Low Dose Radiation Risks: Present Research & Future Perspectives

Location: Round Hall of the Presidium of National Academy of Sciences of Armenia, Yerevan, Armenia

Date: March 30th – April 2nd, 2025

This activity is supported by the NATO Science for Peace and Security Programme, the Internation Union of Radioecology, International Association for Radiation Research (IARR), Institute of Molecular Biology NAS RA and McMaster University

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This workshop is supported by: The NATO **Science** for **Peace** and **Security** Programme

DAY 1 – Sunday March 30th

17:00 – 20:00	Registration and Welcome Reception (IBIS Hotel, 5/1 Northern Ave, Yerevan)

DAY 2 – Monday March 31st

08:30 – 09:20	Registration (National Academy of Sciences, 24, Marshall Baghramian Ave.)
09:20 – 09:40	Welcome Address, A new future: rational and expected outputs of the ARW [**Carmel Mothersill**, Canada; **Arsen Arakelyan**, Armenia]

Session 1 *– Low-dose radiobiology and environmental toxicology background [Chaired by:* ***Carmel Mothersill****, Canada]*

09:40 – 10:00	Low dose radiobiology - an overview [**Carmel Mothersill** Canada]
10:00 – 10:20	Radiation impact to ecosystems at low doses, issues and challenges ahead [**Francois Brechnigac**, France]
10:20 – 10:40	Multiple stressor exposures [**Brit Salbu,** Norway]
10:40 – 11:00	Low dose and low-dose-rate studies of neutrons and gamma rays on cancer in cadence in large-scale animal studies [**Gayle Woloschak,** USA]
11:00 – 11:10	*Coffee Break*
11:10 – 11:30	Environmental toxicology and transgenerational effects in non-human species [**Shayenthiran Sreetharan,** Canada]
11:30 – 11:50	Beyond the AOP: causal inference engines in coupled human and natural systems (CHANS) for radioecology [**Paul Schofield**, UK]
11:50 – 12:10	Enhancing radiation risk assessment with 3D culture models [**Nelly Babayan,** Armenia]
12:10 – 12:30	Open discussion for Session 1

12:30 – 13:30	*Lunch*

Session 2 - *Low-dose effect mechanisms [Chaired by:* ***Arsen Arakelyan****, Armenia]*

13:30 – 13:50	Toxic, but not cytotoxic nor genotoxic - Low-Dose ionizing radiation can trigger senescence and loss of multi-potency in adult stem cells [**Michael Rosemann**, Germany]
13:50 – 14:10	How low dose ionizing radiation engages immune networks [**Dorthe Schaue**, USA]
14:10 – 14:30	Modelling the Effects of Low-Dose Radiation: Studying Its Implications in Clinical Radiotherapy and Radiation Protection [**Gibin Powathil**, UK]
14:30 – 14:50	Approaches to developing holistic models in radioecology [**Colin Seymour,** Canada]
14:50 – 15:15	Open discussion for Session 2
15:15 – 15:30	*Coffee Break*

Session 3 – *Multiple Stressors and markers [Chaired by:* ***Brit Salbu,*** *Norway]*

15:30 – 15:50	Time to x LNT and base radiation protection regulations on science [**Marek Janiak,** Poland]
15:50 – 16:10	Radiation in the City: Evaluating Environmental Radioactivity and Public Health Risks [**Olga Belyaeva**, Armenia]
16:10 – 16:30	Genotoxic effects of low LET irradiation by electron pulses in human cells [**Rouben Aroutiounian**, Armenia]
16:30 – 16:50	Long-Term Pathway Activation in Cardiac Ventricular Tissues Following Low-Dose Gamma and simGCRsim Irradiation [**Arsen Arakelyan**, Armenia]
16:50 - 17:10	Deciphering molecular mechanisms of plant radiosensitivity [**Dag Anders Brede,** Norway]

17:10 – 17:35	Open discussion for Session 3
17:35 – 19:00	*Free time*
19:00	*Dinner*

DAY 3 – Tuesday April 1st

***Session 4** – Modelling approaches and novel tools [Chaired by: **Colin Seymour,** Canada]*

09:00 – 09:20	On the possibility of using physical methods in the tasks of bioindication of small doses of radiation [**Hrachya Sargsyan,** Armenia]
09:20 – 09:40	Delayed effects of chronic radiation exposure on aquatic life across biological organization levels in the Chernobyl exclusion zone [**Dmitri Gudkov**, Ukraine]
09:40 – 10:00	Modelling adaptive responses following chronic and low dose exposure in amphibians [**Marilyne Audette-Stuart,** Canada]
10.00 - 10.20	Low-dose radiation effects on stem cells in wild animals in Fukushima, [**Kentaro Ariyoshi,** Japan
10:20 – 12:50	*Workshop group photograph & Tour of CANDLE*
12:50 – 14:00	*Lunch*

***Session 4** – Continued [Chaired by: **Colin Seymour,** Canada]*

14:00 – 14:20	Current work of the ICRP related to environmental radiological protection [**David Copplestone**, UK]
14:20 – 14:40	Imaging Molecule to Man – Unveiling the implications in Low Dose Radiation Research [**Rao Papineni, USA]**
14:40 – 15:00	Open discussion for Session 4

Session 5 *– Learning from other disciplines about multiple stressor interactions [Chaired by:* ***Andrea Bonisoli Alquati****]*

15:00 – 15:20	Learning from Emergency and ARS planning [**Michael Abend**, Germany]
15.20-15.40	Learning from Ecotoxicology in Shaping Future Directions in Radioecology [**Andrea Bonisoli Alquati,** USA]
15:40 – 16:00	*Coffee Break*
16:00 – 16:20	Quantum signaling directs IR effects on T-helper (Th) lymphocyte-mediated immune responses: A framework for understanding and treating irreversible osteopenia and cardiovascular disease after deep space exercises/sojourns [**Nicholas Dainiak**, USA]
16:20 – 16:40	Complex chromosome aberrations in human populations as biomarkers of LET: Challenges and future considerations [**Rhona Anderson**, UK]
16:40 – 17:00	Open discussion for Session 5
17:00 – 17:20	Developing a position paper [**Carmel Mothersill**, Canada and **Arsen Arakelyan**, Armenia]
17:20 – 19:30	*Free Time*
19:30	*ARW Dinner*

DAY 4 – Wednesday April 2nd

9:00 – 10:00	Poster Session

Session 6 - *System approaches in radiobiology and ecotoxicology [Chaired by:* ***Andrea Bonisoli Alquati,*** *USA]*

10:00 – 10:20	Adverse Outcome Pathways in Radiation Research and Impact Assessment [**Knut Erik Tollefsen**, Norway]
10:20 – 10:40	System biology and wicked problems [**Larry Kapustka**, Canada]
10:40 – 11:00	*Coffee Break*

Session 6 *– Continued [Chaired by:* ***Andrea Bonisoli Alquati,*** *USA]*

11:00 – 11:20	When is Change Bad? Low Dose Radiation Research from an Ethical and Social Science Perspective [**Deborah Oughton,** Norway]
11:20 – 11:40	Risk communication: how should we effectively engage the public? [**Rhea Desai,** Canada]
11:40 – 12:00	Open Discussion for Session 6
12:00 – 13:00	Discussion and comments on all sessions of NATO ARW
13:00 – 14:00	*Lunch*
14:00 – 15:30	Position paper development [facilitated by **Carmel Mothers**ill, Canada and **Arsen Arakelyan**, Armenia]
15:30 – 15:50	*Coffee Break*

Closing Session *– [Chaired by:* ***Carmel Mothersill and Arsen Arakelyan****]*

15:50 – 16:10	Work plan for contributions to NATO Science Series book
16:10 – 16:30	Open discussion, final comments on workshop
16:30 – 16:45	Closing remarks
16:45 – 19:00	*Free time*
19:00	*Dinner*

Poster Presentations

1. **Elena Kalita** - Comparison of radiation effects on DNA damage and cell survival in 2D and 3D cell culture models
2. **Anahit Atoyants** - Tradescantia-Micronucleus assay of undisturbed Aragats massif (Armenia) soils genotoxicity considering their radioactivity
3. **Yury Cherepennikov** - Applicability of Commercially Available Admixed Plastic Filaments for Simulating Bone Tissue in 3D-Printed Dosimetry Phantoms
4. **Spartak Hovhannisyan** - Exposure to Radon in Tap Water: Risk Assessment and Spatial Trends in Yerevan, Armenia
5. **Lily Kalashyan** - Telomere Lengths of Human Chromosomes as Potential Biomarkers of Genomic Instability Induced by Electron Beam Radiation
6. **Irina Grigoryan** - Possible Mechanism of the Impact of Radiation on Living Organisms