



EURADOS Education and Training:

a key issue to support knowledge dissemination and skills in radiation dosimetry

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EUTERP Workshop, Qawra (Malta)
11th of April, 2019



EURADOS Education and Training:

a key issue to support knowledge dissemination and skills in radiation dosimetry

Outline

1. EURADOS
2. EURADOS Working Groups
3. Annual Meetings
 - > Winter Schools
 - > Scientific Workshops
 - > Intercomparison participant's sessions
 - > Learning Network
4. Training Courses
5. EURADOS Young Scientist Grant and Award
6. Promotion of Education and Training
7. EURADOS reports

EURADOS Education and Training:

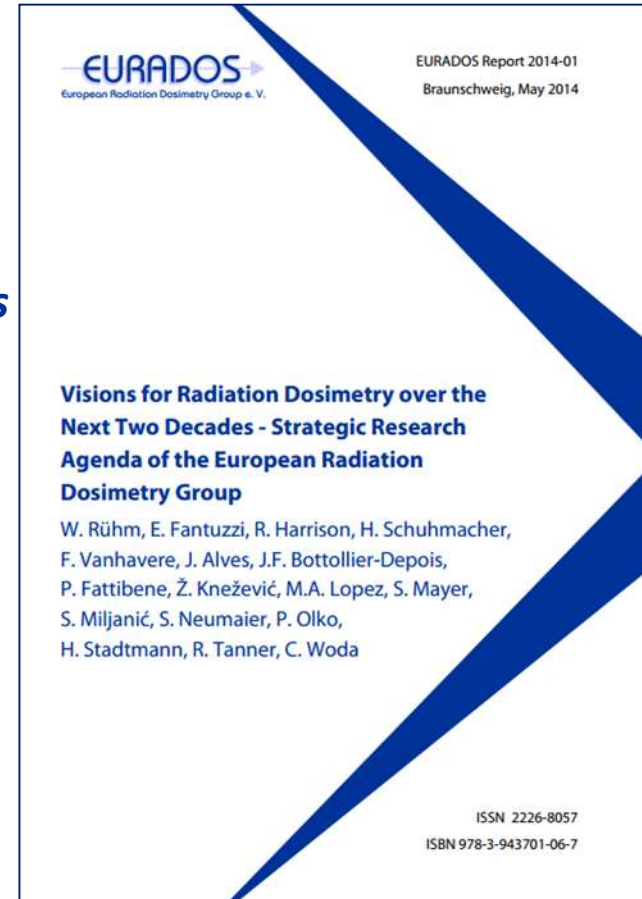
a key issue to support knowledge dissemination and skills in radiation dosimetry

Based on:

EURADOS SRA

*Visions for Radiation Dosimetry over the next two decades
– Strategic Research Agenda of the European Radiation
Dosimetry Group*

W. Rühm, E. Fantuzzi, R. Harrison, H. Schuhmacher, F. Vanhavere, J. Alves, J.F. Bottollier-Depois, P. Fattibene, Ž. Knežević, M.A. Lopez, S. Mayer, S. Miljanić, S. Neumaier, P. Olko, H. Stadtmann, R. Tanner, C. Woda



Available: http://www.eurados.org/en/Documents_Publications

EURADOS: European Radiation Dosimetry Group

- **Founded:** in 1981 by scientists involved in contracts funded by the European Commission
- **Aim:** to promote European research, development and cooperation in dosimetry
- **Financial resources:** support from the European Commission funded projects
last EC project in 2004-08
- **EURADOS e.V.:** In 2008 registered in Germany as a Registered Society
 - New Constitution was set up
 - Self-sustained organization with regular income

EURADOS: European Radiation Dosimetry Group

- **Goal:** to promote science, technology, harmonization and European cooperation in dosimetry
- **Activities:**
 - Coordination of working groups
 - Promotion of research and technical development
 - Its implementation in routine work, conformance with international practices
 - Organization of scientific meetings and training activities
 - Organization of inter-comparisons and bench mark studies
- **Financial resources:**
 - Self-sustained organization, with regular income:
 - Sponsoring institutions,
 - Levies raised for organized activities (annual meetings, training courses and IC exercises),
 - Projects funded by the European Commission
- **EURADOS:** Maintains a network of experts, of reference and research laboratories in research, industry and dosimetry services

- **Voting Members**

73 Voting Members from 31 countries

- **EURADOS Executive Board**

Chair: W. Rühm (Helmholtz Munich, Germany)

Vice-Chair: F. Vanhavere (SCK-CEN, Belgium)

Secretary: J.-F. Bottollier-Depois (IRSN, France)

Treasurer: H. Schuhmacher (PTB, Germany)

- **EURADOS Office**

operated by HMGU: W. Rühm, K. Hürkamp and O. Hupe

- **EURADOS Council**

J.F. Bottollier-Depois, I. Clairand, E. Fantuzzi, P. Fattibene, R. Harrison, O. Hupe, M.A. Lopez, P. Olko, V. Olsovcova, W. Rühm, H. Schuhmacher, F. Vanhavere



Eight EURADOS Working Groups

- WG2 - Harmonization of Individual Monitoring (P. Gilvin, UK)
- WG3 - Environmental Dosimetry (A. Vargas, Spain)
- WG6 - Computational Dosimetry (H. Rabus, Germany)
- WG7 - Internal Dosimetry (B. Breustedt, Germany)
- WG9 - Radiation Dosimetry in Radiotherapy (L. Stolarczyk, Poland)
- WG10 - Retrospective Dosimetry (C. Woda, Germany)
- WG11 - High-Energy Radiation Fields (M. Caresana, Italy)
- WG12 - Dosimetry in Medical Imaging (Ž. Knežević, Croatia)



Changes in 2018 and 2019

- WG6: H. Rabus replaces R. Tanner as chair
- WG9: L. Stolarczyk replaces R. Harrison as chair

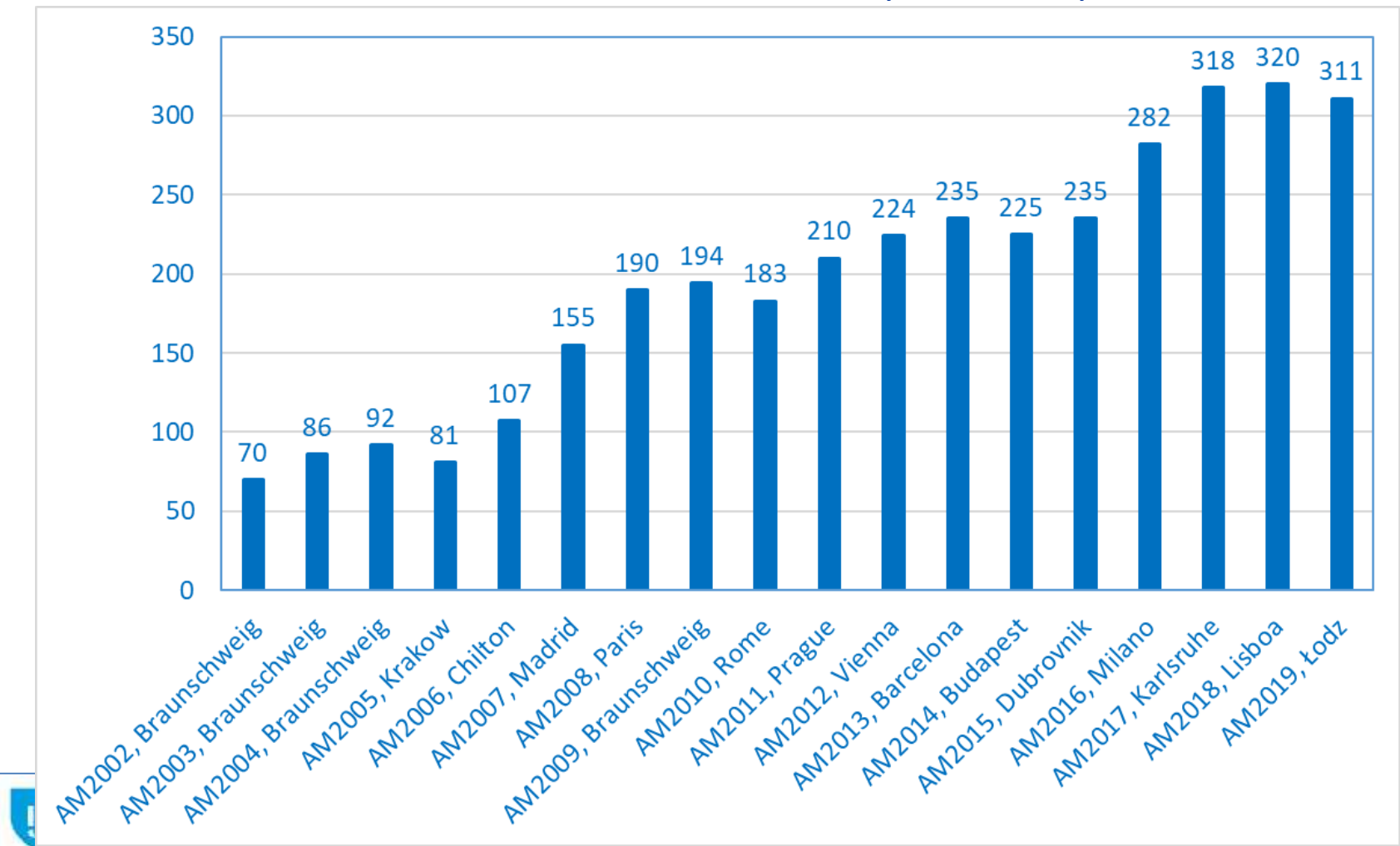
Associate Members from VM

>500 scientists contribute to the overall EURADOS objectives

EURADOS Annual Meetings

EURADOS Annual Meetings (AM)

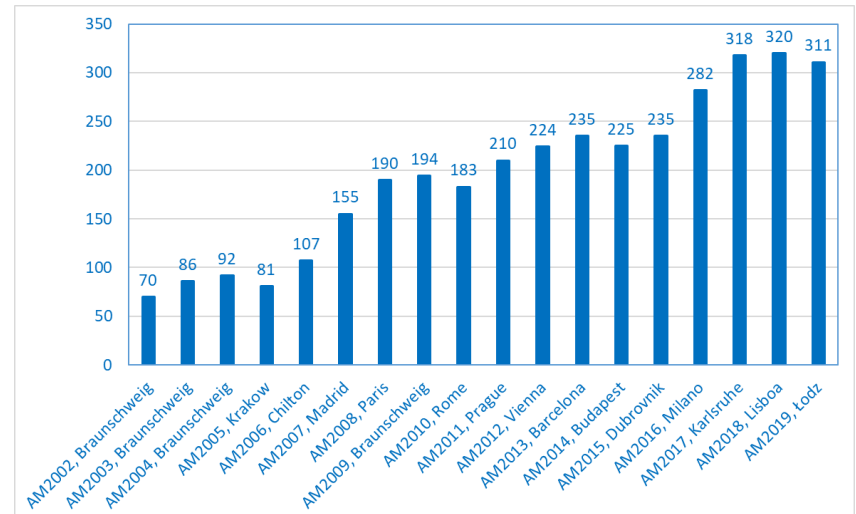
- Central events for the dissemination of EURADOS activities
- Attracts the interests of the dosimetry community



EURADOS Annual Meetings

EURADOS Annual Meetings (AM)

- Central events for the dissemination of EURADOS activities
- Attracts the interests of the dosimetry community
- General Assembly
- Council meetings
- WGs meetings (open)
- Winter Schools and/or Scientific Workshops
- Sessions for participants in the Intercomparison exercises
- Learning Network



EURADOS Winter Schools

- Winter Schools:**
- “Refresh courses” of 1 to 1,5 day
 - Held during AMs since 2007
-
- AM2019 Radon: Dosimetry, Metrology and Regulation
 - AM2018 Application of physical and computational phantoms in dose assessment
 - AM2017 Internal dosimetry for radiation protection and medicine
 - AM2016 Dosimetry for epidemiological cohorts
 - AM2015 The Fukushima Daiichi nuclear accident - the role of dosimetry in assessing the consequences
 - AM2014 Relative Biological Effectiveness, radiation weighting factor and quality factor
 - AM2013 Status and Future Perspectives of Computational Micro- and Nanodosimetry
 - AM2011 Radiation Protection for Medical Staff
 - AM2010 Radiological Emergencies – Internal exposures
 - AM2009 Low-Dose Radiation Effects
 - AM2008 Retrospective Dosimetry
 - AM2007 Uncertainties in Radiation Dosimetry

Presentations available:
www.eurados.org

EURADOS Scientific Workshops

- Scientific Workshops:**
- Present and Disseminate WG activity
 - Held during AMs since 2004

Published in the open literature:

- AM2012 Dosimetry for second cancer risk estimation in radiotherapy *Rad Meas*
- AM2010 Accelerator radiation protection and shielding *Radiat Prot Dosim*
- AM2009 Cosmic Radiation and Aircrew Exposure *Radiat Prot Dosim*
- AM2008 Dosimetric Issues in the Medical Use of Ionizing Radiation *Radiat Prot Dosim*
- AM2007 Characterization of Workplaces for the Assessment of the Doses to Individuals *Radiat Prot Dosim*
- AM2006 Uncertainties in Dosimetry – Principles through Practice *Radiat Prot Dosim*
- AM2005 Radiation Protection Dosimetry and Dosimetry for Medical Applications *Radiat Prot Dosim*
- AM2004 Biological and Physical Dosimetry for Radiation Protection *Radiat Prot Dosim*

EURADOS IC participants' sessions

EURADOS Intercomparisons

- Organization of regular, self-sustained IC exercises
- IMS need to comply with ISO/IEC 17025
- Photons 2y; extremity and neutrons larger intervals
- Held during AMs since 2008, with 2 exceptions

Acronym	Subject of the IC exercise	IMS/Sys	Session at
IC2008ph	Whole body dosimeters in photon fields	52/62	AM2009, Braunschweig, Germany
IC2009ext	Extremity dosimeters in photon and beta fields	44/59	AM2010, Rome, Italy
IC2010ph	Whole body dosimeters in photon fields	70/85	AM2011, Vienna, Austria
IC2012ph	Whole body dosimeters in photon fields	74/88	AM2013, Barcelona, Spain
IC2012n	Neutron dosimeters	31/34	NEUDOS12, Aix 2013
IC2014ph	Whole body dosimeters in photon fields	96/112	IM2015, Bruges
IC2015ext	Extremity dosimeters in photon and beta fields	52/72	AM2016, Milano, Italy
IC2016ph	Whole body dosimeters in photon fields	86/103	AM2017, Karlsruhe, Germany
IC2017n	Neutron dosimeters	32/33	AM2019, Lodz, Poland
IC2018ph	Whole body dosimeters in photon fields	101/121	AM2019, Lodz, Poland
IC2019ext-eye	Extremity and eye-lens in photon and beta fields	To be	To be decided

EURADOS IC participants' sessions

EURADOS Intercomparisons

- Organization of regular, self-sustained IC exercises
- IMS need to comply with ISO/IEC 17025
- Photons 2y; extremity and neutrons larger intervals
- Held during AMs since 2008, with 2 exceptions

At the end of each IC exercise a **participants' meeting** is organized to:

- Promote exchange of information among participants,
 - Present the overall results in and anonymized way,
 - Distribute certificates,
 - Discuss lessons learned
-
- At later stage,
EURADOS report published
Publications in open literature



EURADOS Learning Network

EURADOS Learning Network

- IC lessons learned
- Identification of topics of interest
- In response to IMS needs
- Held during AMs since 2017



AM	Title of the session at the Learning Network	Px
AM2017	Homemade type testing Accreditation issues: Part A - Assuring the quality of test and calibration results Part B - The use of customer surveys and customer feedback to improve a dosimetry service Part C - How does YOUR dose report looks like?	55
AM2018	Dosimetric aspects of QA/QC Traceability - Validation of the method Management aspects of QA Causes of “bad” results	52
AM2019	Eye-lens dosimetry Transit and background dose subtraction ISO/IEC 17025:2017	51

EURADOS Training Courses

- Maintain competence in the field of dosimetry in Europe
- Answer to needs of the dosimetric community
- Well-established topics of interest to the dosimetry community: radiation quantities, monitoring techniques, biokinetics, interpretation of monitoring data, dose assessment, uncertainty estimation , quality management, implementation of EC Directives and Technical Recommendations, etc.
- Duration: 3 to 5 days
- Assistance limites (<40 participants)
- Self-sustained

Activity carried out by a specific WG

- Nomination of a Scientific Committee of WG members
- Preparation of a training programme
- Appointment of lecturers
- Organization of the training action in collab with host Institute
- Continuous improvement: attendants' feedback

EURADOS Training Courses

- **WG07** EURADOS-IAEA Regional TC on Advanced methods for internal dose assessment

2009 CzTU, Prague, Czech Republic

34 participants



- **WG07** TC on Monte Carlo methods for calibration of body counters

2013 KIT, Karlsruhe, Germany

14 participants



EURADOS Training Courses

- **WG06** EURADOS School on Voxel phantom development and implementation for radiation physics calculations

2011 IRSN, Fontenay-aux-Roses, France

31 participants

2014 HMGU, Neuherberg, Germany

25 participants

2018 KIT, Karlsruhe, Germany

11 participants

Location:



Helmholtz Zentrum München,
Neuherberg, Germany

Date:
13-15 May 2014
Duration: 2.5 days

Contact:
EuradosVoxelSchool@helmholtz-muenchen.de

Important dates:
Registration open after: 1 October 2013
Registration deadline: 28 February 2014
Payment of registration fee: 31 March 2014
School: 13-15 May 2014

The completed registration form has to be returned per email to EuradosVoxelSchool@helmholtz-muenchen.de

The European Radiation Dosimetry Group is a non-profit scientific society which stimulates collaboration between European laboratories in the field of dosimetry of ionising radiation.

Co-organising institutions:
Helmholtz Zentrum münchen
German Research Center for Environmental Health



EURADOS →
Neuherberg, Germany
13-15 May 2014
2nd EURADOS School
on
Voxel phantom development and implementation for radiation physics calculations



Final Announcement

EURADOS Training Courses

- **WG10** EURADOS School on Retrospective Dosimetry (practical exercises in Solid State and Cytogenetic dose reconstruction)

2012 BfS and HMGU, Neuherberg (Germany)

12 participants



Location:



The school will be held at Neuherberg, which is just outside the city limits of Munich

Important dates:

Registration open: 1 March 2012
Registration deadline: 31 July 2012
Deadline for payment of registration fee: 15 September 2012
School: 22-26 October 2012

The completed registration form has to be returned by email to EURADOSchool@bfs.de

EURADOS
European Radiation Dosimetry Group e. V.

Neuherberg, Germany
22-26 October 2012

EURADOS School on Retrospective Dosimetry
(Practical exercises in Solid State & Cytogenetic dose reconstruction)



Organisation:

Heinrich-Zentrum München
Senior Research Center for Environmental Health

Bundesrat für Strahlenschutz

Date:

22-26 October 2012
Duration: 5 days

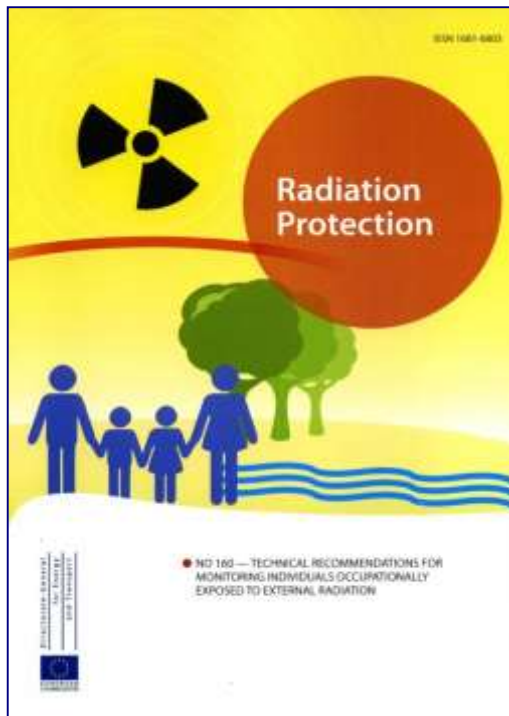
First Announcement

EURADOS Training Courses

EU-Trimer project (tender issued by EC) for the preparation of the European Technical Recomm. for Monitoring Individuals Occupationally Exposed to External Radiation

Radiation Protection 160
published in 2009.

- **WG02 TC** on the Implementation of RP 160 and lessons learned from IC exercises



EURADOS Training Courses

- **WG02** TC on the Implementation of RP 160 and lessons learned from IC exercises

2012 Institute of Nuclear Physics, Krakow, (Poland)

41 participants



2013 Ruđer Bošković Institute, Zagreb (Croatia)

32 participants



2015 Instituto Superior Técnico, LPSR, Bodadela (Portugal)

27 participants



2017 Azienda Ospedaliero Univ Careggi, UO Fisica Sanitaria, Florence

47 participants

(Italy)



EURADOS Training Courses (2009-2018)

WG	Training Course (title, venue)	Year	Px
WG02	European Technical Recommendations for Monitoring Individuals Occupationally Exposed to External Radiation (Radiation Protection 160)		
	4 th Azienda Ospedaliero Univ Careggi, UO Fisica Sanitaria, Firenze, Italy, April 2017	2017	47
	3 rd Instituto Superior Técnico, Bobadela, Portugal, May 2015	2015	25
	2 nd Ruđer Bošković Institute, Zagreb, Croatia, Nov 2013	2013	32
	1 st Institute of Nuclear Physics of the Polish Academy of Sciences, Krakow, Poland, Nov 2012	2012	41
WG06	EURADOS Voxel Phantom School		
	3 rd Karlsruhe Institute of Technology, Karlsruhe, Germany, March 2018	2018	11
	2 nd Helmholtz Zentrum München, Neuherberg, Germany, May, 2014.	2014	25
	1 st IRSN, Fontenay-aux-Roses, France, October, 2011	2011	31
WG07	Monte Carlo Methods for calibration of body counters		
	Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, November, 2013	2013	14
WG10	School on Retrospective Dosimetry (Practical exercise in Solid State & Cytogenetic dose reconstruction)		
	Helmholtz Zentrum München, Neuherberg, Oct 2012	2012	12
WG07	EURADOS-IAEA Regional Training Course on Advanced Methods for Internal Dose Assessment (Application of IDEAS Guidelines and dissemination of CONRAD internal dosimetry results)		
	IAEA and Czech Technical University, Prague, Czech Republic, February 2009.	2009	34

EURADOS Training Courses

(2009-2018)

TC organized in the framework of Concert
EJP for the Integration of RP Research under Horizon 2020

WG	Training Course	Year	Px
WG06+WG07	EURADOS-CONCERT Short Training Course on Application of Monte Carlo methods for dosimetry of ionizing radiation. Karlsruhe Institute of Technology, Karlsruhe, Germany, March	2018	11
WG10	EURADOS-CONCERT School on Uncertainty analysis processes for retrospective dosimetry and associated research. IRSN, Fontenay-aux-Roses, France, June	2017	20

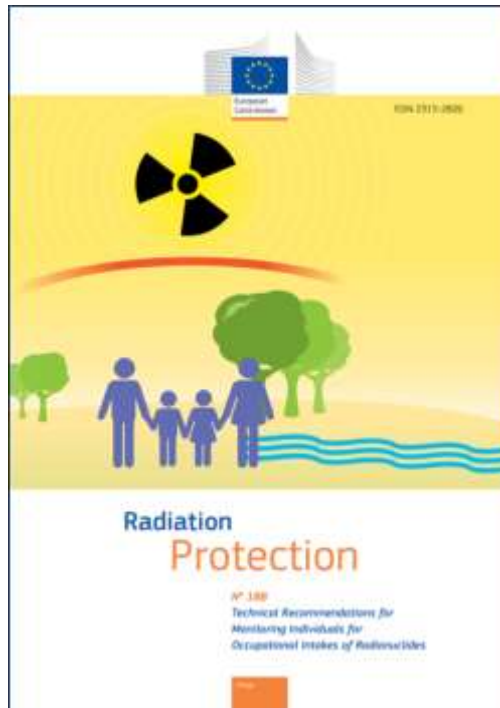
(2019)

WG	Training Course	Year	Px
WG10	RENEB-EURADOS-CONCERT: ADORE Application of cytogenetic and EPR/OSL techniques for biological dosimetry and physical retrospective dosimetry. Bundesamt für Strahlenschutz, Helmholtz Zentrum München, Germany, June-July	2019	12
WG10	EURADOS-CONCERT School on Uncertainty in biological, physical, and internal dosimetry following a single exposure. IRSN, Fontenay-aux-Roses, France, April	2019	23

EURADOS Training Courses (2019)

Techrec project (tender issued by EC) for the preparation of the European Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides

Radiation Protection 188
published in 2018.



- **WG07** TC on the Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides

2019 IAEA, Vienna, Austria
25th-29th of March



EURADOS Training Courses (2019)

- **WG07** TC on the Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides

Learning Objectives

- firm understanding of the principles and practice of internal dosimetry and internal contamination monitoring (ICRP, ICRU, ISO, IAEA, IDEAS).
- how to apply the Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides, EC- RP188.
- how to specify a monitoring programme for a wide range of exposure conditions and assess internal doses from the results of monitoring.
- good understanding of accuracy requirements, quality assurance requirements, and criteria for approval and accreditation



Photos Credit: Bastian Breustedt/KIT

Target Audience

- Beginners (graduated) in the field of internal dosimetry, preferably with previous experience in radiation protection, health physics and/or medical physics.
- Not for internal dosimetry experts.

EURADOS Training Courses (2019)

- **WG07** TC on the Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides

2019 IAEA, Vienna, Austria
25th-29th of March
30 participants



Target Audience

- Beginners (graduated) in the field of internal dosimetry, preferably with previous experience in radiation protection, health physics and/or medical physics.
- Not for internal dosimetry experts.

EURADOS Training Courses (2019)

- **WG02** TC on the Implementation of RP 160 and lessons learned from IC exercises

5th Ed: Radiation Protection Dosimetry and Accreditation of IMS: Secrets and Solutions

2019 IRSN, Fontenay-aux-Roses, France
13th-17th of May 2019

41 (expected)

Important dates:
Registration deadline: 18th April 2019
Deadline for payment: 23rd April 2019
Training course: 13th-17th May 2019

Background:
The 5th EURADOS Training Course on Radiation Protection Dosimetry is an initiative of the EURADOS working group on Harmonization of Individual Monitoring (WG02). The authors of the Technical Recommendation RP160 were all members of the WG02 and in 2012 initiated this series of training courses. During the years, the scope of the Training Course was broadened, but still follows in its basic ideas the RP160 document.
Earlier training courses on RP160 were held in 2012 at the IFZ in Krakow, Poland, in 2013 at the IRI in Zagreb, Croatia, in 2015 at the IST in Bobadela, Portugal and in 2017 at the ADU Carruggi in Florence, Italy.
Some training material and extra documentation will be provided.

Intended audience:
The course is intended for all stakeholders in individual monitoring for external radiation but in particular for junior or trained managers of approved dosimetry services.


Download:
The Technical Recommendations RP160 can be downloaded from the websites of the European Commission:
<http://ec.europa.eu/energy/sites/ener/files/documents/160.pdf>

EURADOS
Institut de Radioprotection et de Sécurité Nucléaire
Fontenay-aux-Roses and
Croissy Sur Seine Cedex / Paris, France



EURADOS
The European Radiation Dosimetry Group is an independent society of more than 70 scientific institutions with a focus on the dosimetry of ionizing radiation. EURADOS was founded in 1981 and is seated in Neuhofberg, Germany, as an "eingetragene Verein, i.e.V.T."
<http://www.eurados.org>

EURADOS
European Radiation Dosimetry Group
Fontenay-aux-Roses / Paris
France
13-17 May 2019
EURADOS Training Course
Radiation Protection Dosimetry and
Accreditation of IMS:
Secrets & Solutions
(based on Radiation Protection 160)



Second announcement

EURADOS Grants

- Established in 2014
- Motivate young associate members (<35y old)
- Encourage their involvement in WG activities
- Amount confirmed by the EURADOS Council annually

EURADOS Young Scientist Grant

- Support of a research stay to develop work within the topics identified in the EURADOS Strategic Research Agenda (SRA);
- The final outcome shall result in a peer reviewed publication and/or presentation at international conference or workshop.

EURADOS Young Scientist Award

- Recognition of excellent work performed within a topic identified in the EURADOS Strategic Research Agenda (SRA);
- The work should be published in a peer reviewed publication and/or presented at an international conference or workshop.

EURADOS Grants

- WG chairs should encourage (or appoint) applicants
 - Applicant <35y old
 - CV of the applicant
 - Relevant publications
 - Research plan within the topics of the SRA
 - Excellent research / technical work: original and innovative
 - Deadline for applications: end of September
-
- A Council committee makes an appraisal of the applications
 - For a Council decision

5 EURADOS Young Scientist Grants

4 EURADOS Young Scientist Awards

Conferences endorsed by EURADOS

EURADOS promotes the continuation of a series of conferences on dosimetry like *Individual Monitoring Conference (IM)* and *Neutron and Ion Dosimetry Symposium*

- Preparation work
- Scientific committee members
- Set-up of scientific programme
- Selection of abstracts, oral and poster communications
- Organization of refresher courses
- Chairing sessions
- Review of papers for publication

Education and Training Sessions at events

- Radiation Protection Platforms (MELODI, ALLIANCE, NERIS, EURAMED)
- Radiation Protection Week
- International Radiation Protection Association meetings

Conferences endorsed by EURADOS

EURADOS promotes the continuation of a series of conferences on dosimetry like *Individual Monitoring Conference (IM)*



IM2020 April 2020, Budapest (Hungary)

IM2015 April 2015, Bruges (Belgium)

IM2010 March 2010, GAEC, Athens (Greece)

IM2005 April 2005, Seibersdorf Labs / IAEA, Vienna (Austria)

IM2000 September 2000, STUK, Helsinki (Finland)



Conferences endorsed by EURADOS

EURADOS promotes the continuation of a series of conferences on dosimetry like *Individual Monitoring Conference (IM)* and *Neutron and Ion Dosimetry Symposium (NEUDOS)*



NEUDOS-13 May 2017, Krakow (Poland)

NEUDOS-12 June 2013, Aix-en-Provence (France)

NEUDOS-11 October 2009, Cape Town (South Africa)

NEUDOS-10 June 2006, Uppsala, Sweden

Publication of EURADOS Reports



http://www.eurados.org/en/Documents_Publications/Reports_documents

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Acknowledgements

Thanks are due to WG chairs and associate members for their efforts in setting up the various Education and Training activities mentioned in this presentation

- **EURADOS Education and Training activities in the 2009-2019 period**

JG Alves, E Fantuzzi, W Rühm, P Gilvin, A Vargas, R Tanner, H Rabus, MA Lopez, B Breusted, R Harrison, L Stolarczyk, P Fattibene, C Woda, M Caresana, Ž Knežević, J-F Bottollier-Depois, I Clairand, S Mayer, S Miljanic, P Olko, H Schuhmacher, H Stadtmann, F Vanhavere

To be submitted to: *Journal of Radiological Protection*

Thank you for your attention!