thin Mylar foils](#)
(2011) *Radiation Measurements*, 46 (6-7), pp. 631-634.
18. Peräjärvi, K.A., Ihantola, S., Pöllänen, R.C., Toivonen, H.I., Turunen, J.A.
[Determination of ²³⁵U, ²³⁹Pu, ²⁴⁰Pu, and ²⁴¹Am in a nuclear bomb particle using a position-sensitive \$\alpha\$ - \$\gamma\$ Coincidence technique](#)
(2011) *Environmental Science and Technology*, 45 (4), pp. 1528-1533.
19. Peräjärvi, K., Eronen, T., Elomaa, V.-V., Hakala, J., Jokinen, A., Kettunen, H., Kolhinen, V.S., Laitinen, M., Moore, I.D., Penttilä, H., Rissanen, J., Saastamoinen, A., Toivonen, H., Turunen, J., Äystö, J.
[Ultra-high resolution mass separator-Application to detection of nuclear weapons tests](#)
(2010) *Applied Radiation and Isotopes*, 68 (3), pp. 450-453.
20. Turunen, J., Peräjärvi, K., Pöllänen, R., Toivonen, H.
[PANDA-A novel instrument for non-destructive sample analysis](#)
(2010) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 613 (1), pp. 177-183.
21. Pöllänen, R., Ruotsalainen, K., Toivonen, H.
[Determination of ²³⁹Pu and ²⁴⁰Pu isotope ratio for a nuclear bomb particle using X-ray spectrometry in conjunction with \$\gamma\$ -ray spectrometry and non-destructive \$\alpha\$ -particle spectrometry](#)
(2009) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 610 (2), pp. 515-521.
22. Pöllänen, R., Toivonen, H., Peräjärvi, K., Karhunen, T., Smolander, P., Ilander, T., Rintala, K., Katajainen, T., Niemelä, J., Juusela, M., Palos, T.
[Performance of an air sampler and a gamma-ray detector in a small unmanned aerial vehicle](#)
(2009) *Journal of Radioanalytical and Nuclear Chemistry*, 282 (2), pp. 433-437.
23. Peräjärvi, K., Hakala, J., Jokinen, A., Moore, I.D., Penttilä, H., Pöllänen, R., Saastamoinen, A., Toivonen, H., Turunen, J., Äystö, J.
24. [Event mode data acquisition for characterization of samples containing radioactive particles](#)
(2009) *IEEE Transactions on Nuclear Science*, 56 (3), art. no. 5076023, pp. 1444-1447.
25. Pöllänen, R., Toivonen, H., Peräjärvi, K., Karhunen, T., Ilander, T., Lehtinen, J., Rintala, K., Katajainen, T., Niemelä, J., Juusela, M.
[Radiation surveillance using an unmanned aerial vehicle](#)
(2009) *Applied Radiation and Isotopes*, 67 (2), pp. 340-344.
26. Peräjärvi, K., Lehtinen, J., Pöllänen, R., Toivonen, H.
[Design of an air sampler for a small unmanned aerial vehicle](#)
(2008) *Radiation Protection Dosimetry*, 132 (3), pp. 328-333.
27. Aarnio, P.A., Ala-Heikkilä, J.J., Isolankila, A., Kuusi, A., Moring, M., Nikkinen, M., Siiskonen, T., Toivonen, H., Ungar, K., Zhang, W.
[LINSSI: Database for gamma-ray spectrometry](#)
(2008) *Journal of Radioanalytical and Nuclear Chemistry*, 276 (3), pp. 631-637.
28. Smolander, P., Kuukankorpi, S., Moring, M., Toivonen, H.
[In-field management of spectrometric data in radiological threat and emergency](#)
(2008) *Journal of Radioanalytical and Nuclear Chemistry*, 276 (2), pp. 341-346.
29. Peräjärvi, K., Turunen, J., Hakala, J., Jokinen, A., Moore, I.D., Penttilä, H., Saastamoinen, A., Siiskonen, T., Toivonen, H., Äystö, J.
[The decay of ^{133m}Xe](#)

- (2008) *Applied Radiation and Isotopes*, 66 (4), pp. 530-534.
30. Lahtinen, J., Toivonen, H., Hänninen, R.
[Effective use of radiation monitoring data and dispersion calculations in an emergency](#)
(2007) *International Journal of Emergency Management*, 4 (3), pp. 468-480.
31. Ungar, K., Zhang, W., Aarnio, P., Ala-Heikkilä, J., Toivonen, H., Siiskonen, T., Isolankila, A., Kuusi, A., Moring, M., Nikkinen, M.
[Automation of analysis of airborne radionuclides observed in Canadian CTBT radiological monitoring networks using LINSSI](#)
(2007) *Journal of Radioanalytical and Nuclear Chemistry*, 272 (2), pp. 285-291
32. Siiskonen, T., Toivonen, H.
[A model for fitting peaks induced by fast neutrons in an HPGe detector](#)
(2005) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 540 (2-3), pp. 403-411.
33. Toivonen, H.
[Airborne gamma spectrometry - Towards integration of European operational capability](#)
(2004) *Radiation Protection Dosimetry*, 109 (1-2), pp. 137-140
34. Stocki, T.J., Bean, M., Ungar, R.K., Toivonen, H., Zhang, W., Whyte, J., Meyerhof, D.
[Low level noble gas measurements in the field and laboratory in support of the Comprehensive Nuclear-Test-Ban Treaty](#)
(2004) *Applied Radiation and Isotopes*, 61 (2-3), pp. 231-235.
35. Siiskonen, T., Toivonen, H.
[Electron conversion decay of ^{133m}Xe](#)
(2004) *Radiation Physics and Chemistry*, 69 (1), pp. 23-24.
36. Wotawa, G., De Geer, L.-E., Denier, P., Kalinowski, M., Toivonen, H., D'Amours, R., Desiato, F., Issartel, J.-P., Langer, M., Seibert, P., Frank, A., Sloan, C., Yamazawa, H.
[Atmospheric transport modelling in support of CTBT verification - Overview and basic concepts](#)
(2003) *Atmospheric Environment*, 37 (18), pp. 2529-2537.
37. Denier, P., Toivonen, H.
[Evaluation of the International Monitoring System and International Data Centre of the Comprehensive Nuclear-Test-Ban Treaty Organization](#)
(2001) *Kerntechnik*, 66 (3), pp. 147-150.
38. Ylatalo, S., Toivonen, H., Lehtinen, J.
[Authentication of particulate air samples by aerosol](#)
(2000) *Aerosol Science and Technology*, 33 (5), pp. 419-426.
39. Pöllänen, R., Valkama, I., Toivonen, H.
[Transport of radioactive particles from the Chernobyl accident](#)
(1997) *Atmospheric Environment*, 31 (21), pp. 3575-3590.
40. Leppänen, A., Toivonen, H.
[Detecting artificial airborne radioactivity: On-line monitoring of external dose rate near an aerosol filter](#)
(1997) *Radiation Protection Dosimetry*, 71 (4), pp. 283-288.
41. Pollanen, R., Toivonen, H.
[Skin dose calculations for uranium fuel particles below 500 µm in diameter](#)
(1995) *Health Physics*, 68 (3), pp. 401-405.
42. Pollanen, R., Toivonen, H.
[Transport of large uranium fuel particles released from a nuclear power plant in a severe accident](#)
(1994) *Journal of Radiological Protection*, 14 (1), art. no. 006, pp. 55-65.
43. Pollanen, R., Toivonen, H.
[Skin doses from large uranium fuel particles: Application to the Chernobyl accident](#)
(1994) *Radiation Protection Dosimetry*, 54 (2), pp. 127-132.
44. Toivonen, H., Pollanen, R., Leppänen, A., Klemola, S., Lahtinen, J., Servomaa, K., Savolainen, A.L., Valkama, I.
[A nuclear incident at a power plant in Sosnovy Bor, Russia](#)
(1992) *Health Physics*, 63 (5), pp. 571-573.

45. Toivonen, H., Bailey, M.R.
[Development of the spinning disk to produce monodisperse aerosols in a wide range of sizes](#)
(1989) *Aerosol Science and Technology*, 11 (3), pp. 196-205.
46. Rytömaa, T., Servomaa, K., Toivonen, H.
[The Chernobyl reactor accident and radioactive particles found in Finland \[Tsernobylin ydinvoimalaturmassa syntyneet kuumat hiukkaset: mahdollinen vaara terveydelle Suomessa.\]](#)
(1986) *Duodecim; laaketieteellinen aikakauskirja*, 102 (17), pp. 1190-1196.