

Curriculum Vitae Dr. Georg Fehrenbacher

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PERSONAL DATA

Date of Birth: 17/04/1963 (Schramberg)
Nationality: German

EMPLOYMENT HISTORY

03.2017-

RADIATION PROTECTION DELEGATE FOR THE UNIVERSITY OF TUEBINGEN AND THE UNIVERSITY HOSPITAL OF TUEBINGEN, HEAD OF THE CENTRAL ISOTOPE LABORATORY AND RADIATION PROTECTION DEPARTMENT (19 EMPLOYEES)

Radiation Protection Physicist, Health and Safety Officer

- General radiation protection for the university / university hospital
- Radiation protection approval procedures for the university and university hospital (including radiation therapy, X-ray diagnostics, nuclear medicine, radiopharmacy) with the authority / Tuebingen (function as 'Strahlenschutzbevollmächtigter')
- Radiation protection advice for occupational exposed personnel, medical staff, exposed patients and the employer's liability insurance association
- Quality assurance for medical X-ray devices incl. communication with the medical council of Baden-Wuerttemberg
- Operation of the isotope laboratory (service installation for experiments of life science researchers and geoscientists using radioactive substances)
- Organisation of the cooperation with the company doctor (industrial and radiation protection medicine)
- Member of the committees for industrial safety at the university and at the university hospital respectively
- Management of training courses in radiation protection and lectures for radiation protection at the medical faculty for the university courses 'Biomedical Technologies' (B.Sc., M.Sc.) and 'Medical Radiation Science' (M.Sc.)
- Laser radiation protection for the university and university hospital ('Laserschutzbeauftragter' according to the optical radiation protection ordinance)

04.2013 - 02.2017

RADIATION PROTECTION DELEGATE FOR FAIR AND GSI, HEAD OF THE DEPARTMENT RADIATION PROTECTION (8 EMPLOYEES)

Radiation Protection Physicist, Health and Safety Officer

- Radiation protection planning for the FAIR facilities together with scientists and engineers from GSI and FAIR as well as with planners from external companies
- Overall responsibility for the FAIR approval procedure with the Ministry for Environment in Hessen according to the radiation protection legislation
- Permission procedures for GSI due to the radiation protection ordinance and X-ray ordinance for accelerators, laboratories and test facilities

12. 1999 – 03. 2013

HEAD OF THE DEPARTMENT OCCUPATIONAL SAFETY AND RADIATION PROTECTION AT GSI

Radiation Protection Physicist, Health and Safety Officer

- Head of a department with 30 employees (physicists, engineers, technicians) for occupational health safety, radiation protection, laser radiation protection, water conservation, dangerous goods, (radioactive) waste
- Radiation Protection Supervision as Radiation Protection Officer 'SSB' (since 2004 as Radiation Protection Delegate 'SSBv') for the GSI Accelerators UNILAC, SIS, ESR, Experimental Areas and Laboratories for Nuclear Chemistry: Handling of Sealed and Unsealed Radioactive Sources (^{55}Fe , ^{90}Sr , ^{238}U , $^{241,243}\text{Am}$, ^{248}Cm , ^{249}Cf with Activities up to TBq)
- Management of approval procedures with the authorities (regional authority Darmstadt, Ministry for Environment, Wiesbaden)
- Cooperation with the external service for industrial and radiation protection medicine (Company Doctor)
- Development and introduction of a computer based instruction system for health occupational safety and radiation protection
- Implementation of an education course (practical training) in radiation protection for engineers (B.Sc.) at GSI together with DHBW (University of Cooperative Education in Karlsruhe, Baden-Wuerttemberg)
- Examples for planning advice: radioactive laboratories (e.g. service room for the preparation of uranium cathodes for the ion sources), design of a shielding of a X-ray device for the irradiation of cells (Bio Department) and of the shielding housing of a X-ray irradiation unit for detector tests
- Responsibility for the permissions of the **carbon ion therapy project at GSI** (2000- 2008): Approval procedures for medical research at the 'Federal Office for Radiation Protection' and the Hessen Ministry for Environment for the treatment of tumors in the brain and in the salivary gland together with the university hospital in Heidelberg.
- **Architectural radiation protection planning for the Heidelberg ion therapy center HIT**

05.1998 – 11.1999

TÜV-SÜD, MUNICH

Expert for Radiation Protection

- Assessment for nuclear decommissioning projects in the 'Department for Environmental Radioactivity and Radioactive Contaminated Sites'
- Clearance measurements for radioactive contaminated sites
- Management of decommissioning projects for nuclear fuel factories for the release from the atomic law

06.1993 – 04.1998

GSF-GESELLSCHAFT FÜR STRAHLEN- UND UMWELTFORSCHUNG

(CENTER FOR RADIATION AND ENVIRONMENTAL RESEARCH),

INSTITUTE FOR RADIATION PROTECTION

Post-Doc-Position

- Research and development of the personnel dosimetry system in the department for personnel dosimetry
- Dosimetry of neutron and gamma radiation
- X-ray spectrometry
- Introduction of artificial neural networks for dosimetry and spectrometry, development of evaluation algorithms for the spectral analysis of film dosimeter responses

EDUCATION

- 04.1990 – 11.1993 **PHD-STUDIES AT GSF (CENTER FOR RADIATION AND ENVIRONMENTAL RESEARCH), INSTITUTE FOR RADIATION PROTECTION**
Dr.rer.nat.
- Spectrometry of gamma and X-rays, neutron dosimetry
- 03.1989 – 12.1989 **COMMUNITY SERVICE AT THE HOSPITAL SCHWABING/MUNICH**
- 04.1983 – 01.1989 **STUDIES OF PHYSICS AND MATHEMATICS AT THE RUPRECHT-KARLS-UNIVERSITY IN HEIDELBERG**
Diploma in Physics
- Diploma Thesis at the Max-Planck-Institute for Physics, Munich: Liquid-Argon-Calorimeter for the HERA Experiment H1 at DESY, Hamburg (Supervisor at University: Prof. Dr. Albrecht Wagner)
- 1982 **ABITUR AT ALBERTUS-MAGNUS-GYMNASIUM IN ROTTWEIL, BADEN-WUERTTEMBERG**

FURTHER ACTIVITIES

- Consultant** Radiation protection (RP) expert work for IAEA / UN: a) **Working group for the preparation of the report ‘Regulatory Control of the Safety of Ion Radiotherapy Facilities’**, b) Missions for IAEA: 1. **RP for the proton therapy facility in Riyadh, Saudi-Arabia**; 2. RP for therapy electron linacs in Dakar, Senegal; 2. Development of a training module ‘Planning the Shielding Layout of Electron Therapy Accelerators’, 3. Radiation protection assessment of the synchrotron light facility SESAME in Jordan
- Architectural shielding design of the particle therapy facility in Marburg (MIT)**
- Shielding layout for the proton therapy facility in Dresden (OGZ)**
- RP Expert** Member of the **radiation protection expert** group for the **particle therapy center MedAustron in Wiener Neustadt (Austria)** supervised by the country Lower Austria
- Official RP expert for the operation for the Marburg particle therapy facility according to the German radiation protection ordinance commissioned by the country Hessen
- Assessment of the radiation protection for a new ion accelerator (Tandem) at the ‘Federal Office for Physics and Technology’ (PTB), Braunschweig (department for neutron dosimetry)
- Member of a radiation protection expert group for the assessment of the rare isotope facility RAON in South-Korea

QUALIFICATIONS

RP Specific Qual.	<p>Radiation Protection Ordinance: (sealed and unsealed radioactive sources as well as accelerator radiation protection – operation, RP planning: S1.1, S1.2, S1.3, S2.1, S2.2, S2.3, S3.1, S3.2, S4.1, S4.2, S5, S6.1, S6.2, S6.3, S6.4), functions: 'Strahlenschutzbeauftragter, Strahlenschutzbevollmächtigter'</p> <p>X-ray ordinance: Supervision of examination, testing, maintenance or repair of X-ray devices (R5.1), functions: 'Strahlenschutzbeauftragter, Strahlenschutzbevollmächtigter'</p>
Approval as RP Expert	Approval as official radiation protection expert for ion accelerators by the Hessen Ministry for Environment 'Strahlenschutzsachverständiger für Ionenbeschleuniger'
Health and Safety	Education as occupational health and safety officer at the 'Federal Office for Industrial Safety and Industrial Medicine'
Laser Protection	Laser radiation protection for industrial and scientific applications (Laserschutzbeauftragter)
Further Training	Dangerous Goods – Training on transportation of radioactive sources, training on water protection, disposal of waste, medical physics
Teaching	<p>Lectures in radiation protection at the university of applied science THM in Giessen (M.Sc. Medical Physics and Radiation Protection), supervision of training, bachelor and master theses</p> <p>Organization of a Workshop: PURSAFE (<u>P</u>reventing <u>h</u>uman intervention for <u>i</u>ncreased <u>s</u>afety in <u>i</u>nfrastructures <u>e</u>mitting ionizing radiation), 23/09-01/10/2013</p> <p>Contributions to TÜV Seminars:</p> <p>Dresden 2006: 'Radiation Protection for the International FAIR Project at GSI',</p> <p>Wiesbaden 2007: 'Release of Activated Materials from Accelerators',</p> <p>Hamburg 2008: 'Comparison of the Shielding Layout of Carbon Ion Therapy Facilities in Japan, Italy and Germany',</p> <p>Darmstadt 2011: 'Radiation Protection Planning for FAIR'</p> <p>Teaching Award 2018 (summer semester 2017, winter semester 2017/2018) 'Medical Radiation Science' for the lecturing team 'Physics and Technology for the Application of Radiation in Medicine', category <i>best teaching event</i> (ranking Nr. 3) nominated by the students of the medical faculty of the university of Tuebingen</p>
Languages	German native, English advanced

SELECTION PUBLICATIONS, TALKS, PATENTS

Patents and Patent Applications	<p>15 national (international) Patents, Examples:</p> <ul style="list-style-type: none"> • Shielding for an Accelerator Facility (AZ 102016105720.7) • Shielded Chamber for the Ion Therapy for the Shielding of Neutrons up to GeV Energies (DE 10235116B4) • Dosimeter for the Detection of Neutron Radiation (DE102004020979A1)
40 Publications, Talks, Poster	<p>Examples:</p> <ul style="list-style-type: none"> • G. Fehrenbacher et al., Radiation Protection Planning for the International FAIR Project, Contribution to the FS Conference 2015, Baden near Vienna, Austria, 5.-9. Oktober (139-145) • S. Rollet, S. Agosteo, G. Fehrenbacher, C. Hranitzky, T. Radon, M. Wind, Intercomparison of radiation protection devices in a high-energy stray neutron field, Part I: Monte Carlo simulations, Radiation Measurements 44 (2009) 649–659 • PTCOG Publication Report Nr. 1, 2010, N.E. Ipe, G. Fehrenbacher, I. Gudowska, H. Paganetti, J.M. Schippers, S. Rösler, Y. Uwamino, Shielding Design and Radiation Safety of Charged Particle Therapy Facilities: http://www.ptcog.ch/archive/Software_and_Docs/Shielding_radiation_protection.pdf • G. Fehrenbacher, Radiation Protection for Particle Therapy Facilities, Shielding Aspects of Accelerators, Targets and Irradiation Facilities SATIF-10, Workshop Proceedings, p. 315-331, Geneva, Switzerland, 2-4 June 2010 • T. Radon, F. Gutermuth, G. Fehrenbacher, Monte Carlo Simulations for the Shielding of the future High-Intensity Accelerator Facility FAIR at GSI <i>Radiat.Prot.Dosimetry (20 December 2005) 115 (1-4): 212-215</i> • Vogt, K., Haida, M., Fehrenbacher, G., Soil activation studies for the FAIR project. In: 1st ARIA 2008 Workshop on Accelerator Radiation Induced Activation, October 13-17, 2008. Paul Scherrer Institut (PSI), Switzerland • F.Horst, G. Fehrenbacher, K. Zink: On the neutron radiation field and air activation around a medical electron linac, Radiation Protection Dosimetry (2016) (1-12), doi:10.1093/rpd/ncw120.
Referee Work	<p>Nuclear Instruments and Methods in Physics Research, Radiation Protection Dosimetry, Journal of Environmental Radioactivity</p>