

**REG 08:00—16:00 Conference Registration**Venue: *Entrance M-Building***OP 09:30—09:40 Opening Plenary**Venue: *M-Plenary*Chair: **Melissa Denecke (IAEA)**

Time	Presenter		
09:30	R. M. Grossi	IAEA	Opening Remarks– Director General
09:40	N. Mokhtar	IAEA	Welcome by Deputy Director General-NA
09:50	J. Osso Junior	Brazil	ICARST-2017: Highlights and Lessons Learned
10:05	M. Denecke	IAEA	Administrative Remarks–ICARST Scientific Secretariat

*Coffee break: 10:30—11:00***PS01 11:00—12:30 Plenary Session: Radiation Science and Technology for the Future**Venue: *M-Plenary*Chair: **Meera Venkatesh (India)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
11:00	547	O. Güven	Türkiye	Radiation Processing of Polymers: How We Have Come to Where We Are Today
11:30	800	T. Bjørnstad	Norway	Radiotracer and Sealed Source Technology: Past, Present, and Future...
12:00	332	N. Ramamoorthy	India	Radiation Technology Practices: Fostering Advances and Addressing Challenges

*Lunch break: 12:30—14:00***A01 14:00—15:30 Trends in Radiation Science and Technology**Venue: *M-Plenary*Chair: **Piotr Ulanski (Poland)**

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
14:00	545	M. Al-Sheikhly	USA	An Eye Opener on the Bright Future of Ionizing Radiation in Synthesis of Novel Materials for Medicine and Technology
14:15	408	X. Coqueret	France	Recent Advances in the Radiation Chemistry of Polysaccharides
14:30	10	N. Ludwig	France	Combined Dose, Dose Rate, Irradiation Temperature and Atmosphere Effects on Irradiated Polymer Materials: A Fundamental and Experimental insight to E-beam and X-Ray Irradiation
14:45	419	S. Pillai	USA	Accelerator Technologies for Environmental Remediation and Water Reuse Applications
15:00	96	P. Vasquez	Brazil	New Trends and Applications of Ionizing Radiation for Preservation of Cultural Heritage Tangible Materials

*–Discussion–**Coffee break: 15:30—16:00*

**B01 14:00—15:30 Advances and Trends in Radiotracer Technology**Venue: **Conference Room M2**Chair: **Tor Bjørnstad (Norway)**TSec: **Hannah Affum (IAEA)**

Time	ID	Presenter		
14:00	401	Q. Nguyen Huu	Vietnam	What Tracers Can Do – A Critical Review
14:15	317	J.-H. Jin	Rep. of Korea	Statistical Errors in Flow Rate Measurement by Transit Time Method Using Radioactive Tracers
14:30	607	A. Buffler	South Africa	Positron Emission Particle Tracking for Flow Visualization
14:45	653	P. Brisset	France	Study of Dumping of Dredging Products in Laboratory Channel
15:00	263	F. Ditrói	Hungary	Lateral Activity Distribution in Irradiated Targets Confirmed by Positron Emission Tomography

*–Discussion–**Coffee break: 15:30—16:00***C01 14:00—15:30 Role of IAEA in Advancement of Radiation Science and Technology**Venue: **Board Room A**Chair: **Lixin Shen (China)**TSec: **Celina Horak (IAEA)**

Time	ID	Presenter		
14:00	504	E. da Costa Alves	Portugal	The Role of Irradiation Facilities to Reduce the Environmental Impact of Pandemic Waste
14:15	64	V. Kalia	India	Trends in Radiation Processing of Food in India
14:30	488	M. Min Htwe	Myanmar	Pesticide Residue Screening and Determination in Agricultural Soil and Effluent Water with GCMS and FTIR Methods for the Purpose of Pesticide Removal using Gamma Irradiation
14:45	214	B. Saputro	Indonesia	High Dose Rate Dosimetry Laboratory in Indonesia: Challenges and Future Prospects
15:00	410	O. Salina	Norway	RoboLab - Providing Remote Access to a Physical Radiation Laboratory

*–Discussion–**Coffee break: 15:30—16:00*

**A02 16:00—17:30 Advanced Radiation Chemistry**Venue: *M-Plenary*Chair: **Mohamad Al-Sheikhly (USA)**

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
16:00	522	L. Wojnarovits	Hungary	Reactions of $\text{Cl}\bullet/\text{Cl}_2\bullet$ - and $\text{CO}_3\bullet$ - Radicals During Wastewater Treatment by Ionizing Radiation
16:15	517	P. Ulanski	Poland	Recombination Kinetics of Poly(Acrylic Acid) Radicals in Aqueous Solution. A Pulse Radiolysis Study
16:30	521	M. Sadeghi Bogar	Germany	Quantitative EPR Study of Electron Activated Poly(vinylidene fluoride) and Poly(ethylene tetrafluoroethylene) Foils
16:45	724	A. Baidak	United Kingdom	Hydrogen Production in the Alpha Radiolysis of the Ion Exchange Resins
17:00	241	I. P. Kavirayani	India	Pulse Radiolysis Studies on Selenium Centred Radicals and Their Comparision with Sulfur Analogues

–Discussion–

**B02 16:00—17:30 Advances in Imaging Technologies in Industry**Venue: *Conference Room M2*Chair: **Ferenc Ditroi (Hungary)**

TSec: Gerardo Maghella Seminario (IAEA)

Time	ID	Presenter		
16:00	216	T. Bjørnstad	Norway	“Nuclear Clocks” for Unique Labeling of Valuable Digital Films
16:15	648	K. Unlu	USA	Determination of Microplastics in Environmental Samples via Neutron Radiography and Tomography at Penn State-Radiation Science and Engineering Center
16:30	17	K. N. Myaing	Myanmar	Design and System Development of Portable Gamma Computed Tomography CT Scanning System
16:45	299	Y. Sun	China	Intelligent Recognition Method for Radiation Images of Large Vehicle Inspection System
17:00	730	S. Zaw	Myanmar	Design and Program Development for Industrial Gamma Fan-beam CT based on Single-source and Single-detector System

–Discussion–

**C02      16:00—17:30      Sustainable Development with Radiation Science and Technology**Venue: *Board Room A*Chair: **Wilson A. P. Calvo (Brazil)**

TSec: Valeriia Starovoitova (IAEA)

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Time	ID	Presenter		
16:00	24	A. El-Fiki	Egypt	Molecular Diversity Analysis of in vitro and Irradiated Tomato ( <i>Lycopersicon esculentum</i> Mill) Grew Under Salt Stress Expressed by SCoT and ISSR markers.
16:15	572	J. H. Tang	Singapore	Jump-Starting Public Engagement and Interest in Radiation Science in Singapore
16:30	384	U. Saha	USA	Development of the AARST Consortium Standard on Protocol for the Collection, Transfer and Measurement of Radon in Water
16:45	204	L. Shen	China	New Progress and Development Trend of China's Radiation Science and Technology in Recent Years
17:00	454	S. Massa	Italy	Use of Gamma Rays to Mimic Cosmic Radiation for the Characterization of Engineered Tomato Plants Intended for Cultivation in Space Outposts.

*–Discussion–*

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**18:00—19:30****Welcome Reception**Venue: *M-Building*

**A03 09:00—10:30 Advanced Nanomaterials and Composites**Venue: **M-Plenary**Chair: **Xavier Coqueret (France)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
09:00	495	M. Barsbay	Türkiye	Formation of Palladium Nanoclusters via Radiation-Induced Reduction of Pd(II) Ions Absorbed on PVP Shell Grafted on Silica Microparticles by RAFT Polymerization and Investigation of their Catalytic Activities
09:15	243	S. Sakata	Brazil	Reduced Graphene Oxide obtained by Gamma Radiation to Produce Screen Printed Glucose Biosensor
09:30	437	L. M. Ferreira	Portugal	Use of Ionic Liquids in the Radiation Processing of Nanostructured Hybrid Materials
09:45	622	W. Pasanphan	Thailand	Tailoring Nanohybrids and Nanocomposites as Functional Materials and Active Surface Coatings Using Radiation
10:00	347	I. Marić	Croatia	A $\gamma$ -Irradiation Method for the Synthesis of Iron Oxide/Au Nanostructures

–Discussion–

*Coffee break: 10:30—11:00***B03 09:00—10:30 Radiotracers for Troubleshooting Industrial Processes**Venue: **Conference Room M2**Chair: **Jovan Thereska (ISTRA)**

TSec: Hannah Affum (IAEA)

Time	ID	Presenter		
09:00	143	T. Smolinski	Poland	Radiotracer Leak Detection Method Developed at INCT
09:15	582	O. Potier	France	Modeling Hydrodynamics of Complex Systems Using Results of Tracing Experiments: Examples of the General Model of Activated Sludge Reactors Obtained from about 200 Experiments
09:30	416	W. A. P. Calvo	Brazil	Development of an Irradiation System for Production of Gaseous Radioisotopes and of a Tomographic 2-D Gamma Scanning for Industrial Process Troubleshooting in Brazil
09:45	372	G. A. Johansen	ISTRA	High Speed Tomographic Imaging of Dynamic Industrial Processes
10:00	326	A. Saadaoui	Morocco	Infrared Thermography and Neutron Backscattering for Detecting the Clogging Deposits in Hydrocarbon Pipes

–Discussion–

*Coffee break: 10:30—11:00*

**C03 09:00—10:30 Wastewater and Sludge Treatment**

Venue: Board Room A

Chair: Laszlo Wojnarovits (Hungary)

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
09:00	566	M. Driscoll	USA	Degradation of Microcystin, MIB and Geosmin in Water by Electron-Beam Irradiation
09:15	415	A. Sagatova	Slovakia	Chemical Pre-Treatment in Radiation Degradation of PCBs in Sediments
09:30	440	S. He	China	Electron Beam Technology for Textile Wastewater Treatment: A Full Scale Application in China
09:45	493	E. Takács	Hungary	Detection and Elimination of Antibacterial Activity from Wastewaters
10:00	425	Y. Sun	Poland	Mechanism of Perfluorooctanoic Acid (PFOA) Degradation in Aqueous Solution Under Ionization Radiation

–Discussion–

Coffee break: 10:30—11:00

**A04 11:00—12:30 Grafted Materials as Membranes and Adsorbents**

Venue: M-Plenary

Chair: Olgun Güven (Türkiye)

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
11:00	794	M. Tamada	Japan	Emulsion Graft Polymerization Promoting Technology Transfer
11:15	414	M. Nasef	Malaysia	Co-Graft Polymerization of 1-vinylimidazole with N-vinylpyridine onto EB Preirradiated poly(ethylene-co-tetrafluoroethylene) Film for Composite Proton Conducting Membrane with Enhanced Acid Doping
11:30	265	Y. Kodama	Brazil	Effects of Gamma Radiation Absorbed Dose on VBC Grafting Onto LDPE Films and on Anion Exchange Membrane Fuel Cells Performance
11:45	499	F. Kirac	Türkiye	The Synthesis of Superior Proton Exchange Membrane (PEM) via Radiation-induced RAFT Polymerization for Fuel-cell Technologies
12:00	435	J. Madrid	Philippines	Radiation-induced Grafting of poly(glycidyl methacrylate) Nanostructures onto Gold Surface by RAFT-mediated Polymerization

Lunch break: 12:30—14:00

**B04 11:00—12:30 Sealed Sources and Nucleonic Control Systems**Venue: **Conference Room M2**Chair: **Simon Adzaklo (Ghana)**

TSec: Gerardo Maghella Seminario (IAEA)

Time	ID	Presenter		
11:00	302	R. Alami	Morocco	Column Scanning Case Study: Between Misinterpretation and Reality
11:15	102	S. Mohd Yunos	Malaysia	Interface Inspection for Surge Drum Vessel using Gamma-Ray Transmission and Neutron Backscatter Techniques
11:30	137	M. P. Hlaing	Myanmar	Utilization of Gamma Scanning Technique for Inspection of CO <sub>2</sub> Absorber in Fertilizer Plant
11:45	712	F. Ningsih	Indonesia	Gamma-Ray Scanning Approach for Rectifier and After Washer Column Investigation with Sc-46 Radionuclide Source
12:00	120	M. Lohvithee	Thailand	Inspection of Big Trees' Internal Structure using Gamma Radiation

–Discussion–

*Lunch break: 12:30—14:00***C04 11:00—12:30 Biohazard Mitigation**Venue: **Board Room A**Chair: **Mark Driscoll (USA)**

TSec: Valeriia Starovoitova (IAEA)

Time	ID	Presenter		
11:00	456	M. Sudlitz	Poland	Application of Radiation Technology to Decomposition of Selected Organic Pollutants in Waters, Waste and Sludge
11:15	441	Ö. Kantoğlu	Türkiye	Detection and Radiation Induced Treatment of Emerging Micropollutants in WWTP Effluents
11:30	340	J. Wang	China	Electron Beam Technology for Hospital Wastewater Treatment: A Full Scale Application in China
11:45	61	M. V. Vogt	Argentina	Radiation Inactivation of Biohazards in Laboratory Animal Waste
12:00	76	F. Hmaied	Tunisia	Monitoring of Biohazards in Healthcare Wastewater using Electron Beam Irradiation

–Discussion–

*Lunch break: 12:30—14:00***S01 12:30—14:00 Empowering Users of Radiotracers and Sealed Sources Technologies in Industry and Environment**Venue: **Conference Room M6**Chair: **Mohd Amirul Syafiq Mohd Yunos (Malaysia)**

TSec: Hannah Affum (IAEA)

**A05 14:00—15:30 Advanced Materials for Healthcare and Energy Applications**Venue: **M-Plenary**Chair: **Wanvimol Pasanphan (Thailand)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
14:00	762	K. V. Katti	USA	Radioactive Gold-198 Nanoparticles In Nanomedicine: Green Innovative Theranostics Approaches in Oncology
14:15	512	E. Muscolino	Italy	Radiation-Tailored Xyloglucan-Doxorubicin Nanoparticles for Cancer Therapy
14:30	485	N. D. Nguyen	Vietnam	Synthesis of Copper Nanoparticles/Diatomite by Electron Beam Irradiation and Antibacterial Effect Against Pathogenous Bacteria for Striped Catfish
14:45	67	R. S. Dalvi	India	Application of Gamma Irradiated Chitosan Nano-fragment for Stabilization of Expansive Soil
15:00	158	R. H. Lazzari Garcia	Brazil	The Influence of Gamma Radiation Doses on rGO/Pt for Energy Storage Applications

–Discussion–

Coffee break: 15:30—16:00

**B05 14:00—15:30 Mitigating Climate Change Effects: Protecting Coast Lines and**Venue: **Conference Room M2 Environment**Chair: **Abdelaziz Saadaoui (Morocco)**

TSec: Gerardo Maghella Seminario (IAEA)

Time	ID	Presenter		
14:00	7	J. Bezuidenhout	South Africa	The Investigation Of Natural Radionuclides As Tracers For Monitoring Sediment Processes
14:15	303	F. C. Fonseca Camargo	Brazil	Evaluation and Validation of $^{115}\text{Cd}/^{115\text{m}}\text{In}$ Generator for Industrial and Environmental Applications
14:30	46	R. le Roux	South Africa	The Development of a Delta Underwater Gamma System (DUGS) for Radionuclide Measurements in Aquatic Sediment
14:45	702	C. Tsampanis	Greece	Prompt Radioactivity Geo-referenced Measurements using the <i>in-situ</i> KATERINA-II detection system: Method Demonstration in Beach Sand Areas
15:00	654	P. Brisset	France	Measurement of Vertical Density Profiles in the Mud Deposits of the Dredging Products Dumping Site of “la Lambarde”

–Discussion–

Coffee break: 15:30—16:00



**C05 14:00—15:30 Environmental Monitoring**

Venue: Board Room A

Chair: Manfred Groening (IAEA)

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
14:00	82	P. Kessaratikoon	Thailand	A 27-Year (1994-2020) Record of Specific Activities of $^{137}\text{Cs}$ in Surface Soil and Beach Sand Samples in the Southern and the Eastern Regions of Thailand: Before and After the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) Accident
14:15	349	M. Majer	Croatia	Environmental Monitoring Using Radiophotoluminescent Dosimeters – Experience of the Ruđer Bošković Institute
14:30	383	E. Andersson Sundén	Sweden	Activity Measurements of Weak Signals in Biological Samples
14:45	688	A. Röttger	Germany	New Traceability Chains for Radon: Metrology for Use in Climate Change Observation and Radiation Protection
15:00	557	M. S. S. Asser	Egypt	Corrosion Protection of Steel Strips Coated by Poly(aniline/glycidyl methacrylate / poly vinyl pyrrolidone) Composite Prepared by Gamma Radiation.

–Discussion–

Coffee break: 15:30—16:00

**A06 16:00—17:30 Radiation-modified Natural Polymer Materials**

Venue: M-Plenary

Chair: Lucille Abad (Philippines)

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
16:00	602	S. F. Mohamad	Malaysia	Radiation-Induced Peroxidation and Grafting of Cellulose Nanocrystals: Efficient Synthesis of Stimuli-Responsive Nanoparticles
16:15	161	S. S. Kyaw	Myanmar	Development of Ethylene-vinyl-acetate (EVA) Based Low Cost, Versatile Dye Adsorbent Through Radiation Grafting
16:30	452	T. Rattanawongwiboon	Thailand	Evaluating the Performance of Chitosan-poly(ethylene glycol) Diacrylate Beads, Prepared by Radiation-Induced Crosslinking, as a Matrix for Encapsulation of Peppermint Oil
16:45	551	N. A. F. Othman	Malaysia	Preparation and Properties of Biodegradable Dual-layer Mulch Film for Agricultural Use
17:00	462	K. Cieřła	Poland	Modification of the Properties of the Films Formed in Starch:PVA System by Addition of Selected Agents Supported by Radiation Treatment

–Discussion–

**B06 16:00—17:30 Modelling and Radiotracers**Venue: *Conference Room M2*Chair: **Olivier Potier (France)**

TSec: Hannah Affum (IAEA)

Time	ID	Presenter		
16:00	290	M. Badar U Zaman	Pakistan	Visualization of Two Phase Flow Patterns Developed in a 90 degree Vertical Bend Using CFD Simulation and Gamma Computed Tomography Validation
16:15	621	W. Chirume	Zimbabwe	Simulation of Gamma Computed Laminography
16:30	455	S. van der Veeke, R. Koomans	Netherlands	The Next Generation of Gamma-Ray Spectrometers: UAV Borne Gamma-Ray Measurements
16:45	806	P. Cong	China	Innovation of Nuclear Technology Application
17:00	286	H. Mutinda	Kenya	Automated Microcontroller Based Gamma Column Scanner With Wireless Data Acquisition and Control System

–Discussion–

**C06 16:00—17:30 Radiation Technology for Green Environment**Venue: *Board Room A*Chair: **Anne-Laure Lamure (Switzerland)**

TSec: Valeriia Starovoitova (IAEA)

Time	ID	Presenter		
16:00	735	T. R. Edgecock	United Kingdom	The Study of the Environmental Applications of Electron Beams in the Horizon 2020 IFAST Project
16:15	70	S. Dalvi	India	Electron Beam Irradiated Chitosan: An Overview of its Applications for Sustainable Productivity in Different Crops
16:30	659	B. Kim	Rep. of Korea	Commercialization of Air Purification System based on Low Energy Electron Accelerator
16:45	496	F.-H. Roegner	Germany	Low-Energy Electron Inactivation LEEI - A Successful Technology to Inactivate Pathogens for Vaccine Production and Beyond
17:00	160	Y. Zhang	China	Addressing Challenges Posed by Low Energy Electron Beam Curing Through Innovated Co-operations

–Discussion–

**S02 18:00—19:30 Radiation Technology Creates a Better Life**Venue: *Conference Room M6*Chair: **Lixin Shen (China)**

TSec: Wenbin Yang &amp; Celina Horak (IAEA)

**A07 09:00—10:30 Sterilization of Healthcare Products including PPE**Venue: **M-Plenary**Chair: **Yves Henon (United Kingdom)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
09:00	477	M. Niederreiter	Austria	The Future of Radiation Sterilisation– Prospects and Challenges From the Viewpoint of an Irradiation Service Provider
09:15	596	A. Akhavan Agh Ghaleh	Iran	A Comparison of Gamma and Electron Beam Technologies for Sterilization of Polycarbonate Used in Medical Devices
09:30	188	M. H. Trabelsi	Tunisia	Economical Aspects of the Industrial Applications Using the Tunisian Circe-III Electrons Accelerator
09:45	798	S. Masic	Serbia	Influence of Gamma Irradiation on Polymer Materials Used in Medical Devices Manufactured in Serbia
10:00	242	Y. Yin	China	Radiation Sterilization of Disposable Medical Protective Clothing during the Outbreak of COVID-19

–Discussion–

Coffee break: 10:30—11:00

**B07 09:00—10:30 Mitigating Climate Change: Monitoring Sediment Dynamics**Venue: **Conference Room M2**Chair: **Patrick Brisset (France)**

TSec: Gerardo Maghella Seminario (IAEA)

Time	ID	Presenter		
09:00	234	J. Thereska	ISTRA	Natural Radioactivity of Sediments as “Tracer” for Evaluation of Sediment Dynamics in Water Bodies
09:15	316	R. Koomans	ISTRA	Radiometric Mapping of Seafloor Sediments as Tracer for Sediment Transport
09:30	77	D. Diaz Llatas	Peru	Estimating Suspended Sediment Yield (SSY) and Identifying the Main Sediments Sources in a Mountain Catchment
09:45	16	H. Mahmoud	Egypt	An Efficient System for Mapping Sediment Transport Based on Radioisotopes Measurements
10:00	56	K. Kilel	Kenya	Measurement of Primordial Radionuclides using <i>in situ</i> Gamma Ray Spectrometer as Sediment Tracers

–Discussion–

Coffee break: 10:30—11:00

**C07 09:00—10:30 New Generation of Industrial Irradiators**Venue: *Board Room A*Chair: **Cody Wilson (Belgium)**

TSec: Valeriia Starovoitova (IAEA)

Time	ID	Presenter		
09:00	266	P. Dethier	Belgium	E-Beam and X-Ray Systems for Food Irradiation – Mevex Latest Developments
09:15	418	A. Bryazgin	Russian Federation	ILU Electron Accelerators for E-beam and X-ray
09:30	796	K. Wilczyńska	France	LUTEX– New Irradiation and Ion Implantation Facility
09:45	359	M. Murphy	USA	Latest Developments in the Industry-Wide Collaboration to Fill Data and Education Gaps for Transitioning to E-beam and X-ray for Medical Product Sterilization
10:00	312	S. Lee	Rep. of Korea	Progress Report on RFQ Based Compact Heavy Ion Accelerator for Swift Heavy Ion Irradiation

–Discussion–

*Coffee break: 10:30—11:00***A08 11:00—12:30 Microbiological Qualification for Radiation Sterilization**Venue: *M-Plenary*Chair: **Monique Lacroix (Canada)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
11:00	106	A. Raad	Argentina	Elimination of <i>Listeria Monocytogenes</i> in ‘Salamín’ (Argentinean Dry Fermented Sausage) by Gamma Irradiation
11:15	811	A. Mejri	Tunisia	The Use of the Irradiation Technologies in Tunisia: QC/QA and Routine Dosimetry of Irradiation Facilities
11:30	25	G. A. Ali	Egypt	Gamma Irradiation to Control <i>Corcyra cephalonica</i> (stainton) and Investigate the Effective Generic Dose on Some Physical and Microbiological Qualities of Rice
11:45	99	N. P. R. Rathnayake Mudiyansele	Sri Lanka	Effect of Gamma Irradiation on Physicochemical and Microbial Properties of Two Selected Medicinal Herbal Teas; <i>Iramusu</i> ( <i>Hemidesmus indicus</i> (L.)) and <i>Polpala</i> ( <i>Aerva lanata</i> (L.))
12:00	103	I. Vujcic	Serbia	Effect of Gamma Irradiation on the Inactivation of Aflatoxin of Hemp Flour and the Influence of Gamma Irradiation on Microbiological and Nutritional Properties

–Discussion–

*Lunch break: 12:30—14:00*

**B08 11:00—12:30 Radiotracer Technology for Industrial Process Efficiency**Venue: **Conference Room M2**Chair: **Joon-Ha Jin (Rep. of Korea)**

TSec: Gerardo Maghella Seminario (IAEA)

Time	ID	Presenter		
11:00	139	V. Yelgaonkar	India	Investigation of Cause of Temperature Variation Across a Packed Bed
11:15	94	S. Adzaklo	Ghana	Computed Tomography and Gamma Scan in Optimisation of Industrial Processes
11:30	281	K. M. Rodolfo	Angola	Monitoring of Waters that Feed Minings using Radioactive Tracers
11:45	810	A. Amponfi	Ghana	Determination of Sedimentation Efficiency of a Wastewater Treatment Plant Using Radioactive Tracers
12:00	154	H. Affum	Ghana	Plant Performance Assessment Using Online Radiotracer Technology– A Case Study of a Composite Wastewater Treatment Plant

–Discussion–

*Lunch break: 12:30—14:00***C08 11:00—12:30 Techno-economical Aspects of Operating Irradiation Facilities**Venue: **Board Room A**Chair: **Aleksandr Bryazgin (Russia)**

TSec: Valeriia Starovoitova (IAEA)

Time	ID	Presenter		
11:00	500	C. Wilson	Belgium	Progress Status of a New Industrial Solution for Radio-isotopes Production by Photonuclear Reactions: The 40 MeV Rhodotron
11:15	373	M. Alcérreca Sanchez	Mexico	Risk Analysis for the Optimal Use of the Installed Capacity in a Gamma Irradiation Plant
11:30	245	S. Tantawi	USA	Novel Electron Accelerator Developments for Security and Medical Applications
11:45	251	T. Kroc	USA	Alternative Technologies for Medical Device Sterilization using Radiation – Recent progress, Current Status, and Lessons Learned
12:00	791	N. Pessoa Barradas	IAEA	Specific Considerations and Guidance for the Establishment of Ionizing Radiation Facilities

–Discussion–

*Lunch break: 12:30—14:00***S03 12:30—14:00 Education and Training in Radiation Science and Technology through IAEA Collaborating Centres**Venue: **Conference Room M6**Chair: **Melissa Denecke (IAEA)**

TSec: Celina Horak (IAEA)

**A09 14:00—15:30 Radiation Processing Applications in Food and Agriculture**Venue: **M-Plenary**Chair: **Suresh Pillai (USA)**TSec: **Celina Horak & Carl Blackburn (IAEA)**

Time	ID	Presenter		
14:00	480	J. Madureira	Portugal	Improving Bioactive Compounds Extraction From Olive Wastes Using Gamma Radiation
14:15	507	D. Werner	France	Phytosanitary Treatment of Mangoes by X-Ray Irradiation – Feasibility Study
14:30	92	M. Lacroix	Canada	FCV-F9 Virus Elimination in Fresh Product Using Combined Treatments With $\gamma$ -Irradiation
14:45	617	P. Mukherjee	India	Mobile Irradiator: A Concept Towards Food Security in India
15:00	739	L. Ounalli	Tunisia	Effects of Gamma Irradiation on Fatty Acids and Biological Activities of Garlic

–Discussion–

*Coffee break: 15:30—16:00***B09 14:00—15:30 Radiotracers for Industrial Processes Optimization and Safety**Venue: **Conference Room M2**Chair: **Thorsten Jentsch (ISTRA)**TSec: **Hannah Affum (IAEA)**

Time	ID	Presenter		
14:00	394	G. Maghella Seminario	IAEA	Determination of Residence Times in Operating Units of a Drinkable Water Treatment Plant by using Radiotracer I-131
14:15	714	P. Parada	Chile	Hydrodynamic Evaluation of a NaSH Loop Piping Circuit in a Molybdenum Flotation Plant by Means of Radiotracers
14:30	636	B. Azmi	Indonesia	On-Line Leak Test to Combined Feed Exchanger Hydrocracker Unibon Using Radiotracer Technique: On Field Experimental at Oil Refinery Plant
14:45	599	M. Asare	Ghana	Flow Hydrodynamics Determination of a Cavitation Air Flotation Tank Using Radioactive Tracer Technology
15:00	202	E. A. N. V. Edirisinghe	Sri Lanka	Investigation of Water Leakage of Samanalawewa Reservoir, Sri Lanka Using Radio-Tracer Technique

–Discussion–

*Coffee break: 15:30—16:00*

**C09 14:00—15:30 Current Status of EB, Gamma, and X-ray Facilities**

Venue: Board Room A

Chair: Markus Niederreiter (Austra)

TSec: Valeriia Starovoitova (IAEA)

Time	ID	Presenter		
14:00	745	A. Pierard	Belgium	BEYOND: A New Generation of Optimized E-beam & X-Ray Irradiation Solutions
14:15	253	M. A. Etoom	Jordan	Switching Irradiation Facility in Jordan from Co-60 to E-beam X-Ray
14:30	795	J. Ellis	USA	Electrical Grid Resiliency Measures for Electron Beam and X-ray Facilities
14:45	179	S. Kutsaev	USA	Compact Accelerator-based X-ray Sources for Radioactive Isotope Replacement
15:00	353	S. Dorey	France	Supplementing Gamma Radiation With E-beam or X-Ray for Sterilization Purpose– A Material Viewpoint

–Discussion–

Coffee break: 15:30—16:00

**A10 16:00—17:30 Tissue Banking and Tissue Engineering**

Venue: M-Plenary

Chair: Maria Helena Casimiro (Portugal)

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
16:00	180	S. Korraa	Egypt	Electrospinning and Gamma Irradiating for the Preparation of Nano Scaffolds Suitable for Tissue Engineering
16:15	436	P. Bustamante	Argentina	Three-Dimensional Scaffolds for Trabecular Bone Replacement
16:30	532	P. Myint	United Kingdom	Applying Tissue Banking and Tissue Engineering Approach to New Therapeutic Strategy in Bone Repair System
16:45	669	R. Sanchez Sanchez	Mexico	Use of Radiation Sterilized Pig Skin Scaffold Impregnated With Silver Nanoparticles to Improve the Healing Process of Cutaneous Burn Injury in an Athymic Mouse Model
17:00	742	E. Velasquez	Chile	Chilean Experience in the Implementation of a National Tissue Bank

–Discussion–

**B10 16:00—17:30 Managing Environmental and Energy Resources**Venue: *Conference Room M2*Chair: **Noraishah Othman (Malaysia)**

TSec: Hannah Affum (IAEA)

Time	ID	Presenter		
16:00	138	V. Yelgaonkar	ISTRA	Radiotracer Study to Ascertain the Efficacy of Fly Ash Disposal
16:15	567	C. J. Guembou Shouop	Cameroon	<sup>137</sup> Cs Source Optimum Geometry for Disused Sealed Radioactive Sources Management-based Monte Carlo Simulations
16:30	358	J. W. Kirui	Kenya	Assessment of Hazardous Defects in Live Trees: Application of Gamma Scanning in Nairobi, Kenya
16:45	395	J. Park	Rep. of Korea	Feasibility Study on Flow Rate Measurement for Industrial Process With Sealed Gamma Sources
17:00	783	A. Saadaoui	Morocco	Coupling of Gamma Scanning, Neutron Back Scattering and Computed Tomography Techniques for the Control of the Pipes

–Discussion–

**C10 16:00—17:30 Versatility of Industrial Radiation Technologies**Venue: *Board Room A*Chair: **Josef Mittendorfer (Austria)**

TSec: Valeriia Starovoitova (IAEA)

Time	ID	Presenter		
16:00	350	S. Rouif	France	Radiation Grafting on Natural Fibres: An Easy Way to Increase the Functionalities of Textiles and Composites
16:15	237	N. L. Del Mastro	Brazil	Sustainable Packaging Materials for the Food Industry: Role of Radiation Technology
16:30	304	O. Riabukhin	Russian Federation	E-Beam Accelerator of Ural Federal University Used for Training
16:45	760	M. Vadrucci	Italy	Gamma, Electron and X-Rays Dosimetric Intercalibration at the Calliope and REX Irradiation Facilities (ENEA R. C., Italy)
17:00	331	J. Yang	China	A Preliminary Design of 35MeV/70kW Electron Linac for Mo-99 Production

–Discussion–

**S04 18:00—19:30 Accelerators for Environmental Applications**Venue: *Conference Room M6*Chair: **Melissa Denecke (IAEA)**

TSec: Valeriia Starovoitova (IAEA)



**PS02 09:00—10:30 Panel Session: Gender Equality in Radiation Science and Technology**Venue: **M-Plenary**Chair: **Agnes Safrany (Hungary)**

TSec: Aleksandra Peeva &amp; Celina Horak (IAEA)

Time	ID	Presenter		
09:00	799	D. Chmielewska-Śmietanko	Poland	The Legacy of Maria Skłodowska-Curie on the Role of Women in Nuclear Science– INCT as an Example
09:10	813	M. Belinco	Argentina	Women in Nuclear (WiN) Global: Promoting an Inclusive and Sustainable Future for All
09:20		TBD	IAEA	
09:30	812	M. Venkatesh	India	Gender Equality in Radiation Technology Industry – My Experiences and Perception through 40 Year Journey in the Nuclear Industry
09:40	802	S. A. Hashim	Malaysia	Roles of Women in Nuclear (Malaysia) in Promoting Gender Equality at Malaysian Nuclear Agency
09:50	805	M. Boadu	Ghana	Whipping up the Interest of Women in the Nuclear Field: Strategies to Boost Women’s Participation and Involvement in Nuclear Science and Technology

*–Panel Discussion–**Coffee break: 10:30—11:00***PS03 11:00—12:30 Education and Training in Radiation Science and Technology**Venue: **M-Plenary**Chair: **Andrzej Chmielewski (Poland)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
11:00	327	E. Macerata	Italy	How to Attract New Students Towards NRC: The MOOC Experience
11:10	11	F. Kuntz	France	Aerial’s Excellence Center For Radiation Processing. An Irradiation Platform for R&D, Education and Training
11:20	749	C. Mattone	Italy	Integrated Educational Kit for Radiation Detection Training
11:30	91	T. Jentsch	ISTRA	International Standardization of Basic Industrial Radiotracer and Radiation Applications– Current State
11:40	786	H. Ben Abdelouahed	IAEA	Training and Certification on Radiometric Technology at the International Atomic Energy Agency (IAEA): Status and Perspectives
11:50	338	M. Nemec	Czech Republic	Project A-CINCH: Augmented Cooperation in Education and Training in Nuclear and Radiochemistry

*–Panel Discussion–**Lunch break: 12:30—14:00***S05 12:30—14:00 Ongoing and Planned Coordinated Research Projects (CRPs) in Radiation Science and Technology**Venue: **Conference Room M6**Chair: **Melissa Denecke (IAEA)**

TSec: Celina Horak (IAEA)

**A11 14:00—15:30 Preservation of Cultural Heritage**Venue: **M-Plenary**Chair: **Branka Mihaljević (Croatia)**

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
14:00	330	L. Cortella	France	Dosimetric Approach for Cultural Heritage Treatments by Gamma Irradiation: Issue and Experience
14:15	438	I. V. Moise	Romania	Substantiation of Irradiation Dose for Radiation Treatment of Cultural Heritage
14:30	481	D. Solpan Ozbay	Türkiye	Radiation Induced Grafting for the Preservation and Consolidation of Cellulosic Archive Materials
14:45	337	K. Marušić	Croatia	Dose Rate Dependence on Successful Radiation Treatment of Cultural Heritage Objects
15:00	502	L. T. T. Nguyen	Viet Nam	Radiation Disinfection of Fungi Contaminated in Historical Archives

*Coffee break: 15:30—16:00***B11 14:00—15:30 Numerical Residence Time Distribution (RTD) Modelling**Venue: **Conference Room M2**Chair: **Vivek Yelgaonkar (ISTRA)**

TSec: Hannah Affum (IAEA)

Time	ID	Presenter		
14:00	108	N. Lobos	Chile	Hydrodynamic Evaluation of an Industrial Flotation Plant by Means of Radioactive Tracers: A Tool to Support the Global
14:15	5	I. M. Fernández Gómez	Cuba	Evaluation of the Hydraulic Characteristics of the Solid Traps System of the Pig Center
14:30	12	N. Othman	Malaysia	Development of RTD Models in a Commercial Core-Flood Rig During Water-Flooding Activity Using Radiotracer Technique
14:45	19	E. H. Mahdy Ali	Egypt	Improvement of Radiotracer Residence Time Distribution Analysis in Industrial Applications
15:00	174	J. S. Luabanya	D. R. Congo	On-line Radiotracer Technology for Digester Flow Hydrodynamics Investigations

*Coffee break: 15:30—16:00*

**C11 14:00—15:30 Dosimetry and Quality Management**

Venue: Board Room A

Chair: Andras Kovacs (Hungary)

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
14:00	524	C. Ankjærgaard	Denmark	Dosimetry for Radiation Processing in 2021 and Beyond – The Role of the Accredited Calibration Laboratory
14:15	6	A. Nasreddine	France	The Use of Alanine Dosimeters for Kilo-voltage X-Ray Applications
14:30	32	K. Farah	Tunisia	Thermoluminescent Response of Gamma Irradiated Cu–Na Ion-Exchanged Silicate Glass in the Dose Range Between 0.001-100 kGy
14:45	171	D. Tonev	Bulgaria	Radiation Protection, Dosimetry and Standards of Three Different Types of Irradiation Facilities in Bulgaria
15:00	289	H. Yasuda	Japan	Application of Optically Stimulated Luminescence From Thin Materials for Assessing Non-homogeneous Radiation Exposure

*Coffee break: 15:30—16:00***A12 16:00—17:30 Recycling of Plastic Wastes by Ionizing Radiation**

Venue: M-Plenary

Chair: Florent Kuntz (France)

TSec: Celina Horak (IAEA)

Time	ID	Presenter		
16:00	49	M. Kaci	Algeria	A Degradation Study of Polyamide 11/Halloysite Nanotubes Nanocomposites under Gamma Irradiation
16:15	774	Y.-M. Lim	R. Korea	Recycling of Construction Waste Plastic Materials by Radiation
16:30	640	C. T. Ratnam	Malaysia	Effect of Electron Beam Irradiation on the Physical and Mechanical Properties of Waste Nitrile Glove/ Ethylene Vinyl Acetate (rNBR/EVA) Blends
16:45	525	D. Constantinescu	Romania	Economic and Technical Aspects of Sorting of Mixed Thermoplastic Waste
17:00	464	A. Ponomarev	Russian Federation	Radiation-Assisted Recycling of Multilayer Polymer Materials and Multicomponent Polymer Blends

**B12 16:00—17:30 Radiation for Cultural Heritage Characterization**Venue: *Conference Room M2*Chair: **Rachad Alami (Morocco)**

TSec: Gerardo Maghella Seminario (IAEA)

Time	ID	Presenter		
16:00	431	G. Aquilanti	Italy	The Joint IAEA-EST Synchrotron Light Activities
16:15	42	D. Atwa Khalil	Egypt	An X-Ray Microtomographic Insight Into Pharaonic Solar Boats and Wooden Statue Treated by Different Nano-Consolidation Systems
16:30	808	A. Simon	IAEA	IAEA “Accelerators for Heritage”
16:45	444	E. Ergun	Türkiye	Imaging and Evaluation of Cultural Heritages by Simple and Advanced X-Ray Systems
17:00	678	A. Mendoza Cuevas	Cuba	Qualitative and Quantitative Low Energy Dispersive XRD-XRF Non-invasive Analysis for Cultural Heritage

**C12 16:00—17:30 Advancement in Dosimetry**Venue: *Board Room A*Chair: **Ioan-Valentin Moise (Romania)**

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
16:00	600	S. Robin-Chabanne	France	Development and Validation of a Methodology to Reproduce Operational Qualification (OQ) measurements in IONISOS Sablé Gamma Radiation Facility by Monte-Carlo Simulation Using RayXpert®
16:15	530	M. Bailey	United Kingdom	Monte Carlo Calculations for Electron Beam Processing – The Importance of the Use of Realistic Electron Spectra
16:30	183	M. Iskakov	Kazakhstan	Development of an Automated Radiation Monitoring System at ISL Enterprises
16:45	239	S. Pawlak	Argentina	Proficiency Testing for Interlaboratory Comparison of Dosimetry Systems
17:00	468	B. P. Kiss	Hungary	A Dosimeter With a Range of 10 Gy to 1000 kGy That Performs in Environments of Temperature and Humidity Extremes

**S06 18:00—19:30 IAEA NUTEC Plastics Initiatives for Recycling Of Plastic Wastes**Venue: *Conference Room M6*Chair: **Melissa Denecke (IAEA)**

TSec: Celina Horak (IAEA)

**PS04 09:00—09:30 Future Perspectives and Challenges**Venue: *M-Plenary*Chair: **Melissa Denecke (IAEA)**

TSec: Bumsoo Han (IAEA)

Time	ID	Presenter		
09:00	412	A. Chmielewski	Poland	Radiation Technologies: Future is Today

**PS05 09:30—11:00 Technical Cooperation Success Stories: Country Reports**Venue: *M-Plenary*Chair: **Erzsebet Takacs (Hungary)**

Co-chair: Jane Gerardo-Abaya (IAEA)

Tsec: Bumsoo Han (IAEA)

Time	ID	Presenter		
09:30	344	L. Abad	Philippines	The Philippine Experience in the Use of E-beam Technology as a Critical Factor in the Technology Transfer of Carrageenan Plant Growth Promoter
09:45	417	W. A. P. Calvo	Brazil	Development and Construction of a Mobile Electron Beam Accelerator to Treat and Recycle Industrial Effluents in Brazil
10:00	381	Z. Khalilov	Azerbaijan	Sterilization by Gamma Radiation for Single-Use Disposable Papers for Biotechnological Purposes
10:15	807	A. Kovács	Hungary	Enhancing the Use of Radiation Technologies in Industry and Environment in European Region under IAEA Technical Cooperation Projects
10:30	809	B. Carter	IAEA	Supporting Nuclear Science and Technology Education at the Secondary and Tertiary Level under IAEA TC Programme
10:45	804	I. Opoku-Ntim	Ghana	Radioactive Tracer Technology and Sealed Sources Applications in Ghana: Underscoring the Role of IAEA Technical Cooperation

*Coffee break: 11:00—11:30***CS 11:30—13:00 Closing Session**Venue: *M-Plenary*Chair: **Melissa Denecke (IAEA)**

TSec: Celina Horak (IAEA)

Time	Presenter		
11:30	M. Denecke	IAEA	Awarding of Young Professional Awards

*Summary of ICARST-2022*

11:45	X. Coqueret	France	Review of Stream A
12:00	R. Alami	Morocco	Review of Stream B
12:15	N. Ramamoorthy	India	Review of Stream C and Overall

*Closing*

12:30	N. Mokhtar	IAEA	Closing Remarks—Deputy Director General-NA
12:40	H. Liu	IAEA	Closing Remarks—Deputy Director General-TC