

Editorial

The recently published draft of the new Euratom Work Programme (WP 2018) presents new challenges. Notably, NFRP-2018-7 focuses on «Availability and use of research infrastructures for education, training and competence building». Perhaps it's time to dedicate some effort to including Radiation Protection infrastructure use in a training programme, highlighting the importance of open access, data sharing, potential re-use of the data generated and harmonisation of practices and protocols? As indicated in Issue 18 of AIR², our survey revealed that most respondents were not aware of these issues. Education and training is urgently needed if we want to make the best use of the data produced, per the H2020 project guidelines.

Dr Laure Sabatier, CEA

The floor to...

At the start of the millennium, the idea of sustaining and rescuing endangered data and material began to receive attention within the radiobiology community. Under the sponsorship of the European Commission and the European Late Effects Project Group (EULEP), a substantial amount of data from animal irradiation experiments was collected in the European Radiobiology Archives (ERA). The first efforts to make this data accessible to the community were undertaken in the FP6 sponsored project "Promotion and Update of the European Radiobiological Archives" (ERA-PRO) (2006-2009) through the creation of an online database.

These efforts were continued in the FP7 project "Sustaining access to Tissues and data from Radiobiological Experiments" (STORE) (2009-2012). The goals of the STORE project were the creation of a data warehouse which would offer open access to every registered user, the standardisation of procedures on how to use archival material and, last but not least, how to guarantee the sustainability of databases or tissue banks, a question not yet fully resolved.

Initially the idea of sharing data and material (a topic that has come up frequently in this bulletin) was not warmly welcomed by the radiobiology community. A strong message of the STORE project, supported by other consortia and documents such as the Rome Agenda, was that funding organisations, journals and researchers needed to develop coordinated policies and actions on sharing issues.

In the Horizon 2020 joint programme CONCERT (WP6.3.1), we further developed the basic idea of

sharing and preserving not only data and biomaterials but also infrastructures in general, and the endangered and rare facilities in particular. The latter include radiation facilities that are able to administer radiation at low or very low doses or dose rates, as these are valuable tools for low dose risk research. In addition, endangered tissue data banks and costly facilities such as high quality imaging platforms fall into this category.

Identification of the needs to support sustainability of critical facilities

The aims of this subtask are to gather detailed information on critical existing infrastructures

and their strengths and weaknesses in the light of future research needs, and to index their accessibility for the radiation research community. A lesson learned from the STORE project is the necessity to use quality-controlled, standardised protocols in the different facilities.

In the long term, the maintenance of endangered and rare facilities and their accessibility will be dependent on identifying a suitable model for sustainability, with at least some element of cost recovery. Furthermore, both financial and scientific sustainability will depend on the sharing imperative being acknowledged by the radiation science community and on acceptance of responsibility across national boundaries.

Dr Soile Tapio

HMGU

CONCERT WP 6.3.1



Photo: Soile Tapio/HMGU



Future events:

9th November 2017

EURATOM Fission and Radiation Protection Info Day
Brussels, Belgium

14-15th and 16th
November 2017

TERRITORIES: 2 Workshops:
Oslo-Norway

31st December 2017

Deadline Call for Travel Grants

WP 6 News:

AIR²D²:

- Please complete the online [form\(s\)](#) to register your infrastructure(s) in the database.
- A new option to feature your infrastructure is now available: [add document](#).

Follow STORE on Twitter:
[@STOREDatabase](#)

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December 2017



Exposure platforms

Calibration and Dosimetry Laboratory (INTE-UPC) Radiation Protection and Medical Radiation Physics

The Calibration and Dosimetry Laboratory (in Spanish, LCD) of the Institute of Energy Techniques (INTE) at the Polytechnic University of Catalonia (UPC) is a secondary standard metrology laboratory for ionising radiation, accredited by the Spanish accreditation body (ENAC). The LCD obtained its first formal recognition in 1987 with the award of the EN 45001 standard, followed in 2009 by the ISO/IEC 17025.

regulator), to organise periodic intercomparisons of Spanish-approved personal dosimetry services.

As a university laboratory, LCD organises training sessions for graduate



Photo: INTE-UPC

Dr Mercè Ginjaume



Photo: INTE-UPC

UPC Photon calibration facility

The main equipment of the Laboratory includes the following: a photon irradiator with six ^{137}Cs and one ^{60}Co sources; an HS320 Rich Seifert X-ray generator of high stability with a maximum high voltage of 320 kV; a MAMMOMAT Siemens low-energy X-ray generator with Mo anode to produce mammography qualities; an Amersham-Buchler BSS-1 beta secondary standard irradiator with two sources of ^{90}Sr , and several 10 cm x 10 cm alpha-beta sources designed for calibrating portable surface contamination monitors.

Measurement traceability for photon radiation is ensured through the calibration of several ionisation chambers to the National Metrology Institute of Germany (PTB) and through the calibration of the beta secondary standard to the National Institute of Standards in the United States (NIST).

The LCD offers a calibration service for users of ionising radiation, mainly in Spain. The most common services include: calibration of environmental and radiation protection instruments; surface contamination monitors; kVp meters and dosimeters for X-ray quality control, and the irradiation of personal dosimeters both passive and active. LCD also collaborates with the Spanish Nuclear Safety Council (CSN, Spanish

and post-graduate students on topics related to the field of radiation protection. LCD is part of the Biomedical Engineering Research Centre (CREB) of the UPC. The LCD team is currently participating in several national and international research projects and is also actively involved in several activities of the European Radiation Dosimetry Group (EURADOS).

The main research projects undertaken at LCD include the FP7 project ORAMED (2008-2011), various projects financed by the CSN (e.g. *Development of Methodologies for Estimating the Dose to the Eye Lens in Interventional Radiology* (2012-2015)), and the Horizon 2020 project, MEDIRAD (2017-2021). The research activities of the Laboratory are linked to the INTE's Dosimetry and Medical Radiation Physics research programme. Further details regarding projects, publications and theses involving the facilities, are available via the website.



Photo: INTE-UPC



ID Card:

Exposure type:
External

Source:
ISO 4037-1 Narrow X-Ray series, ^{137}Cs , ^{60}Co , IEC 61267 diagnostic (RQR) and mammography (RQR-M) radiation qualities, ISO 6980-1 ^{90}Sr - ^{90}Y , wide area reference sources (^{90}Sr - ^{90}Y , ^{60}Co , ^{14}C , ^{241}Am , ^{36}Cl)

Dose rate:
 ^{137}Cs (1 $\mu\text{Gy/h}$ - 54 mGy/h), ^{60}Co (11 $\mu\text{Gy/h}$ - 0.45 mGy/h), X-ray (narrow series) (0.1-200 mGy/h), X-ray (diagnostic) (0.1-10 Gy/h), ^{90}Sr - ^{90}Y (4 mGy/h; 0.5 Gy/h)

Irradiation type:
gamma, X-ray, beta

Irradiated organism type:
None

Address:
Polytechnic University of Catalonia
Institute of Energy Technologies
Calibration and Dosimetry Laboratory
Diagonal, 647
08028 Barcelona (Spain)

Access:
Joint research collaborations, service contracts

Supporting lab:
Thermoluminescent Dosimetry Laboratory (TLD), Computer cluster

Internet link:
<https://inte.upc.edu/en>

Contact:
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Related to:
EURADOS, MELODI



German airline crew cohort

The use of radiation registry data in the 3rd follow-up study

Commercial airline crews are one of the occupational groups with the highest exposure to natural radiation of cosmic origin. Several national airline personnel cohorts in Europe and North America were established in the 1990s with the aim of investigating the occupational health risks of cockpit and cabin crew, and in particular to identify radiation-associated cancer. As one of the largest national studies (n=26,846), the German cohort study is currently concluding its third follow-up investigation with an additional 10 years of observation, up to the end of 2014, and with an overall follow-up time of up to 55 years (1960-2014).

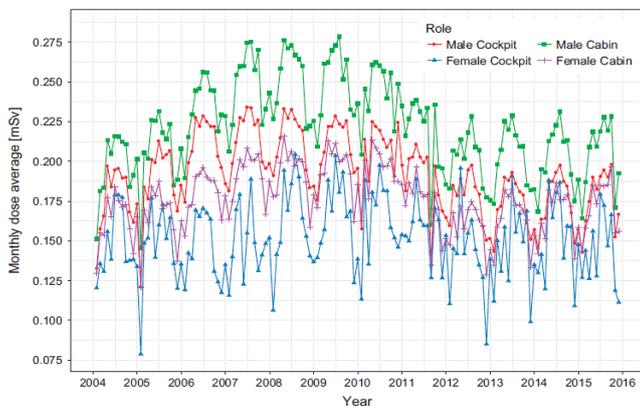
et al., 2017). In this third follow-up period, exposure data from 26,805 cohort members was available, compared to n=5,995 in the previous analyses. SMR and RR analyses are currently underway and results will be submitted for publication in international peer-reviewed journals in the first part of 2018.



Photo: BIPS

Pr Hajo Zeeb

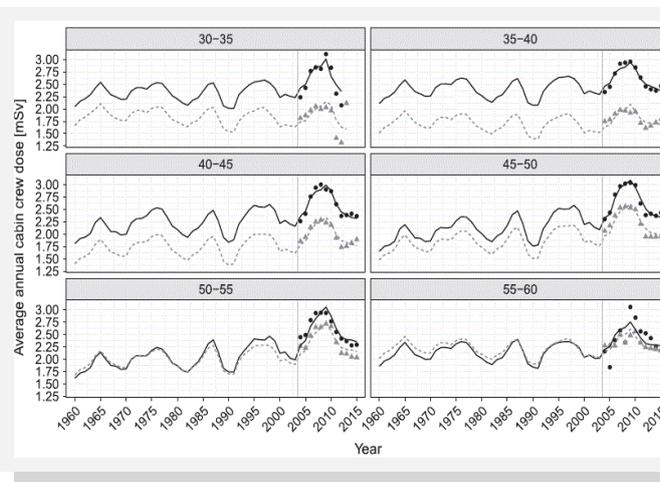
To our knowledge this is the first mortality follow-up study using SSR registry data in Germany. The data availability further enables convenient and quality assured exposure assessment via data-linkage for (possible) future follow-up studies of this cohort and/or the set-up of a new generation of aircrew cohorts, as working conditions have changed since the initial cohort started in terms of flight frequencies, ranges and routes, thus resulting in higher lifetime radiation doses compared to those individuals who started in the pre-jet era. Also, follow-up work will be more convenient as unique registry identifiers are used, which will ensure cohort retention and nearly complete exposure assessment. Furthermore, SSR data may also be used to ascertain vital status if SSR data availability exceeds the cohort time-inclusion criteria, which also leads to cost reduction.



Mean monthly effective aircrew dose from 2004 to 2015, stratified by sex and role. Reprinted by permission from Macmillan Publishers Ltd: [J Expo Sci Environ Epidemiol] (doi:10.1038/jes.2017.21)

In the previous follow-up studies, exposure assessment was based on dose reconstructions using a job-exposure matrix approach based on company flight records, to estimate individual radiation doses for the cockpit personnel only. Cabin crew were not included as detailed flight records were not available. Following regulatory changes in 2003, aircrews in Germany are now systematically monitored, and individual monthly effective doses have been documented by the Federal Radiation Registry (SSR) since mid-2003 (complete data availability: start of 2004).

Thus, in this follow-up study, the newly available exposure data are now included for cockpit and cabin cohort members, for exposures during the period from 2004 to 2014. In addition, the estimated radiation exposure of the cabin crew for the years from 1960 to 2003 has been modelled as a function of age, sex, job category, solar activity and male pilots' dose, to provide the opportunity to conduct dose-response analyses for the full cohort (Wollschlaeger



Predicted (lines) and observed (points) average annual effective cabin crew dose plotted from 1960 to 2015, stratified by sex and 5-year age groups.

Reprinted by permission from Macmillan Publishers Ltd: [J Expo Sci Environ Epidemiol] (doi: 10.1038/jes.2017.21)

ID Card:

Cohort type:

German airline cockpit and cabin crew with 26,805 individual occupational exposure records

Age/follow-up:

Age at exposure: 18-62 years; mortality follow-up for radiation-related cancers and other disease outcomes

Biobank available:

No

Access:

To be discussed with the research team

Internet link:

<https://www.bips-institut.de/en/home.html>

Contact:

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Related to:

MELODI



Analytical platforms, Models & Tools

Centre for Omic Sciences (COS)

A unit for metabolomics, proteomics, genomics and transcriptomics

EURECAT is the major Technology Centre of Catalonia, Spain. EURECAT provides the industrial and business sectors with differential technology and advanced expertise; it offers solutions to their innovation needs and boosts their competitiveness in a fast-paced environment. The range of services offered by the centre is primarily focused on key strategic sectors of the Catalan economy: Food, Health, Energy and Resources, Industrial Systems, Design-based Industries, Industries related to Sustainable Mobility and the Cultural Industries.

technologies, comprising a microarray platform, a next generation sequencing platform, 9 high-end mass spectrometers including MS-Imaging systems, 2 NMR instruments, an SPR protein



Photo: EURECAT

Dr Nuria Canela

interaction analysis system and various robots and high throughput technologies, as well as computing infrastructures and other analytical tools. Moreover, the biotechnologies infrastructure has acquired new facilities to develop in silico, in vitro and in vivo research studies and human intervention studies to validate the efficacy and non-toxicity of new bioactive compounds and extracts.



Photo: COS

The centre serves over a thousand businesses, participates in over 200 national and international R&D&I high level strategic projects, holds 73 international patents and owns 9 technology-based companies. It comprises eight centres in Catalonia and one in Latin America (Brazil).

EURECAT has 3 main technology divisions: digital, industrial and biotechnologies. Its biotechnologies division manages the Centre for Omic Sciences (COS). COS is a joint Unit comprising the University Rovira i Virgili (URV) and EURECAT. COS hosts a large, well-equipped analytical facility for high throughput omic studies which focuses on metabolomics but also includes proteomics, transcriptomics, genomics, imaging and research facilities for organisms and cells, based on an initial equipment investment of more than 10 million euros.

EURECAT-COS is a singular facility, unique in Spain, due to its equipment set-up and its approach to biochemical problems. COS provides support services to both companies and academia. These services are underpinned by state-of-the-art

The vision of COS is to become a hub facility for omic sciences based on a metabolomics approach, and to become a European reference centre for omic science research and services applied to the field of food and nutrition. The facility is unique because its approach to biological problems begins with metabolomics in order to generate new hypotheses for molecular mechanisms that can then be validated using the other omics (proteomics, transcriptomics and interactomics) and in vivo models. Additionally, the integrated information from the different omics provides a novel means of investigating biomarkers and understanding biological processes related to the consumption of healthy foods.

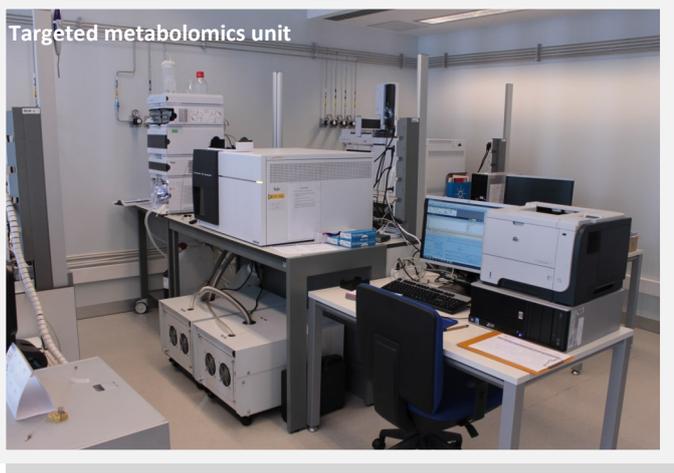


Photo: COS



ID Card:

Analytical platform type:

Scientific operator in the world of omic technologies fully equipped with cutting-edge metabolomics, proteomics, transcriptomic, and genomic tools. We offer scientific advice and support from experimental design prior to omic assessment complete with facilities with in-vitro and in-vivo models and a Human Nutrition Unit available to our clients.

Main techniques proposed:

DNA sequencing & fragment analysis (Sanger DNA Sequencing), Next generation sequencing (Ion Torrent PGM), Microarray analysis, Automated real-time PCR analysis, Targeted proteomic profiling (SRM assays), MALDI tissue imaging, Luminex bead array and others.

Capacity:

Hundreds samples per month

Address:

Centre for Omic Sciences
Avda. Universitat no 1
43204-Reus, Spain

Access:

For access demands please contact:

info@omicscentre.com

Internet link:

<http://omicscentre.com>

Contact:

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Related to:

MELODI, ALLIANCE



Future events:

CONCERT Short Courses

5-9 February 2018

Emergency and recovery preparedness and response

National Center of Radiobiology and Radiation Protection, Bulgaria

Contact:

Nina Chobanova
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19-23 February 2018

Radiation Protection:
Basics and Applications
Forschungszentrum Jülich, Germany

Contact:

Ralf Kriehuber
r.kriehuber@fz-juelich.de

5-16 March 2018

Assessment of long-term radiological risks from environmental releases: modelling and measurements, Technical University of Denmark

Contact:

Bastian Breustedt
Bastian.breustedt@kit.edu

Other Events

5-11 November 2017

MICROS 2017, 17th International Symposium on Microdosimetry, Venice, Italy

5-8 February 2018

EURADOS AM2018, Lisbon, Portugal

27-28 February 2018

ISBER European Biospecimen Research Symposium

International Society for Biological and Environmental Repositories, Luxembourg

11-15 June 2018

EPRBioDose 2018, Munich, Germany

1-5 October 2018

3rd ERPW, Rovinj Rovigno, Croatia

See also on CONCERT website

Issue

Exposure platforms

Databases, Sample banks, Cohorts

Analytical platforms, Models & Tools

Published to date:

Oct 2015, #1
Nov 2015, #2
Dec 2015, #3
Feb 2016, #4
Mar 2016, #5
Apr 2016, #6
May 2016, #7
Jun 2016, #8
Jul 2016, #9
Sep 2016, #10
Oct 2016 #11
Nov 2016, #12
Dec 2016, #13
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Mar 2017, #15
Apr 2017, #16
May 2017, #17
Jun 2017, #18
Jul 2017, #19
Sep 2017, #20
Oct 2017, #21
Nov 2017, #22

FIGARO

B3, Animal Contamination Facility

Pulex Cosmic Silence

SNAKE

Radon exposure chamber

Biological Irradiation Facility

CIRIL

Mixed alpha and X-ray exposure facility

SCRS-GIG

Facility radionuclides availability, transfer and migration

LIBIS gamma low dose rate facility ISS

Microtron laboratory

Nanoparticle Inhalation Facility

Infrastructure for retrospective radon & thoron dosimetry

Alpha Particles Irradiator Calibration Laboratory at KIT

Changing Dose rate (SU)
Low dose rate (SU)

Chernobyl Exclusion Zone

MELAE

MICADO'LAB

DOS
NDS

CALLAB

Radon Calibration Laboratory

Calibration and Dosimetry Laboratory (INTE-UPC)

FREDERICA

The Wismut Cohort and Biobank

STORE

French Haemangioma Cohort and Biobank

3-Generations exposure study

Wildlife TransferDatabase

Portuguese Tinea Capitis Cohort

Elfe Cohort

RES²T

INWORKS cohort

JANUS

EPI-CT Scan cohort

UEF Biobanking

Chernobyl Tissue Bank

Chernobyl clean-up workers from Latvia

Belgian Soil Collection

Estchern Cohort

German airline crew cohort

RENEB

The Hungarian Genomics Research Network
METABOHUB

Dose Estimate, CABAS, NETA

PROFI

Radiobiology and immunology platform (CTU-FBME)

LDRadStatsNet

ERICA Tool

CROM-8

France Génomique

Transcriptomics platform SCKCEN

CATI

The Analytical Platform of the PRE-PARE project
HZDR Radioanalytical Laboratories

SYMBIOSE

Advanced Technologies Network Center

BfS whole and partial body Counting

INFRAFONTIER

ECORITME

CERES

CORIE

Centre for Omic Sciences (COS)

Coming soon:

Dec 2017, #23

To Be Announced

To Be Announced

To Be Announced