

# **OPERRA Workshop: Modelling of pathogenesis**

**Date: Monday, January 12, 2015, 14:00 - Tuesday, January 13, 2015, 17:30**

**Place: Helmholtz Zentrum München, Munich, Germany**

## **Task 2.6: Integrating knowledge from non-radiation research**

### **Subtask 2.6.6: Modelling of pathogenesis**

#### **Background**

As part of the activities of the HORIZON2020 framework programme, the European Union (EU) is setting up a European Joint Programme (EJP) in radiation protection to promote the common programming and implementation of Member States research activities. The EJP's scientific content will be laid down in Strategic Research Agendas (SRAs) for a number of EU-funded research networks under the administrative umbrella structure OPERRA (Open Project for the European Radiation Research Area; Website under construction, information accessible at MELODI website, see below) for further integration and definition of research priorities in Europe. OPERRA has the capacity to administer future calls for research in radiation protection on behalf of the European Commission. Under OPERRA, the three networks ALLIANCE, NERIS and EURADOS address important topics in radioecology, emergency preparedness and dosimetry.

The fourth network, MELODI (Multidisciplinary European Low Dose Initiative, [www.melodi-online.eu](http://www.melodi-online.eu)), is concerned with assessing the health effects of ionizing radiation at low doses. MELODI was founded in 2010 as a registered association under French law. The purpose of MELODI is to propose research priorities for Europe in this field of competence, to establish and update a SRA addressing health risks at low doses, to contribute to the dissemination of knowledge, and to liaise with international partners like WHO and IAEA.

The objective of OPERRA task 2.6 is the exploration of expertise gathered in other fields of research, not directly related to radiation protection research, with a view to strengthening the exchange and integration of knowledge between the radiation and non-radiation research communities. For this, task 2.6 will organize small workshops with scientists from outside and inside the radiation community in order to identify knowledge and infrastructures that can be applied to radiation research, thus optimizing resources for the future. By bringing together relevant experts in thematic workshops, a roadmap will be developed for the integration of knowledge in epidemiology, bioinformatics, animal models, biomarkers, integrative biology and modelling from outside the radiation R&D field that will support on-going efforts to better understand mechanisms of radiation-induced health effects. This will be achieved through six complementary subtasks. Subtask 2.6.6 includes the organisation of a workshop on “modelling of pathogenesis”.

Two sessions of this workshop will be jointly held with the OPERRA workshop on „Integrative biology and systems biology“ organised by Dr Kristian Unger from the Research Unit Radiation Cytogenetics (ZYTO). The Institute of Radiation Protection and ZYTO are members of the Department of Radiation Sciences at the Helmholtz Zentrum München. Both workshops precede the OPERRA periodic meeting on 14-16 January on the same campus.

As a result of these workshops, a “Roadmap for integrating knowledge from non-radiation research” will be prepared that will support on-going and future efforts to better understand mechanisms of radiation induced health effects.

## **Time schedule:**

### **Monday, January 12, 2015**

#### **Session 1: 14:00 - 15:45: Cellular systems and systems biology**

Talk 1: 14:00 - 14:45

Talk 2: 14:45 - 15:30

Discussion: Future development and integration in the field of radiation research:  
15:30-15:45

#### **Coffee Break 15:45-16:15**

#### **Session 2: 16:15 - 18:00: Together with Systems Biology workshop: Networks, molecular pathways and consequences for pathogenesis**

Talk 3: 16:15 - 17:00

Talk 4: 17:00 - 17:45

Discussion: Integration Systems Biology with Modelling of pathogenesis:  
17:45-18:00

#### **Dinner in a Bavarian Restaurant**

### **Tuesday, January 13, 2015**

#### **Session 3: 9:00 - 10:45: Cellular systems and models of pathogenesis**

Talk 5: 09:00 - 09:45

Talk 6: 09:45 - 10:30

Discussion: Future development and integration in the field of radiation research:  
10:30-10:45

#### **Coffee Break 10:45-11:00**

#### **Session 4: 11:00 - 12:45: Systems biology and models of pathogenesis**

Talk 7: 11:00 - 11:45

Talk 8: 11:45 - 12:30

Discussion: Future development and integration in the field of radiation research:  
12:30-12:45

#### **Lunch break: 12:45-13:45**

#### **Session 5: 13:45 - 15:30: Together with Systems Biology workshop: Networks, molecular pathways and consequences for pathogenesis**

Talk 9: 13:45 - 14:30

Talk 10: 14:30 - 15:15

Discussion: Integration Systems Biology with Modelling of pathogenesis:  
15:15-15:30

#### **Coffee Break 15:30-16:00**

#### **Session 6: 16:00 - 17:30: Summary discussion, definition of research priorities**

#### **End of workshop**

## List of Speakers:

**William Paul Accomando**, Universität Freiburg, Germany:

*Genotyping of pre-neoplastic lesions in the colon*

**Jonas Behr**, ETH Zürich, Switzerland:

*Modeling tissue specific cancer progression for 21 cancer types based on maximum a posteriori inference of directed graphs*

**Marc Chadeau-Hyam**, Imperial College London, London, UK:

*A hidden Markov model for smoking-induced lung cancer dynamics*

**Fieke Dekkers**, RIVM, Netherlands:

*Models of cardiovascular diseases (tentative)*

**Markus Eidemüller**, Helmholtz Zentrum München, Germany:

*Models of carcinogenesis with radiation-induced genomic instability: Breast cancer in the Swedish hemangioma cohort*

**Heiko Enderling**, University of South Florida, USA:

*Agent-based modeling of cancer stem cell-driven solid tumor dynamics*

**Jan Christian Kaiser**, Helmholtz Zentrum München, Germany:

*Integration of molecular biology and radiation epidemiology in models of carcinogenesis*

**E. Georg Luebeck**, Fred Hutchinson Cancer Research Center, Seattle, USA:

*Towards a mechanistic understanding of left-right differentials in colorectal cancer: a modeling approach*