



# ANS Conference

## 8th International Conference on Isotopes and Expo

*Preparing for Tomorrow*

Sponsored by the Accelerator Applications, Biology & Medicine, and Isotope & Radiation Divisions of the American Nuclear Society

**Preliminary Program**

[www.8ici.org](http://www.8ici.org)



August 24-28, 2014  
Hyatt Regency-Chicago  
Chicago, IL



# ANS Conference

## 8<sup>TH</sup> International Conference on Isotopes and Expo

### SPONSORS



 **ANS** Accelerator Applications Division

 **ANS** Biology and Medicine Division

 **ANS** Isotopes and Radiation Division

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# Meeting Officials



**Honorary Chair:**  
**Myung-Chul Lee**  
*President, WCI*  
*President, Korean Association*  
*for Radiation Application*



**General Chair:**  
**Paul T. Dickman**  
*Argonne National Laboratory*



**Assistant General Chair:**  
**Nigel R. Stevenson**  
*Clear Vascular, Inc.*



**Technical Program Co-Chair:**  
**Rolf Zeisler**  
*National Institute of Standard*  
*and Technology*



**Technical Program Co-Chair:**  
**Stephen P. LaMont**  
*Los Alamos National Laboratory*



**Finance Chair:**  
**James T. Tanner**  
*U.S. Food and Drug Administration*  
*(retired)*



**Publications Co-Chair:**  
**Sam Glover**  
*University of Cincinnati*



**Publications Co-Chair:**  
**Bryan P. Bednarz**  
*University of Wisconsin-Madison*



**International Program Director:**  
**Gulbarshyn Bozheyeva**  
*MELE Associates, Inc.*



**Executive Advisory Board**  
**JongKyung Kim**  
*WCI, Secretary-General*  
*President, KAERI*



**Executive Advisory Board:**  
**Meera Venkatesh**  
*IAEA*



**Executive Advisory Board:**  
**Ron Cameron**  
*OECD-NEA*



**Executive Advisory Board Member:**  
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*Qatar University*



**President Elect, WCI**  
**Van Zyl de Villiers**  
*Director, Safeguard Operation B, IAEA*



**International Coordinator WCI:**  
**Nam Ho**  
*WCI*

## TECHNICAL PROGRAM COMMITTEE

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- Alfred Morgenstern**, *JRC Institute for Transuranium Elements, Germany*
- F. Meiring Nortier**, *Los Alamos National Laboratory, USA*
- Sean O’Kelly**, *National Institute of Standards and Technology, USA*
- Tim Payne**, *Australian Nuclear Science and Technology Organization, Australia*
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- Suresh Srivastava**, *Brookhaven National Laboratory, USA*
- Nigel R. Stevenson**, *Clear Vascular, Inc., USA*
- Andreas Türler**, *Paul Scherrer Institut, Switzerland*
- Kenan Ünlü**, *Pennsylvania State University, USA*
- Meera Venkatesh**, *International Atomic Energy Agency, Austria*
- James S. Welsh**, *Fermi National Accelerator Laboratory, USA*
- Boris Zhuikov**, *Institute for Nuclear Research of the Russian Academy of Sciences, Russia*



## MEETING INFORMATION

The 2014 International Conference on Isotopes and Expo Meeting will be held August 24-28, 2014, in Chicago, IL. [www.8ici.org](http://www.8ici.org)

## ACCOMMODATIONS/HOTEL INFORMATION

The Hyatt Regency Chicago will be the location for the 8th International Conference on Isotopes and Expo (8ICI) where all plenaries, technical sessions and exhibits will take place.

The Hyatt Regency Chicago is located at 151 East Wacker Drive, Chicago, IL 60601.

The special room rate for the meeting is: \$195.00/night (single / double rate). To take advantage of this reduced rate, reservations must be made by August 2, 2014. Attendees can make reservations by using the link listed below or by calling 1-888-421-1442 and referencing "8th International Conference on Isotopes and Expo (ANS)".

Reservations can be made online at: <https://aws.passkey.com/event/10776596/owner/2135/home>

## NOTE:

Additional tickets can be purchased at the ANS Registration Desk for the Sunday Opening Reception, and the Closing Banquet.

## NOTICE FOR SPEAKERS

All Speakers and Session Chairs must sign in at the ANS Registration Desk located in the West Tower (Gold Level) outside the Regency Ballroom, during registration hours.

## MEETING REGISTRATION

Meeting, Speaker & Exhibitor Registration will be located at the ANS Registration Desk located in the West Tower (Gold Level) outside the Regency Ballroom of the Hyatt Regency Chicago, Sunday, August 24, 2014 – Thursday, August 28, 2014. Meeting registration is required for all attendees, exhibitors and speakers. Badges are required for admission to all plenaries, technical sessions and events.

## REGISTRATION HOURS

Sunday, August 24, 2014  
12:00 PM – 8:00 PM

Monday, August 25, 2014  
7:00 AM – 6:00 PM

Tuesday, August 26, 2014  
7:00 AM – 6:00 PM

Wednesday, August 27, 2014  
7:00 AM – 6:00 PM

Thursday, August 28, 2014  
7:00 AM – 12:00 PM

## ANS CONFERENCE OFFICE

Location: Atlanta

## ANS SPEAKER READY ROOM

Location: New Orleans

## SPECIAL EVENTS

### Opening Reception

Sunday, August 24, 2014  
6:00 PM – 8:00 PM

Location: Regency A-C

A welcome reception will follow the Opening Plenary. One ticket to the Welcome Reception is included with the full meeting registration.

*Additional tickets can be purchased at the ANS Registration Desk for \$120.00 each.*

## Conference Banquet

Wednesday, August 27, 2014

7:00 PM – 10:00 PM

Location: Crystal Ballroom

*Additional tickets can be purchased at the ANS Registration Desk for \$140.00 each.*

## TECHNICAL TOURS

### Argonne National Laboratory

Thursday, August 28, 2014

12:30 PM – 4:30 PM

Location: Argonne National Laboratory

The tour will include a visit to the Advanced Photon Source, the New Brunswick Laboratory (NBL), and the Nuclear Energy Exhibit, which showcases ANL's heritage of nuclear reactor designs.

Please note required tour attire: long pants and flat, closed-toe shoes.

*Tickets can be purchased at the ANS Registration Desk for \$45.00 each.*

*Limited seating.*

### Fermi National Accelerator Laboratory

Thursday, August 28, 2014

12:30 PM – 5:30 PM

Location: Fermi National Laboratory

The laboratory is dedicated to exploring the three frontiers of high-energy physics, and is the only national laboratory dedicated to the study of particle physics. Currently, FermiLab is building the nation's most advanced test facility for superconducting radio-frequency technology. This innovative technology will serve as the model for next-generation accelerators and is the future of particle physics.

Please note required tour attire: flat, closed-toe shoes.

*Tickets can be purchased at the ANS Registration Desk for \$45.00 each.*

*Limited seating.*



## OPENING PLENARY

### “The Isotopes Story: From the Curies to Element 118”

Join Heino Nitsche, University of California–Berkeley and Lawrence Berkeley National Laboratory, for a special session on the history of isotope knowledge, research and development.

## MARIE CURIE PLENARY

### “Celebrating a Century of Women in Nuclear Science”

Join 8ICI Chairman Paul Dickman for a special session that focuses on the role of women in advancing nuclear science. A century ago, research physicist and chemist Marie Curie founded the Curie Institute. The advent of World War I changed the center’s focus from research to applied nuclear technology. Today, the role of women in the field of nuclear sciences is expanding, changing the way the public perceives the field. This plenary will include presentations and a panel discussion with:

Jean-Louis Alberini, Director of Nuclear Medicine (*Curie Institute*)  
 Janice Dunn-Lee, Deputy Director General (*IAEA*)  
 Darleane Hoffman, Professor Emerita, (*Univ of California–Berkeley*)  
 And other notable speakers.

## WCI PRESIDENT’S FORUM

### “The Public Health Dilemma: Balancing Isotope Supply and Safety and Security”

Join WCI President Myung-Chul Lee and incoming WCI President Vanzyl de Villiers for special forum on policies that may affect future supplies of isotopes. The modern world needs isotopes for public health and prosperity, however increasing concerns about safety and non-proliferation are changing how the market meets these needs. This forum is an extraordinary opportunity for 8ICI attendees to hear from top governmental officials and senior policy makers on emerging issues and their concerns and thoughts about the future. This plenary will include presentations and a panel discussion with: Ramzi Jammal, Executive Vice-President and Chief Regulatory Officer (*Canadian Nuclear Safety Commission*)  
 Jong-Kyung Kim, President, Korean Atomic Energy Research Institute (*KAERI*); Secretary General (*World Council on Isotopes*)  
 Allison Macfarlane, Chairman (*Nuclear Regulatory Commission*)  
 Chris Whipple, ENVIRON Principal, Chair (*NAS Committee on Medical Isotope Production without HEU*)

## PLENARY SPEAKERS

Ilham Y. Al-Qaradawi — *Qatar University (Qatar)*  
 Applications of Positron Annihilation Techniques  
 Jean-Louis Alberini — *Institut Curie (Paris and Saint-Cloud, France)*  
 Radium: From Discovery by Marie Curie to Medical Applications  
 Darren Brown — *Trace Sciences International Corporation (Canada)*  
 Stable Isotope Enrichment Methods – Historical Review and Future Trends  
 Ron Cameron — *OECD-NEA (France)*  
 Economics of Radioisotope Production and Sustainability  
 Richard Ferrieri — *Brookhaven National Laboratory (United States)*  
 Radiometric Fluxomics: A New Era for Quantitative Plant Biology  
 Joanna S. Fowler — *Brookhaven National Laboratory (United States)*  
 Rapid Radiotracer Chemistry and Imaging the Human Brain  
 Marc A. Garland — *US Department of Energy (United States)*  
 Isotope Production and Research at the US Department of Energy  
 Darleane C. Hoffman — *University of California–Berkeley (United States)*  
 The Role of Periodic Tables in the Discovery of New Elements  
 Ramzi Jammal — *Canadian Nuclear Safety Commission (Canada)*  
 WCI President’s Forum  
 Silvia S. Jurisson — *University of Missouri Research Reactor (MURR) (United States)*  
 Current Directions in Diagnostic and Therapeutic Radiopharmaceuticals  
 Annie Kersting — *Lawrence Livermore National Laboratory (United States)*  
 Biogeochemical Process Controlling the Transport of Plutonium in the Environment  
 Jong Kyung Kim — *Korean Atomic Energy Research Institute (Korea)*  
 The Importance of the Government’s Role on the Establishment of a Radioisotope Supply Chain  
 Suzanne Lapi — *Washington University School of Medicine (United States)*  
 Cyclotron Production and Imaging Applications of Positron Emitting Radiometals

Janice Dunn-Lee — *International Atomic Energy Agency (International)*  
 The Next Marie Curie: The Role of the IAEA in Advancing Women in Nuclear Science  
 Allison Macfarlane — *Nuclear Regulatory Commission (United States)*  
 WCI President’s Forum  
 Alfred Morgenstern — *Joint Research Centre Institute for Transuranium Elements (Germany)*  
 Targeted Alpha Therapy with Ac-225 and Bi-213  
 Heino Nitsche — *University of California–Berkeley, and Lawrence Berkeley National Laboratory (United States)*  
 The Isotopes Story: From the Curies to Element 118  
 Adrian (Adi) Paterson — *Australian Nuclear Science and Technology Organization (Australia)*  
 Isotope Development in the Australian Setting  
 Tim Payne — *Australian Nuclear Science and Technology Organization (Australia)*  
 Emerging Applications of Nuclear and Isotopic Techniques in the Environmental Sciences  
 Syed M. Qaim — *Forschungszentrum Juelich (Germany)*  
 Nuclear Data for Medical Isotopes  
 Thomas Ruth — *TRIUMF (Canada)*  
 Accelerator-Based Production of Mo-99  
 Andreas Türler — *Paul Scherrer Institute, and Bern University (Switzerland)*  
 Heavy and Superheavy Element Research  
 Suresh Srivastava — *Brookhaven National Laboratory (United States)*  
 Transforming the Playing Field: Personalized Medicine with the Use of Theragnostic Radiopharmaceuticals  
 Henry VanBrocklin — *University of California–San Francisco School of Medicine, Radiology and Biomedical Imaging (United States)*  
 The Future of Molecular Imaging: A Radiochemist’s Perspective  
 Meera Venkatesh — *International Atomic Energy Agency (International)*  
 Radioisotopes and Radiation Technology in Industry  
 Chris Whipple — *ENVIRON (United States)*  
 WCI President’s Forum

# Meeting Schedule

## SUNDAY, AUGUST 24, 2014

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8:00 am-8:00 pm	Registration
12:00 pm-4:00 pm	Exhibit Setup
4:00 pm-6:00 pm	Opening Plenary
6:00 pm-8:00 pm	Welcome Reception
6:00 pm-8:00 pm	Exhibition

## MONDAY, AUGUST 25, 2014

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7:00 am-6:00 pm	Registration
8:00 am-11:50 am	General Plenary
9:30 am-5:30 pm	Exhibition
9:45 am-10:15 am	Refreshment Break in Expo
1:00 pm-3:00 pm	Technical Sessions <ul style="list-style-type: none"><li>• <i>Reactor-Based Production of Mo-99—I</i></li><li>• <i>Applications in Nuclear Medicine—Therapeutics</i></li><li>• <i>Calibration Methods, Fundamental Nuclear Data, and Airborne Effluents from Medical Isotope Production</i></li><li>• <i>Production of Non-PET Radionuclides</i></li><li>• <i>Reference Materials for Nuclear Mass Spectrometry/Nuclear Analysis, Session to the Honour of Dr. Stefan Buerger (IAEA)</i></li></ul>
3:00 pm-3:30 pm	Refreshment Break in Expo
3:30 pm-6:00 pm	Technical Sessions <ul style="list-style-type: none"><li>• <i>Reactor-Based Production of Mo-99—II</i></li><li>• <i>Theragnostics/Personalized Medicine</i></li><li>• <i>Application of Nuclear Techniques to National Security and Treaty Monitoring</i></li><li>• <i>Isotope Devices, Isotope Tracers and Other Applications</i></li><li>• <i>Quality Assurance Topics in Radioanalytical and Radiopharmaceutical Chemistry—Papers/Panel</i></li></ul>

## TUESDAY, AUGUST 26, 2014

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7:00 am-6:00 pm	Registration
8:00 am-9:40 am	Marie Curie Commemorative Session
9:30 am-5:30 pm	Exhibition
9:45 am-10:10 am	Refreshment Break in Expo
10:10 am-11:50 am	Marie Curie Plenary Session
1:00 pm-3:00 pm	Poster Discussion A and Refreshment Break



3:00 pm-6:00 pm	Technical Sessions <ul style="list-style-type: none"> <li>• <i>Accelerator-Based Production of Mo-99</i></li> <li>• <i>Applications in Nuclear Medicine—Diagnostics</i></li> <li>• <i>Radiopharmaceutical Chemistry</i></li> <li>• <i>Reactor Production of Medical Isotopes</i></li> <li>• <i>Production of Stable Isotopes</i></li> <li>• <i>Stable Isotopes in Materials and Environmental Research</i></li> <li>• <i>Nuclear Data for Medical Isotopes</i></li> <li>• <i>Environmental Fate and Identification of Radionuclides</i></li> </ul>
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### WEDNESDAY, AUGUST 27, 2014

7:00 am-6:00 pm	Registration
8:00 am-9:40 am	Isotope Research Plenary
9:30 am-3:00 pm	Exhibition and Posters
9:45 am-10:10 am	Refreshment Break in Expo
10:10 am-11:50 am	World Council on Isotopes President's Forum
1:00 pm-3:00 pm	Poster Discussion B and Refreshment Break
3:00 pm-6:00 pm	Technical Sessions <ul style="list-style-type: none"> <li>• <i>Production of Pet Radionuclides</i></li> <li>• <i>Economics of Radioisotope Production and Sustainability</i></li> <li>• <i>Securing the Supply of Isotopes in the Future—Panel/Papers</i></li> <li>• <i>Medium and High Energy Accelerator/Cyclotron Production of Isotopes</i></li> <li>• <i>Separation Chemistry and Target Preparation for Nuclear Chemistry Experiments</i></li> <li>• <i>Heavy and Superheavy Elements Research</i></li> <li>• <i>Isotopes in Plant Biology: Future Sustainability in Energy and Agriculture—I</i></li> </ul>
7:00 pm-10:00 pm	Conference Banquet

### THURSDAY, AUGUST 28, 2014

7:00 am-12:00 pm	Registration
8:00 am-10:00 am	Technical Sessions <ul style="list-style-type: none"> <li>• <i>Isotope Recovery and Reclamation</i></li> <li>• <i>Production and Application of Alpha Emitters</i></li> <li>• <i>Isotopes in Plant Biology: Future Sustainability in Energy and Agriculture—II</i></li> <li>• <i>Applications of Research and Industrial Isotopes</i></li> </ul>
10:20 am-12:00 pm	Closing Plenary
12:30 am-4:30 pm	Argonne National Laboratory Technical Tour
12:30 am-5:30 pm	Fermi National Accelerator Laboratory Technical Tour

# Monday Technical Sessions

**SUNDAY, AUGUST 24, 2014, 4:00 P.M.**

## OPENING PLENARY

*Session Organizers:* Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)

## WELCOMING REMARKS

Paul T. Dickman, General Chair  
Myung-Chul Lee, President WCI  
Peter B. Littlewood, Director, Argonne National Laboratory  
Donald Hoffman, Past President ANS

## KEYNOTE LECTURE

The Isotopes Story: From the Curies to Element 118  
Heino Nitsche (Univ of California, Berkeley/LBNL), invited

**SUNDAY, AUGUST 24, 2014, 6:00 P.M.-8:00 P.M.**

## OPENING RECEPTION

**MONDAY, AUGUST 25, 2014, 8:00 A.M.**

## ISOTOPES GENERAL PLENARY

*Session Organizers:* Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)

Economics of Radioisotope Production and Sustainability, Ron Francis Cameron (OECD Nuclear Energy Agency), invited

Isotope Developments in the Australian Setting, Adrian Walter Paterson, Karina Meredith, Quan Hua (ANSTO), invited

Accelerator-Based Production of Mo-99, Thomas J. Ruth (TRIUMF/BC Cancer Agency), invited

Isotope Production and Research at the U.S. Department of Energy, Marc A. Garland (DOE), invited

Stable Isotope Production—Historical Review and Future Trends, Darren J. Brown (Trace Sciences International), invited

Radioisotopes and Radiation Technology in Industry, Meera Venkatesh, Patrick Brisset, Sunil Sabharwal, Agnes Safrany (IAEA), invited

Transforming the Playing Field; Personalized Medicine Using Theragnostic Radiopharmaceuticals, Suresh C. Srivastava (BNL), invited

**MONDAY, AUGUST 25, 2014, 9:45 A.M.-10:15 A.M.**

## REFRESHMENT BREAK IN EXPO

**MONDAY, AUGUST 25, 2014, 1:00 P.M.**

## REACTOR-BASED PRODUCTION OF Mo-99—I

*Session Organizers:* Natesan Ramamoorthy (HBNI), James S. Welsh (NIU Inst for Neutron Therapy)

Improvements to Production and Supply of LEU Molybdenum, Mark John Embury-Moore, Aaron Flett (ANSTO), invited

Future U.S. Supply of Mo-99 Production Through Fission Based LEU/LEU Technology, Carmen Irene Bigles, Alejandro Valderrabano, James Welsh (Coqui RadioPharmaceuticals Corp.), invited

A Small Reactor Design for <sup>99</sup>Mo Production with Novel Fuel, Gary M. Stange, Thomas “Rock” Mackie, Michael Corradini (Univ of Wisconsin, Madison)

A Novel Micro-Porous Sorbent for <sup>99</sup>Mo/<sup>99m</sup>Tc Generator Using (n,f $\times$ ) <sup>99</sup>Mo, Lou Centofanti, Tom Yarbrough, Robert J. Schreiber, Sally McQuaid, Shameem Hasan (Perma-Fix Environmental Services Inc.)

Metallurgical Considerations for the Fabrication of LEU Dispersion Targets with a High Uranium Density for MO-99 Production, Ho Jin Ryu (KAIST), Yong Jin Jeong, Ji Min Nam, Jong Man Park (KAERI)

Options for the Separation of Medical Isotope Molybdenum-99 from Low Enriched Uranium Solutions, Iain May, A. S. Anderson, R. Copping, G. E. Dale, D. A. Dalmas, M. J. Gallegos, L. A. Hudson, C. T. Kelsey, S. D. Reilly, D. Rios, F. H. Stephens, F. L. Taw, K. A. Woloshun (LANL)

## APPLICATIONS IN NUCLEAR MEDICINE—THERAPEUTICS

*Session Organizers:* Meera Venkatesh (IAEA), Bryan P. Bednarz (Univ of Wisconsin, Madison)

Dosimetry-Based Treatment Planning: Personalized Medicine in Radiopharmaceutical Therapy, Robert Francois Hobbs (Johns Hopkins Univ), invited

Merging Therapeutic and Diagnostic Imaging: Phospholipid Ether-Based Targeting Approaches for Broad Spectrum Cancer Detection and Treatment, Joseph John Grudzinski, Jamey Weichert (Univ of Wisconsin, Madison), invited

Towards Multiscale Personalized Dosimetry for Diapeutic Radiopharmaceuticals, Bryan P. Bednarz, Abigail Besemer (Univ of Wisconsin, Madison), Joseph Grudzinski, Benjamin Titz (Novelos Therapeutics, Inc.), Paul Wickre, Jamey Weichert, Lance Hall (Univ of Wisconsin, Madison), invited

Preparation and Evaluation of Sn-117m Annexin for Vulnerable Plaque, George M. St. George, Jason A. Rogers, R. Keith Frank, Scot H. Ellebracht (IsoTherapeutics Group, LLC), Nigel

R. Stevenson, David W. Mueller, Gilbert R. Gonzales (*Clear Vascular, Inc.*), Jaime Simon (*IsoTherapeutics Group, LLC*)

CycloSam® Sm-153 DOTMP, A New Therapeutic Bone Agent, Jaime Simon, R. Keith Frank, Prakash U. Bakhru (*IsoTherapeutics Group LLC*), Richard E. Wendt (*Univ of Texas M.D. Anderson Cancer Center*), Jimmy C. Lattimer, Kim A. Selting, Alan R. Ketring (*Univ of Missouri*)

Antitumor Effect of Radioactive CISPLATIN ( $^{195}\text{mPt}$ ) Produced by Photonuclear Method, Elena N. Bodnar (*Trauma Risk Management Research Inst*), N. Dikiy, E. Medvedev (*Kharkov Inst of Physics and Technology*)

Assessment of  $^{203}\text{PB}/^{212}\text{PB}$  Labeled MCH-Peptides for Theranostics of Malignant Melanoma, B. K. Kudelin (*V. G. Khlopin Radium Inst*), V. Yu. Sukhov (*S. M. Kirov Military Medical Academy*), Valery Kalinin, L. M. Solin, V. A. Jakovlev (*V. G. Khlopin Radium Inst*)

## CALIBRATION METHODS, FUNDAMENTAL NUCLEAR DATA, AND AIRBORNE EFFLUENTS FROM MEDICAL ISOTOPE PRODUCTION

*Session Organizer:* Steven R. Biegalski (*Univ of Texas, Austin*)

Calibrating a New Generation of Field Nuclear Measurements for Treaty Inspections, Derek Anderson Haas, Matthew W. Cooper, Justin I. McIntyre, Theodore W. Bowyer, James C. Hayes, Harry S. Miley, Amanda M. Prinke, Michael P. Foxe, Justin D. Lowrey, Craig E. Aalseth, Allen Seifert, Richard M. Williams, Robin A. Riedmann (*PNNL*), invited

Electron-Photon Coincidence Decay of  $^{127}\text{Xe}$ , Franziska J. Klingberg, Steven Biegalski (*Univ of Texas, Austin*), Derek Haas, Amanda Prinke (*PNNL*)

Determination of Short-Lived Fission Product Yields with Gamma Spectrometry, Kenneth J. Dayman, Steven R. Biegalski (*Univ. of Texas, Austin*), Derek A. Haas (*Battelle for the USDOE*)

Radioxenon Measured and Predicted Detections from Southern Hemisphere Medical Isotope Production Facilities, Justin David Lowrey, Paul W. Eslinger, Brian T. Schrom, Judah I. Friese, Derek A. Haas, Harry S. Miley (*PNNL*)

Stack Monitoring at the BaTek Medical Isotope Production Facility, Justin I. McIntyre, I. M. Cameron (*PNNL*), J. Dumais (*BATAN, National Nuclear Energy Agency*), P. W. Eslinger (*PNNL*), A. Gheddou (*CTBTO*), A. Gusbudiman, P. Marsoem (*BATAN, National Nuclear Energy Agency*), H. S. Miley (*PNNL*), M. Nikkinen (*CTBTO*), A. Prinke, M. Ripplinger, B. D. Schrom (*PNNL*), U. Stoehlker (*Federal Office for Radiation Protection*), G. Suhariyono (*BATAN, National Nuclear Energy Agency*), G. A. Warren (*PNNL*), S. Widodo (*BATAN, National Nuclear Energy Agency*), V. T. Woods (*PNNL*)

Local Transport of Radioxenon Released from the Chalk River Laboratories Medical Isotope Facility, Christine Johnson,

Steven Biegalski (*Univ of Texas, Austin*), Justin Lowrey, Derek Haas (*PNNL*)

## PRODUCTION OF NON-PET RADIONUCLIDES

*Session Organizers:* Nigel R. Stevenson (*Clear Vascular, Inc.*), Flavia Groppi (*LASA*)

Methods of Producing High Specific Activity SN-117M with Commercial Cyclotrons, Nigel Raymond Stevenson (*Clear Vascular, Inc.*), invited

The Past, Present and Future of Cyclotron-Based Large Scale SPECT Radioisotopes Production, Sylvain Savaria, Jean-Michel Geets (*IBA*), invited

Cyclotron Production of SPECT Isotopes, Jozef Orzechowski (*TRIUMF*), Jerry Porter (*Nordion*), invited

Isotope Production Using Automated Separation of Irradiated Liquid Targets, George Michael St. George, Jaime Simon (*IsoTherapeutics Group LLC*), Nigel Stevenson (*TcNet LLC*)

Building on TR-24 Success—ACSI Launches a New Cyclotron Model, Alexander Zyuzin, Russell Watt, William Gyles, Markus Pauli (*Advanced Cyclotron Systems Inc.*)

Linac Production of Cu-67: Design, Production, and Separation, David A. Rotsch, David A. Ehst, Nicholas A. Smith, Vahko Makarashvili, Andrew S. Hebden (*ANL*)

Production of High Specific Activity  $^{186}\text{Re}$  for Cancer Therapy Using  $\text{WO}_3$  Targets in a Proton Beam, Michael E. Fassbender (*LANL*), Matthew Gott (*Univ of Missouri, Columbia*), Jonathan Engle, Eva Birnbaum, Kevin John, Joel Maassen, Meiring Nortier (*LANL*), John Lenz (*John Lenz & Assoc.*), Cathy Cutler, Alan Ketring, Silvia Jurisson (*Univ of Missouri, Columbia*), Scott Wilbur (*Univ of Washington*)

Isotope Production and Clinical Research at the University of Washington Clinical Cyclotron, Eric Dorman, Robert Emery, (*Univ of Washington School of Medicine*)

## REFERENCE MATERIALS FOR NUCLEAR MASS SPECTROMETRY/NUCLEAR ANALYSIS SESSION TO THE HONOUR OF DR. STEFAN BUERGER

(*IAEA*)

*Session Organizers:* Stephan Richter (*EC JRC*), Jacqueline L. Mann (*NIST*)

To the memory of Stefan Buerger, Sergei Bulyha (*IAEA*), invited

Implementation of MC-ICP-MS for Bulk Analysis of Environmental Samples at IAEA Safeguards Analytical Laboratories, Sergei Bulyha, Andreas Koepf, Zsuzsanna Macsik (*IAEA*), invited

# Monday Technical Sessions

New Uranium Isotopic Synthetic Calibration Mixes and Recertification of NBL U-Series CRMS, Rebecca B. Thomas, Richard Essex, Colleen Gradle (*DOE–New Brunswick Lab*), invited

Recently Certified Reference Materials from New Brunswick Laboratory, Matthew Joseph Kattathu, Richard Essex, Colleen Gradle (*DOE–New Brunswick Lab*), invited

Certification of Uranium Hexafluoride Reference Materials for Isotopic Composition, Sebastien Mialle, Stephan Richter, Carmel Hennessy, Jan Truyens, Ulf Jacobsson, Yetunde Aregbe (*EC-JRC-IRMM*)

Reference Materials for Nuclear Forensics, Jacqueline Mann (*NIST*), Richard Essex, Paul Croatto (*DOE–New Brunswick Lab*), Jeffrey Morrison (*U.S. Department of Homeland Security*)

Reference Materials for Pu-238 Determination in Plutonium by Thermal Ionisation Mass Spectrometry, Suresh Kumar Aggarwal, Alamelu Devanathan (*BARC*)

Preparation of High Purity Isotopic Reference Standards for Isotope Dilution Mass Spectrometry, Jared R. Horkley, K. P. Carney, E. M. Gantz, T. S. Grimes, R. R. Lewis, J. P. Crow, C. A. Poole, J. J. Giglio, Martha Ruth Finck (*INL*)

## MONDAY, AUGUST 25, 2014, 3:00 P.M.–3:30 P.M.

### REFRESHMENT BREAK IN EXPO

## MONDAY, AUGUST 25, 2014, 3:30 P.M.–6:00 P.M.

### REACTOR-BASED PRODUCTION OF Mo-99—II

*Session Organizers:* Natesan Ramamoorthy (*HBNI*), James S. Welsh (*NIU Inst for Neutron Therapy*)

Scope and Need for Reducing Over-Dependence on Fission-Based Mo-<sup>99</sup>/Tc-<sup>99m</sup>: An Analysis, Natesan Ramamoorthy (*BARC*), invited

ANSTO Nuclear Medicine—Towards a Stable Supply of Mo-99, Michael James Druce, Mark Moore (*ANSTO*)

LEU-Based Fission Mo-99 Process with Reduced Solid Wastes, Seung-Kon Lee, Suseung Lee, Sunghee Jung, Soon-Bog Hong, Kyung-Duk Jang, Sangmu Choi, Junsig Lee, Incheol Lim (*KAERI*)

Mo-99 Production in RIAR: Status and Conversion Planning, Rostislav Alexandrovitch Kuznetsov, Alexander Svyatkin, Alexey Izhutov, Vladimir Starkov, Alexander Pakhomov (*JSC “SSC RIAR”*)

Dynamic System Simulation of Fissile Solution Systems, Steven Karl Klein, Robert Kimpland (*LANL*)

Nuclear Design of the KIJANG Research Reactor for Radio-Isotope Production and Silicon Doping, Hong-Chul Kim, Chul Gyo Seo, Hee Taek Chae (*KAERI*)

### THERAGNOSTICS/PERSONALIZED MEDICINE

*Session Organizers:* Flavia Groppi (*LASA*), Suresh Srivastava (*BNL*)

Theragnostic Radiopharmaceuticals for the Imaging Plus Treatment of Cancer and Other Inflammatory Disorders, Suresh C. Srivastava (*BNL*), Nigel R. Stevenson (*Clear Vascular, Inc.*), invited

Targeting Genomic Biomarkers for Diagnosis and Therapy, Mathew L. Thakur (*Thomas Jefferson Univ*), invited

Multifunctional Radionanomedicine: A New Theranostic Approach, Flavia Groppi, M.L. Bonardi, S. Manenti, L. Gini (*Università degli Studi di Milano & INFN*), E. Sabbioni (*ECSIN Veneto Nanotech*), invited

New Radioisotopes for Innovative Theranostic Approach in Nuclear Medicine, Mickaël Bourgeois (*Arronax Cyclotron/ CRCNA–UMR 892 INSERM*), Mathieu Frindel (*CRCNA – UMR 892 INSERM*), Ferid Haddad (*Arronax Cyclotron*), Michel Cherel (*CRCNA–UMR 892 INSERM*), Jacques Barbet (*Arronax Cyclotron*), Alain Faivre-Chauvet (*CRCNA–UMR 892-INSERM*), invited

Preliminary Production of Ac-225 by Spallation Reaction on Th-232, Leonard F. Mausner, Dmitri G. Medvedev (*BNL*), David Denton, John Cosgrove, Saed Mirzadeh (*ORNL*), Albert L. Hanson (*BNL*), invited

Low Energy Proton Irradiation of <sup>86</sup>SRCL<sub>2</sub> at BLIP to Produce PET Radioisotope Y-86, Dmitri G. Medvedev, Leonard F. Mausner (*BNL*), invited

Deuteron Beams to Produce Radionuclides for Theranostic Medicine Applications, M. L. Bonardi, S. Manenti, L. Gini, Flavia Groppi (*Università degli Studi di Milano & INFN*)

The Theragnostic Radionuclide Pair: <sup>64</sup>Cu/ <sup>67</sup>Cu at Arronax Cyclotron., Nathalie Michel, Thomas Sounalet (*Arronax–SUBATECH*), Cyrille Alliot (*Univ of Nantes*), Mauro Gambaccini (*University and INFN of Ferrara*), Ferid Haddad (*Arronax–SUBATECH*)

Nucleophilic F-18 Fluorination for Bioconjugation Chemistry: Its Applications to Imaging Agents, Dae Yoon Chi (*Sogang Univ*), Byoung Se Lee (*FutureChem Co., Ltd.*), Hyejin Ahn, Byungsoo Kang (*Sogang Univ*), invited

### APPLICATION OF NUCLEAR TECHNIQUES TO NATIONAL SECURITY AND TREATY MONITORING

*Session Organizers:* Kenan Unlu (*Penn State*), Igor Jovanovich (*Penn State*)

Cyclic Neutron Activation Analysis of Actinides for Material Characterization, Bruce D. Pierson, Marek Flaska, Sara Pozzi (*Univ of Michigan*)

Material Characterization to Support a National Nuclear Forensics Library, Stephen Philip LaMont, Marcia Brisson,

Heather Dion, Ed Fei (*DOE*), Michael Kristo, Ian Hutcheon (*LLNL*), Lav Tandon, Robert Steiner (*LANL*), John Wacker, Andy Luksic (*PNNL*)

Environmental Cesium Isotope Ratio Measurements: Nuclear Forensic Applications, Darin Charles Snyder, Nick Mann, Mathew Snow (*INL*)

Evaluating Polymer Ligand Film (*PLF*) for Plutonium and Uranium Extraction in Nuclear Forensics Application, Jung Rim (*DOE–New Brunswick Lab*), Dominic S. Peterson, Claudine Armenta, Edward Gonzales (*LANL*), Kenan Unlu (*Penn State*)

Hot Particle Analysis Using Nondestructive Autoradiography, Nuclear Counting and Microanalysis for Low-Level Activity, Cynthia J. Zeissler, Shirley Turner, Richard M. Lindstrom, Jeff Davis (*NIST*)

Standoff Enrichment Measurements Using Filamentation Laser-Induced Breakdown Spectroscopy, Igor Jovanovic, Kyle C. Hartig, Phyllis Ko (*Penn State*), invited

Ultra-Sensitive Isotope Ratio Measurements Using Laser Photoionization of Sputtered Atoms, David George Willingham, Benjamin E. Naes, Albert J. Fahey (*PNNL*)

High Pressure Marinelli for Counting Low Activity Compressed Gas Samples, Troy A. Robinson, Nick R. Mann, Christopher P. Oertel, Matthew G. Watrous (*INL*), Christopher A. McGrath (*Idaho State Univ*)

Development of a Field-Based Separator for the Rapid Identification of Uranium and Plutonium, Carol Mertz, Michael Kaminski, Carolina Fineman (*ANL*)

Separation of Thorium from Uranium Using Commercial Extraction Chromatographic Resin, Lixiong Wang, Wenbin Zhong, Chong Cheng, Kaiming Long (*China Academy of Engineering Physics*)

The Need for High-Purity Uranium-233, Alan Krichinsky, Doug Canaan, Jo Giaquinton, Cole Hexel (*ORNL*)

## ISOTOPE DEVICES, ISOTOPE TRACERS AND OTHER APPLICATIONS

*Session Organizer:* Rolf Zeisler (*NIST*)

Protective Effects of Active Compound from Ginger Against Radiation-Induced Cell Damage, Jin Kyu Kim, S. M. Nasir Uddin, Dong-Min Chung, Jin-Hong Kim (*KAERI*)

Target Design and Qualification for Plutonium-238 Production, Christopher Bryan, Robert Wham, Randy Hobbs (*ORNL*)

Preparative Scale Separation of Ethyl Esters of Diethylenetriaminepentaacetic Acid by Flash Chromatography, Jonathan M. Fitzsimmons (*BNL*), Michael Jay (*Univ of North Carolina*)

Improvement of Betavoltaic Isotope Battery, Guanquan Wang, Hongyuan Wei, Yuqing Yang, Rui Hu, Yebing Liu, Shunzhong Luo (*China Academy of Engineering Physics*)

Progress in Development of Low Energy Nuclear Reaction (*LENR*) Power Cells for Space Applications, George H. Miley, Kyu-Jung Kim, Tapan Patel, Bert Stunkard (*Univ of Illinois*), invited

C Isotopes in Soil and Pollen in Lake Sediment, Southeastern Brazil: Atlantic—Amazon Forests Ancient Dynamics and Connections, Luiz Carlos Ruiz Pessenda (*CENA/USP*), Antonio Alvaro Buso (*CENA/USP*), Paulo Eduardo De Oliveira, Paulo Cesar Giannini (*IG/USP*), Marcelo Cancela Lisboa Cohen (*UFPA*), Flavio de Lima Lorente, Mariah Francisquini Correia (*CENA/USP*), invited

Nutrients and Trace Elements in Six Sugarcane Varieties Measured by Instrumental Neutron Activation Analysis, Maria Isabel Vega Martinez (*Univ of São Paulo*), Elisabete A. De Nadai Fernandes, Márcio Arruda Bacchi (*CENA/USP*), Gabriel A. Sarriés (*ESALQ/USP*)

## QUALITY ASSURANCE TOPICS IN RADIOANALYTICAL AND RADIOPHARMACEUTICAL CHEMISTRY PAPERS/PANEL

*Session Organizers:* Simon Mark Jerome (*National Physical Lab*), Sally Schwarz (*Washington Univ*)

### PAPERS:

Use of IAEA Reference Materials for QA in Analytical Techniques and Applications to Environmental Sample Analysis, Alessia Ceccatelli, A. Fajgelj, M. Groening, S. Tarjan, A. R. Iurian, A. Pitois (*IAEA*), invited

Quality Control of the Radiopharmaceutical Precursors ItraPol ( $^{90}\text{YCl}_3$ ) and LutaPol ( $^{177}\text{LuCl}_3$ ) Produced at POLATOM, Piotr Garnuszek, Alina Markiewicz, Dariusz Pawlak, Anna Filiks, Tomasz Dziel, Iwona Sasinowska, Michal Korytkowski, Renata Mikolajczak (*POLATOM*)

### PANEL DISCUSSION

#### PANELISTS:

- Cathy Sue Cutler (*Univ of Missouri, Columbia*)
- Suzanne V. Smith (*BNL*)
- Simone Jerome (*National Physical Lab*)
- Sally Schwarz (*Washington Univ*)

Quality Control of Reactor Produced Radioisotopes at MURR, Cathy Sue Cutler, Leonard Manson, Jack Lydon, Mike Flagg (*Univ of Missouri, Columbia*), invited

Research vs cGMP Manufacture—Challenges and Opportunities, Suzanne V. Smith, Jean Odin McCabe invited

# Tuesday Technical Sessions

**TUESDAY, AUGUST 26, 2014, 8:00 A.M.**

## MARIE CURIE COMMEMORATIVE SESSION

*Session Organizer:* Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)

Janice Dunn-Lee, Deputy Director General (IAEA), The Next Marie Curie: The Role of the IAEA in Advancing Women in Nuclear Science

Darleane Christian Hoffman, Professor Emerita, (Univ of California-Berkeley), Some Reflections on my 70 Year Career in Chemistry and the Changing Status of Women

Valerie G. Segovia, Director of Outreach and Development, Nuclear Power Institute (Texas A&M Univ): POWER SET: Empowering Young Women to Assume Their Role in Nuclear Science

Radium: From Discovery by Marie Curie to Medical Applications, Jean-Louis Alberini (Curie Inst), invited

The Role of Periodic Tables in the Discovery of New Chemical Elements, Darleane Christian Hoffman (UCBer/LBNL), invited

**TUESDAY, AUGUST 26, 2014, 9:45 A.M.-10:10 A.M.**

## REFRESHMENT BREAK IN EXPO

**TUESDAY, AUGUST 26, 2014, 10:10 A.M.**

## MARIE CURIE PLENARY SESSION

*Session Organizers:* Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)

Applications of Positron Annihilation Techniques, Ilham Y. Al-Qaradawi, D. A. Abdulmalik (Qatar Univ), invited

Rapid Radiotracer Chemistry and Imaging the Human Brain, Joanna S. Fowler (BNL), invited

Cyclotron Production and Imaging Applications of Positron Emitting Radiometals, Suzanne Lapi (Washington Univ), invited

Current Directions in Diagnostic and Therapeutic Radiopharmaceuticals, Silvia Sabine Jurisson (Univ of Missouri, Columbia), invited

Biogeochemical Processes Controlling the Transport of Plutonium in the Environment, Annie Kersting (LLNL), invited

**TUESDAY, AUGUST 26, 2014, 1:00 P.M.-3:00 P.M.**

## POSTER DISCUSSION A AND REFRESHMENT BREAK

## ISOTOPE PRODUCTION IN REACTORS

Capabilities of the LVR-15 Research Reactor for Production of Medical and Industrial Radioisotopes, Michal Koleska, Jaroslav Ernest, Zdena Lahodova, Ladislav Viererbl, Miroslav Vins, Jaroslav Soltes, Josef Stehno (Centrum vyzkumu Rez)

Development of the Automated Control System Supporting Production of Radionuclides for Medical Applications, Rostislav Alexandrovitch Kuznetsov (JSC "SSC RIAR"), Sergey Novikov, A. Berintsev, A. Kondratyev, Dmitry Kozlov, A. Muralev (Ulyanovsk State Univ), Valery Tarasov (JSC "SSC RIAR"), Vyacheslav Svetukhin, Andrey Zhukov (Ulyanovsk State Univ)

Production of Iodine-131 by Irradiating Tellurium Dioxide at JSC "SSC RIAR", Lev Kazakov, Rostislav Alexandrovitch Kuznetsov, Alexey Kupriyanov, Evgeny Romanov, Valery Tarasov, Dmitry Rybin, Sergey Sazontov, Vitaly Uzikov (JSC "SSC RIAR")

New Version of ORIP\_XXI Software to Analyze the Data on Isotopes, Evgeny G. Romanov, Valery A. Tarasov (JSC "SSC RIAR")

Evaluation of Radiochemical Yield of Molybdenum-99 Fission at WWR-c Nuclear Reactor in Obninsk, Oleg Kochnov, Maya Markina, Vitaliy Pozdeev (Karpov Inst of Physical Chemistry)

Development of Silver-Exchanged Adsorbents for the Removal of Fission Iodine in Fission Mo-99 Process, Seung-Kon Lee, Suseung Lee, Ul Jae Park, Kwon Mo Yoo, Kang Hyuk Choi, Jun Sig Lee (KAERI)

Aluminum Waste Treatment in Fission Mo-99 Process, Suseung Lee, Seung-Kon Lee, Sung-Hee Jung, Soon-Bog Hong, Kyung-Duk Jang, Sang Mu Choi, Jun Sig Lee, In-Cheol Lim (KAERI)

Collection and Recycle of Gaseous Iodine from Fission Mo-99 Off-Gas, Suseung Lee, Seung-Kon Lee, Yong Bae Park, Ul Jae Park, Kwon Mo Yoo, Kang Hyuk Choi (KAERI)

Studying of the Carrier-Free <sup>177</sup>Lu Radioisotope Production Methods in NRC "Kurchatov Institute", Alexey Semenov, P. Boldirev, D. Chuvilin (NRC "Kurchatov Inst"), S. Deev, V. Golovachenko (RAS), D. Markovskiy, R. Nurtdinov, M. Proshin, Y. Vereshagin, V. Zagryadskiy, A. Zaharov (NRC "Kurchatov Inst"), invited

Development of High Specific Activity <sup>99</sup>Mo Radioisotope Production Method in Radiative Absorption Reaction <sup>98</sup>Mo(n,γ)<sup>99</sup>Mo Using Structured Molybdenum-Containing Nanoparticles as Target Material, Alexey Semenov, D. Chuvilin, Ya. Kravec, L. Menshikov, M. Proshin, T. Udalova, Y. Varesagin, A. Zagnitko, V. Zagryadskiy (NRC "Kurchatov Inst"), invited

Development and Scaling of n-GAMMA Mo-99 Production at MURR, Leonard Manson, Jack Lydon, Ralph A. Butler, Mike Flagg (Univ of Missouri, Columbia)

## ISOTOPE PRODUCTION AND OUTPUT ANALYTIC CONTROL AND QUALITY SYSTEMS

Overview of New Uranium Isotopic Reference Materials at IRMM, Stephan Richter, Sebastien Mialle, Jan Truyens, Roger Eykens, Ulf Jacobsson, Yetunde Aregbe (*IRMM-JRC-EU*)

Plutonium Age Dating for Nuclear Forensics: A Close-Up on the Pu/U Chronometers, Monika Sturm (*Univ of Natural Resources and Life Sciences Vienna*), Stephan Richter, Yetunde Aregbe, Roger Wellum, Klaus Mayer (*ECJRC*), Thomas Prohaska (*Univ of Natural Resources and Life Sciences Vienna*)

IRMM-1000 and REIMEP-22: A Certified Reference Material and an Interlaboratory Comparison on U/TH Age Dating for Nuclear Forensics, Celia Venchiarutti, Stephan Richter, Zsolt Varga, Rozle Jakopic, Klaus Mayer, Yetunde Aregbe (*EC-JRC*)

Excitation Function Measurements for TC-99m Production by Proton Beams Irradiation—The Italian Contribution, S. Manenti, L. Gini, Flavia Groppi (*Università degli Studi di Milano & INFN*)

Terminology on the Concepts of Carrier, Specific Activity, Activity Concentration and Purities in Nuclear and Radiochemistry, Radioanalytical and Radiopharmaceutical Chemistry, Mauro Bonardi (*Università degli Studi di Milano*)

## ACCELERATOR PRODUCED ISOTOPES

Computational Fluid Dynamics Simulation of Uranium Aqueous Solution for Mo-99 Production, Jason Oakley, Geoffrey Bull, Michael Corradini (*Univ of Wisconsin, Madison*), Eric Van Abel (*Shine Medical Technologies*)

Radiation Safety in PET Isotope Work: A Resource not a Restriction, Kinda Imran Abdin, Susan M. Langhorst, Daniel Szatkowski (*Washington Univ*)

Accelerator-Based Production of <sup>99</sup>Mo: A Comparison Between the <sup>100</sup>Mo(p,x) and <sup>96</sup>Zr(α,n) Reactions, Gaia Pupillo (*Dipartimento di Fisica e Scienze della Terra and INFN of Ferrara*), Juan Esposito (*INFN*), Ferid Haddad, Natalie Michel (*GIP Arronax*), Mauro Gambaccini (*Dipartimento di Fisica e Scienze della Terra and INFN of Ferrara*)

Radiation Safety in PET Isotope Work: Resource Tools, Kinda Imran Abdin, Daniel Szatkowski, Susan M. Langhorst (*Washington Univ*)

Effect of Bubble Agitation on Heat Transfer from a Volumetrically Heated Liquid Pool, Geoffrey Bull, Jason Oakley, Michael Corradini (*Univ of Wisconsin, Madison*), Eric van Abel (*Shine Medical Technologies*)

Determination of the Specific Activity and Isotope Ratios of Strontium in Production Scale Strontium-82 by Gamma Spectroscopy and ICP-OES/MS, Jonathan M. Fitzsimmons, Leonard F. Mausner (*BNL*)

Zn-65 Purification from Irradiated Gallium Metal, Jonathan

M. Fitzsimmons, Slawko O. Kurczak, Leonard F. Mausner (*BNL*)

Targetry for Production of <sup>44</sup>Ti/<sup>44</sup>Sc Generator Systems at the Los Alamos Isotope Production Facility, Valery Radchenko, Michael E. Fassbender, Francois M. Nortier, Jonathan W. Engle, Justin J. Wilson, Wayne A. Taylor, Eva R. Birnbaum, Kevin D. John (*LANL*)

Basic Examination of a Molybdenum-<sup>99</sup>/Technetium-<sup>99m</sup> Production System Using an Electron Linear Accelerator, Shun Sekimoto, Tsutomu Ohtsuki (*Kyoto Univ*)

Production of <sup>129,130,131,132,136</sup>Cs by Proton Irradiation of <sup>nat</sup>Xe Targets for use in Radiochemical Separation Experiments of Surrogate UREX Waste, Paul Andrew Ellison, Todd E. Barnhart, Robert J. Nickles (*Univ of Wisconsin, Madison*), Jeff Driscoll (*Shine Medical Technologies, Inc.*), Onofre T. DeJesus (*Univ of Wisconsin, Madison*)

Determination of the Specific Activity and Isotope Ratios of Germanium in Production Scale Germanium-68 by Gamma Spectroscopy and ICP-MS, Jonathan M. Fitzsimmons, Leonard F. Mausner (*BNL*)

Method of Photonuclear Production of <sup>99m</sup>Tc, <sup>67</sup>Cu, <sup>195m</sup>Pt, Nicolai Dikiy (*Kharkov Inst of Physics and Technology*), E. Bodnar (*Trauma Risk Management Research Inst*), E. Medvedeva (*Kharkov Inst of Physics and Technology*)

Alternative Method for Separation of Technetium-<sup>99m</sup> from Dissolved Mo Target, Dariusz Pawlak, Jozef L. Parus, Wioletta Wojdowska, Renata Mikolajczak (*POLATOM*)

Study on the Development of Safe Decommissioning Procedures for Medical Isotope Production Cyclotron in Rep. of Korea, Yongmin Kim, Rina Woo, Dayoung Kwon (*Catholic Univ of Daegu*), Minchul Song, Woonkap Cho (*KINS*)

## PRODUCTION OF STABLE ISOTOPES

Carbon Isotope Separation by Ion Exchange Chromatography in Cascade System, Carlos Roberto Sant Ana Filho, L. M. R. Alessandra Rossete, Joao M. Milagres, Clelber V. Prestes, Eduardo Ferriolli, Jose A. Bendassolli (*Univ of São Paulo*)

Mercury Isotope Production by a Photochemical Technique, N.V. Vyazovetskaya, Yu.V. Vyazovetskiy (*Kurchatov Inst*)

## ISOTOPE DEVICES, ISOTOPE TRACERS, AND OTHER APPLICATIONS

Development of Radiation Monitoring System for 30-MeV Cyclotron, Jin-Woo Lee (*KAERI*), Yun-Jong Lee, Min-Goo Hur (*KAERI*), Che-Hwan Im (*REMTECH*)

Experimental Studies of <sup>64</sup>Cu and <sup>67</sup>Cu Medical Isotopes Production Using Spallation Neutrons Generated in Massive Uranium Target, Yuri Petrusenko, V. Sotnykov, V. Voronko (*Kharkov Inst of Physics and Technology*), A. Baldin, S Tyutyunnikov (*Joint Inst for Nuclear Research*)

Software for Simulation of Radiation Fields in 3-D Distributed Multisource Models «RADVIS», Mikhail Tikhonchev, Alex Muralev, Dmitry Kozlov, Andrey Zhukov, Vyacheslav Svetukhin (*Ulyanovsk State Univ*), Rostislav Alexandrovitch Kuznetsov, Valery Tarasov (*JSC "SSC RIAR"*)

Fiber Optic Radiation Dosimetry System Based on Scintillating Fibers, Sergey Novikov, A. Berintsev, A. Chertoriysky, A. Muralev (*Ulyanovsk State Univ*), Rostislav Alexandrovitch Kuznetsov (*JSC "SSC RIAR"*), V. Svetukhin, A. Zhukov, I. Zolotovskiy, D. Kozlov (*Ulyanovsk State Univ*)

Transmutation of Technetium and Production of Artificial Stable Ruthenium, Konstantin Rotmanov, Valery Tarasov, Evgeny Romanov (*JSC "SSC RIAR"*), Andrey Kozar, Vladimir Peretrukhin (*A. N. Frumkin Inst of Physical Chemistry and Electrochemistry*)

Neutron Fluence Power Dependence Studied with Nuclear Track Methodology, on the TRIGA Mark-III Research ININ Nuclear Reactor, Guillermo Espinosa (*Instituto de Fisica, Universidad Nacional Autonoma de México*), J. I. Golzarri (*Instituto de Fisica*), R. Raya-Arredondo, S. Cruz-Galindo (*Instituto Nacional de Investigaciones Nucleares*), L. Sajo-Bohus (*Universidad Simon Bolivar*)

A Novel Design of Human Resource Education Curriculum for Professional Manpower in RI-Biomics Field, Woo-Ho Shin, Yu-Sun Yeom, Young-Muk Hwang, Tai-jin Park (*Korea Radioisotope Association*), Sang-Hyun Park (*KAERI*)

Current Trends of C-14 and H-3 in the Field of RI-Biomics, Sol-Ah Jang, Yu-Sun Yeom, Tai-Jin Park (*Korea Radioisotope Association*)

Evaluation of Cholesterol Absorption Inhibition of Anti NPC1L1 IgY by <sup>3</sup>H-Labeled Cholesterol in Sprague-Dawley Rats, Sang Hyun Park, Hayu Tyas Utami (*KAERI/Univ of Science and Technology*), Jaeyoung Cho (*JYJ Consulting*), Beon-Su Jang (*KAERI/Univ of Science and Technology*)

Comparison Between Peak-to-Peak and Peak-to-Valley Methods for Positron Emission Tomography, Mohammed Alkhorayef (*King Saud Univ*), Nicholas M. Spyrou (*Univ of Surrey*)

## ISOTOPE TRACERS

Effect of Vinasse Application in the <sup>13</sup>C and <sup>15</sup>N in the Soils Cultivated with Sugarcane in South Brazil, Alexsandra Molina Rossete (*Univ São Paulo/USP*), Carlos R. Santana Filho, Gabriela G. Medeiros, Jose A. Bendassolli, Marcelo Z. Moreira, Plinio B. Camargo (*USP*)

<sup>99m</sup>Tc-Labeled Gold-Binding Peptide for Molecular Imaging, Beom-Su Jang, Jong Kook Rho, Joo-Sang Lee, Sang Hyun Park (*KAERI*)

Different Formulations of TBP- TOA/Cyclohexane and Experimental Conditions to Extract the <sup>99m</sup>TcO<sub>4</sub><sup>-</sup>, Eluted from a <sup>99</sup>Mo/<sup>99m</sup>Tc Generator, Judith Dominguez, Marta S. Ortega Pijeira, Ernesto Martinez, Jorge L. Batista, Jorge I. Borroto (*High Inst of Applied Technologies and Science*)

**TUESDAY, AUGUST 26, 2014, 3:00 P.M.**

## ACCELERATOR-BASED PRODUCTION OF Mo-99

*Session Organizers:* Thomas Ruth (*TRIUMF*), George F. Vandergrift III (*ANL*)

Update on the University of Alberta's TR24 Production of Tc-99m, Katherine Gagnon, J. D. Andersson, B. Thomas, J. Wilson, J. Doupe, S. A. McQuarrie, A. J. B. McEwan (*Univ of Alberta*), invited

Current is King: The Direct Production of <sup>99m</sup>Tc Via the <sup>100</sup>MO(P,2N) Channel on Small Medical Cyclotrons, Ken Buckley, Thomas J. Ruth (*TRIUMF*), Francois Benard (*BC Cancer Agency*), Michael Kovacs (*Lawson Health Research Inst*), Anna Celler (*Univ of British Columbia*), Victoire Hanemaayer, Brian Hook, Stuart McDiarmid, Stefan Zeisler (*TRIUMF*), Jeff Corsaut (*Lawson Health Research Ins*), Constantinos Economou (*Centre for Probe Development and Commercialization*), Julius Klug (*BC Cancer Agency*), Ross Harper (*Centre for Probe Development and Commercialization*), Milan Vuckovic (*BC Cancer Agency*), John Valliant (*Centre for Probe Development and Commercialization*), Paul Schaffer (*TRIUMF*), invited

Target Materials for Accelerator Production of TC-99M, Suzanne Lapi, Vernal Richards, Efreem Mebrahtu, Tara Mastren (*Washington Univ*), invited

Safety Regulation of Medical Isotope Production Accelerators in Canada, Kavita Murthy (*Canadian Nucl Safety Comm*)

Supplying Alternative Mo-99/Tc-99m Production: Availability of Mo-100/Mo-98, Patrick Hardy (*ISOFLEX USA*), invited

Accelerator Production of Mo-99 Utilizing Electron Accelerators, James Harvey (*NorthStar Medical Technologies, LLC*), invited

Development of Accelerator Based Domestic Production of Mo-99: NorthStar Medical Technologies, Sergey Chemerisov, George Vandegrift, Peter Tkac, Roman Gromov, Vakho Makarashvili, Bradley Micklich, Charles Jonah (*ANL*), Gregory Dale, Frank Romero, Michael Holloway, Keith Woloshun (*LANL*), Thad Heltemes (*ANL*), Jim Harvey (*NorthStar Medical Technologies LLC*)

Processing and Evaluation of Linear Accelerator-Produced Mo-99/Tc-99m in Canada, Kennedy Mang'era (*Health Sciences Centre & Univ of Manitoba*), invited

Progress Related to Domestic Production of Mo-99: SHINE Medical Technologies, Amanda J. Youker, Sergey Chemerisov, Peter Tkac, George Vandegrift, Dominique Stepinski, John Krebs, Megan Bennett, Delbert Bowers, David Rotsch, Michael Kalensky (*ANL*)

Recovery of Molybdenum for Accelerator Production of Mo-99 Through  $\gamma/n$  Reaction on Mo-100, Peter Tkac, George Fox Vandegrift (*ANL*), James Harvey (*NorthStar Medical Technologies*)

Recent Progress in the Design and Experimental Activities Supporting the Commercial Electron Accelerator Production of the Medical Radioisotope Mo-99, Gregory Edward Dale



(LANL), Sergey Chemerisov, George Vandegrift (ANL), Keith Woloshun, Charles Kelsey, Michael Holloway, Michael Mocko (LANL), Vakho Makarashvili, Peter Tkac, Charles Jonah (ANL), Eric Olivas, Angela Naranjo, Frank Romero, Dale Dalmas (LANL), James Harvey (NorthStar Medical Technologies), invited

Radiation Protection Consideration during Construction, Commissioning and Production of Mo-99 with a 40 kW 35 MeV Electron Linac at the Canadian Light Source, Pradyot Chowdhury (Canadian Light Source Inc.), invited

## APPLICATIONS IN NUCLEAR MEDICINE—DIAGNOSTICS

*Session Organizers:* Cathy Sue Cutler (Univ of Missouri), Buck Rogers (Washington Univ)

Radiometal-Based Immunopet Imaging of Cancer, Hao Hong, Weibo Cai (Univ of Wisconsin, Madison), invited

$^{44m}\text{Sc}/^{44}\text{Sc}$  in Vivo Generator: First Experience of Vector Radiolabeling and Biological Evaluation for Radiopharmaceutical Development, Sandrine C. Huclier (Univ of Nantes), invited

The Site-Specific Radiolabeling of Antibodies on the Heavy Chain Glycans, Brian Matthew Zeglis, Charles B. Davis (Memorial Sloan-Kettering Cancer Center), Robert Aggeler (Life Technologies), Pier Selenica (Memorial Sloan-Kettering Cancer Center), Hee Chol Kang, Aimei Chen, Brian J. Agnew (Life Technologies), Jason S. Lewis (Memorial Sloan-Kettering Cancer Center), invited

Diagnostic Imaging with  $^{68}\text{Ga}$ -Biophosphonates vs. Treatment of Bone Metastases with  $^{177}\text{Lu}$ -Analogues, Marian Meckel (Univ of Mainz), Voitech Kubicek, Petr Herrman (Charles Univ in Prague), Ralf Bergmann, Jens Pietsch, Joerg Steinbach (HZDR), C. S. Bal (AIIMS), Richard Baum (Theranostics), Frank Roesch (Univ of Mainz) invited

Development of Metrology Tools for Enhancing the Quantitative Value of Positron Emission Tomography, Brian E. Zimmerman, Denis E. Bergeron, Jeffrey T. Cessna, Ryan Fitzgerald, Matthew M. Mille, Leticia Pibida (NIST), invited

New SPECT Tracers in the Era of PET: Nice to Have or Need to Have?, Roger Schibli (Paul Scherrer Inst), invited

Imaging Lung Function Using Hyperpolarized  $^3\text{He}$ , Stephen John Kadlecik, Hooman Hamedani, Yi Xin, Rahim Rizzi (Univ of Pennsylvania), invited

Custom Labeling and Evaluation of Proteins with Zr-89, Jason A. Rogers, Druce K. Crump, Jaime Simón, Scot H. Ellebracht (IsoTherapeutics Group LLC), Christopher M. Bull, John L. Chunta (Molecular Imaging, Inc.), Lori Murray (PerkinElmer, Inc.)

## RADIOPHARMACEUTICAL CHEMISTRY

*Session Organizer:* Meera Venkatesh (IAEA)

Which Will be the Workhorse Radionuclide of Future Diagnostic Nuclear Medicine?, Adriano Duatti (Univ of Ferrara), invited

Validation of HCl-EtOH-Method for Preconcentration OF  $^{68}\text{Ge}/^{68}\text{Ga}$  Generator Eluate and Study of the Sorption-Desorption Mechanism, Anton Alekseevich Larenkov, A. B. Bruskin (Burnasyan FMBC), Ya. V. Zubavichus (Kurchatov Inst), G. E. Kodina (Burnasyan FMBC), invited

Iodinated GRP-OPE Conjugate and in Vitro Properties, Zhijun Zhou, Hongyuan Wei, Guanquan Wang (China Academy of Engineering Physics)

## REACTOR PRODUCTION OF MEDICAL ISOTOPES

*Session Organizers:* Natesan Ramamoorthy (Homi Bhabha National Inst), Cathy Cutler (Univ of Missouri)

The Necessity of Research Reactors for Radioisotope Production, Bernard J. Ponsard (SCK.CEN/ BR2 Reactor), invited

Novel Radionuclide Production at POLATOM, Renata Mikolajczak (POLATOM), invited

Production of Radioisotopes at the Jules Horowitz Reactor, Jean-Pierre Coulon (CEA), invited

Reactor Isotope Production at MURR, Cathy Sue Cutler (Univ of Missouri), invited

Production of High Specific Activity of  $^{153}\text{Sm}$  by Isotope Separation Following Neutron Irradiation, John M. Dauria (Isotherapeutics Group, LLC/Simon Fraser Univ), Keith Frank (Isotherapeutics Group, LLC), Alan Ketring (Missouri Univ Research Reactor), Keith Ladouceur (Advanced Applied Physics Solutions), Suzanne E. Lapi (Washington Univ), Thomas J. Ruth (TRIUMF), Paul Schmor (Schmor Particle Accelerator Consulting, Inc.), Daniel W. Stracener (ORNL), Jaime Simon (Isotherapeutics Group, LLC)

Experimental Validation for Optimization of Transcurium Isotope Production, Susan Hogle, Charles W. Alexander, Jonathan D. Burns, Julie G. Ezold (ORNL)

Radiochemical Isolation of the Therapeutic  $^{195m}\text{Pt}$  from the Neutron Irradiated  $^{193}\text{Ir}$  Metal, Nikolay Aksenov, Sarkis Karamyan, Gospodin Bozhikov, Alexander Madumarov, Lydia Sokolova, Sergey Dmitriev (Joint Inst for Nuclear Research)

Production of Transplutonium Elements at JSC “SSC RIAR”, Yuri Toporov, Evgeny Shimbarev, Valery Tarasov, Evgeny Romanov, Alexey Kupriyanov (JSC “SSC RIAR”)

Calculation of the Specific Activity of  $^{177}\text{Lu}$ , Otto Knoesen, Steven Maage (NTP Radioisotopes SOC Ltd)

# Tuesday Technical Sessions

Research Reactor Production and Purification of  $^{64}\text{Cu}$  and  $^{67}\text{Cu}$  Using Enriched Zinc Isotopes, Amanda M. Johnsen, Brenden J. Heidrich, Chad Durrant, Andrew John Bascom, Kenan Unlu (*Penn State*)

Sr-89 Production Using Reactors of JSC “SSC RIAR”, Evgeny G. Romanov, Valery A. Tarasov, Igor Yu. Zhemkov, Rostislav Kuznetsov, Pavel S. Butkalyuk (*JSC “SSC RIAR”*)

## PRODUCTION OF STABLE ISOTOPES

*Session Organizer:* Wolfgang H. Runde (*LANL*)

Isotope Production at Oak Ridge National Laboratory, John William Krueger (*ORNL*), invited

Production Capacities of ROSATOM State Corporation’s Isotope Complex in the Sphere of Stable Isotopes’ Manufacturing and Supplies, Aleksey Vakulenko (*JSC Isotope*)

Development of Electromagnetic and Gas Centrifuge Technologies for the Enrichment of Stable Isotopes, Brian J. Egle, Kevin J. Hart, William D. Strunk, Gary E. Giles (*ORNL*), invited

Demonstration of Magnetically-Activated and Guided Isotope Separation (*MAGIS*), Mark G. Raizen (*Univ of Texas, Austin*)

Multicomponent Separation Potential: Back to the DIRAC, Oleg Aleksandrov, Vadim Gadelsin, Valerii Palkin, Vladimir Seleznev (*Ural Federal Univ*)

## STABLE ISOTOPES IN MATERIALS AND ENVIRONMENTAL RESEARCH

*Session Organizer:* Robert Gregory Downing (*NIST*)

A Time-Dependent Picture of Hydration Layer Evolution During Glass Corrosion via Isotopic Tracing Mechanisms, Joseph Ryan, Daniel Schreiber, Zihua Zhu, James Neeway, Alex Mitroshkov (*PNNL*)

Iodine Valence and Local Environment in Nuclear Waste Glass Characterized by X-Ray Absorption Spectroscopy, David A. McKeown, Isabelle Muller, Ian Pegg (*Catholic Univ of America*)

Local Time-Averaged Gas Holdup in Fluidized Bed Reactor Using Gamma Ray Computed Tomography Technique (CT), Abdelsalam Yahya Efhaime, Muthanna Al-Dahhan (*Missouri Univ of Science and Technology*)

Identifying and Analyzing Species of Pollens in Taiwan by Isotope Ratio Mass Spectrometer, Wen-Chi Jocelyn Wang, Chien-Cheng Jung, Chuan-Pin Lee, Ming-Chee Wu, Huey-Jen Su (*Cheng Kung Univ*)

## NUCLEAR DATA FOR MEDICAL ISOTOPES

*Session Organizers:* Syed M Qaim (*FzJ*), Philip L. Cole (*Idaho State Univ*)

Predicting Medical Isotope Production with TALYS: The Case of  $^{99\text{m}}\text{Tc}$ , Arjan Koning (*NRG*), invited

New Developments in the Experimental Data for Charged Particle Production of Medical Isotopes, Ferenc Ditroi, Ferenc Tárkányi, Sándor Takács (*Hungarian Academy of Sciences*), Alex Hermanne (*Vrije Universiteit Brussel*), invited

Paucity of Photonuclear Data for the Accelerator-Based Production of Isotopes, Valeriia N. Starovoitova, Terry L. Grimm (*Niowave Inc.*), Philip L. Cole (*Idaho State Univ*), invited

New Measurements for Proton and Deuteron Beam Monitor Reactions, Arnaud Guertin, Charlotte Duchemin (*SUBATECH/CNRS/IN2P3*), Eric Garrido (*SUBATECH/CNRS/IN2P3/INSERM UMR*), Ferid Haddad (*SUBATECH/CNRS/IN2P3/GIP Arronax*), Vincent Metivier (*SUBATECH/CNRS/IN2P3*), Nathalie Michel (*SUBATECH/CNRS/IN2P3/GIP Arronax*)

Excitation Function Measurements for PD-103 Production by Deuteron Beams Irradiation, S. Manenti, M. L. Bonardi, L. Gini, Flavia Groppi (*Università degli Studi di Milano & INFN*)

## ENVIRONMENTAL FATE AND IDENTIFICATION OF RADIONUCLIDES

*Session Organizers:* Timothy E. Payne (*ANSTO*), Stacey L. Lance (*Univ of Georgia*)

Ultra-Sensitive Nuclear Measurements of Environmental Radioisotopes, Matthew Douglas, Craig E. Aalseth, Jill M. Brandenberger, James E. Fast, Gary A. Gill, James J. Moran, Robert C. Runkle (*PNNL*), invited

Assessment of Naturally Occurring Radioactive Materials (NORM) In Mission, Texas Surface Soils, Mohammad A. Hannan, Nam Nguyen, Kareem Wahid (*Univ of Texas–Pan American*)

Technetium Behavior in Nuclear Waste Vitrification Processes, Ian L. Pegg (*The Catholic Univ of America*), invited

Using Chemical and Isotopic “Signatures” to Resolve Multiple Contamination Sources in the Environment, Sue B. Clark (*Washington State Univ*), invited

## WEDNESDAY, AUGUST 27, 2014, 8:00 A.M.

### ISOTOPE RESEARCH PLENARY

*Session Organizers:* Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)

Heavy and Super Heavy Elements Research, Andreas Türler (Paul Scherrer Inst/Univ of Bern), invited

Nuclear Data for Medical Radionuclides, Syed M. Qaim (FzJ), invited

Targeted Alpha Therapy with  $^{225}\text{Ac}$  and  $^{213}\text{Bi}$ , Alfred Morgenstern, Frank Bruchertseifer, Christos Apostolidis (EC JRC), invited

Radiometric Fluxomics: A New Era for Quantitative Plant Biology, Richard A. Ferrieri (BNL), invited

## WEDNESDAY, AUGUST 27, 2014, 9:45 P.M.-10:10 P.M.

### REFRESHMENT BREAK IN EXPO

## WEDNESDAY, AUGUST 27, 2014, 10:10 A.M.

### WORLD COUNCIL ON ISOTOPES PRESIDENT'S FORUM

“The Public Health Dilemma: Balancing Isotope Supply and Safety and Security”

*Session Organizers:* Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)

### PANELISTS:

Ramzi Jammal, Executive Vice President (Canadian Nuclear Safety Commission)

Jong Kyung Kim President, Korean Atomic Energy Research Institute; Secretary General (World Council on Isotopes)

Allison Macfarlane, Chairman (Nuclear Regulatory Commission)

Chris Whipple, ENVIRON Principal, Chair (NAS Committee on Medical Isotope Production without HEU)

## WEDNESDAY, AUGUST 27, 2014, 1:00 P.M.-3:00 P.M.

### POSTER PRESENTATION B AND REFRESHMENT BREAK

### RADIOECOLOGY, RADIOACTIVE WASTE, AND ENVIRONMENTAL METHODS

The Design of a Remote Radiation Monitoring System in Water Based on a Silicon Photomultiplier, HyeMin Park, Koan Sik Joo (Myongji Univ)

The Standardization of  $^{241}\text{Pu}$  Samples by  $2\pi\alpha$ -Counting and Precision Gamma-Spectrometry Methods, Igor Evgenievich Alekseev, Tatiana Kuzmina (V.G. Khlopin Radium Inst)

Neutron Activation Analysis of Tree Bark Samples for Use in Aerial Pollution Monitoring, Eliane Conceicao dos Santos, Mitiko Saiki, Frederico Antonio Genezini (Instituto de Pesquisas Energéticas e Nucleares), Paulo Hilario Nascimento Saldiva (Universidade de São Paulo)

Correlation of Trace Element Levels in Brain Tissues Analyzed by Neutron Activation Analysis, Mitiko Saiki (Instituto de Pesquisas Energéticas e Nucleares), Renata Elaine Paraizo Leite (Universidade de São Paulo), Frederico Antonio Genezini (Instituto de Pesquisas Energéticas e Nucleares), Lea Tenenholz Grinberg, Renata Eloah de Lucena Ferretti, Jose Marcelo Farfel, Claudia Suemoto, Carlos Pasqualucci, Wilson Jacob Filho (Universidade de São Paulo)

Samarium Determination by Neutron Activation Analysis in Uranium-Rich Samples, Ibere Souza Ribeiro, Mitiko Saiki, Frederico Antonio Genezini, Guilherme Soares Zahn (Instituto de Pesquisa Energéticas e Nucleares)

Analyzing Emission Spectra Induced by a Transmission-Type X-Ray Tube with Respect to Target Thickness and Material Using Monte Carlo Simulation., Hyunseong Hong, Kaonsik Joo, Seunghye Park, Dongseung Kim (MyongjiUniv), Joongsuk Youn, Seungho Lee, Seungwon Jeon (SEC Co., Ltd)

Investigation of Polonium (IV) Complexation Properties, Julie Champion, Younes Ali (Subatech), David Deniaud, Sebastien Gouin (CEISAM), Gilles Montavon (Subatech), Cyrille Alliot (Arronax/INSERM), Marcel Mokili (Arronax/Subatech), Nicolas Galland, Eric Renault (CEISAM), Rémi Maurice (Subatech)

Radioisotope Content of Coal and Coal Ash of Power Stations in Mongolian Capital City and its Distribution in Environment, Tseren Davaadorj (Radiation Safety and Nuclear Technology Association of Mongolia)

Radionuclide Bioaccumulation in Trees at an Australian Legacy Low-Level Waste Site: Concentration Patterns in Branches and Foliage, Kerry Lynne Wilsher, M .P Johansen, J. J Harrison, T. E Payne (ANSTO), J. A Howitt, G. Doran (Charles Sturt Univ), D. P Child, M. A. C Hotchkis, S. Thiruvoth, L. Mokhber-Shahin, J. R Twining, C. R Vardanega, H. K. Y Wong (ANSTO)

Beam Hardening Artifact: Cause and Correction Techniques, Zhihong Wu, Peng Cong, Ximing Liu (Tsinghua Univ)

A Novel Radionuclide Specific Detector System for the Measurement of Radioactivity at Steel Works, Eduardo Garcia Torano, V. Peyres, B. Caro, M. Roteta, (CIEMAT), D. Arnold, O. Burda (PTB), Mihail-Razvan Ioan (IFIN-HH)

# Wednesday Technical Sessions

Control of Radionuclide Contamination by Using Aquatic Macrophytes, Mykola Dikiy, A. Dovbnya, Yu. Lyashko, E. Medvedeva (*KIPT*)

Structural and Transport Characteristics of  $UCl_3$  and  $CeCl_3$  in Molten LiCl-KCl Mixture: A Molecular Dynamics Simulation Study, Tao Jiang, Ning Wang, Shuming Peng (*China Academy of Engineering Physics*), Liuming Yan (*Shanghai Univ*)

## NUCLEAR FORENSICS

Abatement of Xenon and Iodine Emissions from Medical Isotope Production Facilities, Charles Doll, Christina M. Sorensen, Theodore W. Bowyer, Judah I. Friese, James C. Hayes (*PNNL*), Emmy Hoffmann (*ANSTO*), Rosara Kephart (*Air Force Technical Applications Center*)

Production of Np-236 and Pu-236 for Isotope Dilution Mass Spectrometry, Michael E. Fassbender, Lani Seaman, Jonathan Engle, Valery Radchenko (*LANL*), Ethan Balkin (*Univ of Washington*), George Goff, Kevin John (*LANL*), Scott Wilbur (*Univ of Washington*), Eva Birnbaum, Meiring Nortier (*LANL*)

International Sealed Source Database: A Radiological Forensics Signature Library, Jodi Canaday, David Chamberlain (*ANL*), Martha Finck (*INL*), Yu Tang, Seema Naik (*ANL*), Kevin Carney (*INL*)

Cosmic-Ray Induced Production of Radioactive Noble Gases in the Atmosphere, Ground, and Seawater, William Hamill Wilson, Steven Biegalski, Christine Johnson (*Univ of Texas, Austin*), Justin Lowrey, Derek Haas (*PNNL*)

14 MEV Neutron Irradiation Facility with an Automated Fast Cyclic Pneumatic System, Matthew T. Montgomery, Michael D. Yoho, Steven R. Biegalski, Sheldon Landsberger (*Univ of Texas, Austin*)

UTEX Simulation of Tracer Gas Experiment, Justin David Lowrey, Khri B. Olsen, Derek A. Haas, Amanda M. Prinke, Michael P. Foxe (*PNNL*)

## RESEARCH

Preparation of Purified Strontium-85 Using No-Carrier-Added Technique, Shinya Yano, Yuichiro Wakitani, Takahiro Yamada (*Japan Radioisotope Association*), Kanaya Jumpei, Shibata Seiichi, Kazuya Takahashi, Hiromitsu Haba (*RIKEN*)

Direction Tracking of Environmental Radiation Monitoring System, Jin Hun Park, Hye Min Park, Koan Sik Joo (*Myongji Univ*)

Target Material for Synthesis of Element 117, Rostislav Kuznetsov, Mikhail A. Ryabinin, Evgeny A. Yerin (*JSC "SSC RIAR"*)

Synthesis, Crystal Structure and Spectroscopic Properties of  $[TcO_2(Im)_4]Br \cdot 2H_2O$ , Alesya Maruk, M. S. Grigoriev, A. M. Fedoseev (*RAS*), K. Czerwinski, F. Poineau (*UNLV*), K. E. German. (*RAS*), invited

Development of High-Density Targets for Mo-99 with Using Atomized U Metal Powder, Yong Jin Jeong, Jong Man Park, Kyu Hong Lee, Ki Nam Kim, Sung Hwan Kim (*KAERI*)

## MEDICINE

A Study on the Synthesis of  $^{45}Sc$ -HBED-CC, Pyeong-Seok Choi, Sang Wook Kim (*Dongguk Univ*), Jung-Hoon Park (*KAERI*)

Comparison of Fungal Cell Susceptibility to External Alpha Particle Beam Radiation Versus Alpha Particles Delivered by  $^{213}Bi$ -Bismuth-Labeled Antibody, Ruth Adams Bryan (*Albert Einstein Coll of Medicine*), Igor Shuryak (*Columbia Univ*), Alfred Morgenstern, Frank Bruchertseifer (*EC JRC*), Stephen Marino (*Columbia Univ*), Ekaterina Dadachova (*Albert Einstein Coll of Medicine*)

Synthesis and Evaluation of Surface Modified Folate Immobilized Silica- $^{198}Au$  Nanocomposites, Jeong Hoon Park, Jun Young Lee, Min Goo Hur, Seung Dae Yang (*KAERI*), Kook Hyun Yu, Sang Wook Kim (*Dongguk Univ*)

Radiosynthesis and Comparison of  $^{68}Ga$ -DOTA/NOTA Benzamides for Melanoma Imaging, Jeong Hoon Park, Hee Jung Kim (*KAERI*), Dong Yeon Kim (*Chonnam National Univ*), Min Goo Hur, Seung Dae Yang (*KAERI*), Kook Hyun Yu (*Dongguk Univ*)

Synthesis of Novel Radiopharmaceuticals Using Gallium-68 Labeled  $Fe_3O_4$  Nanoparticles, Bobae Cho (*Dongguk Univ*), Jun-Young Lee, Jung-Hoon Park, Min-Goo Hur (*KAERI*), Kook Hyun Yu (*Dongguk Univ*)

Synthesis of  $[^{123}I]$ Iodoanthraquinones as a Radiotracer of Breast Cancer, Jeong Hoon Park, Jun Young Lee, Min Goo Hur, Seung Dae Yang (*KAERI*), Sang Wook Kim, Kook Hyun Yu (*Dongguk Univ*)

Development of a Prelabeling Approach for a Targeted Nanochelator, Jonathan M. Fitzsimmons (*BNL*), Robert Atcher (*LANL*), Cathy Cutler (*Univ of Missouri*)

Radiometric Enzyme Assays: Tools for Studies of Biotransformations of Thyroid Hormones, Stanislav Pavelka (*Acad. Sci. Czech Rep.*)

Use of Radioanalytical Methods for Following the Development of Diet-Induced Obesity in the Mouse, Stanislav Pavelka, Jan Kopecky (*Acad. Sci. Czech Rep*)

KIT Formulation and Adaptation of PET- Procedure for Fast and Effective Visualization of Inflammation Sites with  $^{68}Ga$ -Citrate, Anton Alekseevich Larenkov, O. E. Klementieva, A. B. Bruskin, G. E. Kodina (*Burnasyan FMBC*), invited

Prospects for Production of Alpha Emitters for Medical Use at JSC "SSC RIAR", Rostislav Alexandrovitch Kuznetsov, Pavel Butkalyuk, Irina Butkalyuk, Valery Tarasov, Evgeny Romanov (*JSC "SSC RIAR"*)

Facile and Efficient Synthesis of  $^{125}I$ -Labeled Hyaluronic Acid, Sang Hyun Park, So-Young Ma, Dong-Eun Lee, Dae Seong Choi (*KAERI*)

Spatial Resolution of Ionization Chamber Arrays in Co-60 Radiotherapy, Qiang Du, Zhifang Wu, Guilai Xing (*Tsinghua Univ*)

Enhanced Kinase Assay Based on Radio-Phosphorylation, Sang Hyun Park, Jong Kook Rho, Mi Hee Choi (*KAERI*)

Determination of the Labeling Yield and Stability of the Complexes Bi-BSA-DOTA and Bi-BSA-DTPA, Ruslan Nurtdinov (*Kurchatov Institut*)

## INDUSTRY AND AGRICULTURE

Reproductive Performance of Crossbred Dairy Cows in Bangladesh: An Isotopic Radiomunoassay Study, M. A. Samad Khan, M. S. R. Siddiki, M. E. Uddin (*Bangladesh Agricultural Univ*)

Consideration of Sky-Shine Radiation Effects for the Development of Korean Regulatory Guide on Industrial Radiography, Yong Ki Chi, Bokyun Seo, Wan-Tae Kim (*KINS*)

Design of Silicon Photomultiplier Based Optical Fiber Dosimeter with Scintillator for High-Dose Radiation Detection in Nuclear Wastes and Radiosurgery, Jeongho Kim, Koansik Joo (*Myongji Univ*)

High Quality Kapton Sandwich  $^{22}\text{Na}$  Radioactive Sealed Source for Positron Annihilation Lifetime Spectroscopy, Takahiro Yamada, Hidetake Ishizu, Ryunosuke Chika (*Japan Radioisotope Association*), Masato Yamawaki (*NIAIST*)

Preparative and Analytical RadioHPLC of Indole-3-[1- $^{11}\text{C}$ ] Acetic Acid for PET Imaging of Auxin Transport in Living Plant, Andrea M. Jedele, Paul A. Ellison, Dhanabalan Murali, Todd E. Barnhart, Robert J. Nickles, Onofre T. DeJesus (*Univ of Wisconsin, Madison*)

A Study on Alloy Compensation in Isotope Thickness Measurement of Steel, Xiaomin Zhang, Zhifang Wu (*Tsinghua Univ*)

A Functional Plant PET Imager with Controllable Environment and Configurable Geometry, Qiang Wang, Aswin J. Mathews, Ke Li, Sergey Komarov, Homayoon Ranjbar, Patrick Zerkel, Joseph A. O'Sullivan, Yuan-Chuan Tai (*Washington Univ*)

Biological Full Value and Safety of Crops Produced by Using Radiation Engineering Technology, A. V. Ivanov, A. A. Ivanov., G. V. Konyukhov, R. R. Gayzatullin (*Federal State Budgetary Institution*)

**WEDNESDAY, AUGUST 27, 2014, 3:00 P.M.**

## PRODUCTION OF PET RADIONUCLIDES

*Session Organizer:* Syed M. Qaim (*Forschungszentrum Juelich*), Suzanne Lapi (*Washington Univ*)

Production Scale Purification of Ge-68 from Irradiated Gallium Metal, Jonathan M. Fitzsimmons, Leonard F. Mausner (*BNL*), invited

High Power Water Targets for the Production of  $^{18}\text{F}$ —Review of Design Features and Analytical Techniques, Matthew Hughes Stokely (*BTI Targetry LLC*), Johanna L. Peeples, J. Michael Doster, Timothy A. Faugl, Igor A. Bolotnov (*NCSU*), Michael C. Poorman (*BTI Targetry LLC*), Gerald T. Bida (*Duke Univ*), Bruce W. Wieland (*BTI Targetry LLC*), invited

Cyclotron Production of  $^{44}\text{Sc}$  for Radiopharmaceutical Applications, Maruta Bunka (*Univ of Bern*), Cristina Mueller, Nicholas van der Meulen, Roger Schibli, Andreas Tuerler (*Paul Scherrer Inst*)

Development of the Non-Standard PET Radionuclides  $\text{Ti-}^{45}$ ,  $\text{Se-}^{73}$  and  $\text{Br-}^{75,76}$ , Ingo Spahn, Heinz H. Coenen (*FzJ*), invited

Sustainable PET Tracer Production at Wisconsin: Stayin' Alive, Robert Jerome Nickles, T. E. Barnhart, O. T. DeJesus, B. T. Christian (*Univ of Wisconsin, Madison*), invited

Production of Longer Lived Positron Emitters at BNL, Leonard F. Mausner, Dmitri G. Medvedev, Jonathan M. Fitzsimmons (*BNL*), invited

Zirconium-89: From Production to Clinical Application, Danielle J. Vugts, Guus A. M. S. van Dongen (*VU Univ Medical Center*), invited

New Developments in the Production of Generator Systems, Frank Roesch (*Univ of Mainz*), invited

Radionuclide Production Using a Compact, Low-Energy Accelerator System, William David Webster, Geoffrey T. Parks (*Univ of Cambridge*), Dmitry Titov (*Siemens Ltd*), Paul Beasley (*Siemens CT TIP Technology and Concepts*)

Isotopes for Combined PET/SPECT Imaging, Chary Rangacharyulu, Christine K. Roh (*Univ of Saskatchewan*)

Potential Contaminated Emissions Due to PET Technologies Operation, Larisa Oleksandrivna Golinka-Bezshyyko, Igor Kadenko, Oleg Bezshyyko (*Taras Shevchenko National Univ*), Yaroslav Kmetyuk, Boris Bondar (*All-Ukrainian Center for Radiosurgery of the Clinical Hospital "Feofania"*), Olena Shevchenko, Tetiana Govorukha, Vladislav Kirichenko (*Kyiv City Oncological Clinical Center*)

## ECONOMICS OF RADIOISOTOPE PRODUCTION AND SUSTAINABILITY

*Session Organizer:* Ron Francis Cameron (*OECD-NEA*)

Are Isotope Shortages a Thing of the Past?, Ron Francis Cameron (*OECD-NEA*), invited

European Union's Efforts to Sustain the Supply of Mo-99, Remigiusz Baranczyk, Stamatios Tsalas (*EC/Euratom Supply Agency*), Guy Y. Turquet de Beaugard (*AIPES*), invited

Sustainability of LEU Based  $^{99}\text{Mo}$  Manufacturing, Pieter Auret Louw (*NTP Radioisotopes SOC Ltd*), invited

# Wednesday Technical Sessions

Production Capacities of Mo-99/Tc-99m Manufacturing Enterprises Within ROSATOM State Corporation's Isotope Complex, Aleksey Vakulenko (*JSC Isotope*)

## SECURING THE SUPPLY OF ISOTOPES IN THE FUTURE PANEL/PAPERS

Session Organizer: Richard August Henkelmann (*ITG*)

### PANELISTS:

Bernard Ponsard (*SCK.CEN - BR2 Reactor, Belgium*)  
Rostislav Kuznetsov (*JSC State Scientific Center, Russia*)  
Wolfgang Runde (*Los Alamos National Laboratory, United States*)  
Pieter Louw (*NTP Radioisotopes, South Africa*)  
Darren Brown (*Trace Sciences International Corp, Canada*)  
Richard Henkelmann (*Isotope Technologies Garching, Germany*)

### PAPERS:

Heavy Isotopes Lead Material Management Organization (*LMMO*), Bradley D. Patton, Sharon M. Robinson (*ORNL*)  
The U.S. Department of Energy Isotope Development and Production for Research and Applications Program, Robert Atcher (*LANL*)

## MEDIUM AND HIGH ENERGY ACCELERATOR/ CYCLOTRON PRODUCTION OF ISOTOPES

Session Organizers: Boris Zhuikov (*RAS*), Francois Meiring Nortier (*LANL*)  
An Overview of North American Intermediate-Energy Facilities and Isotope Production Capabilities, Kevin D. John, Eva R. Birnbaum (*LANL*), invited  
The Future of Isotope Production on Medium and High Energy Proton Beams, Boris L. Zhuikov (*RAS*), invited  
Medium Energy Accelerators for Isotope Production in Europe, Ferid F. Haddad (*Subatech/GIP Arronax*), invited  
Experiences with Bombardments, Monitoring and Interlocking in High-Intensity Split-Beam Operations Using 66 MeV Protons Delivered by a Separated Sector Cyclotron, Christiaan Vermeulen, G. F. Steyn, N. P. Stodart (*iThemba Labs*), invited  
The Status and RI Production Plan of KOMAC, Kye-Ryung Kim (*KAERI*), invited  
Isotope Production Using a Superconducting Electron Linac, Valeriia N. Starovoitova, Terry L. Grimm, Chase H. Boulware, Dyle D. Henning, Jerry L. Hollister, Erik S. Maddock (*Niowave Inc.*), Frank Harmon, Jon L. Stoner (*Idaho State Univ*)  
Production of Medical Isotopes from a Thorium Target Irradiated by Light Charged Particles Up to 68 MeV, Charlotte Duchemin, Ferid Haddad, Arnaud Guertin (*Subatech*), Nathalie Michel (*GIP Arronax*), Vincent Metivier (*emn/subatech*)

Recent Developments Using Polymer Assisted Deposition in Fabricating Radioactive Targets for Nuclear Reactions, Thomas F. Wall, Heino Nitsche (*Univ of Calif-Berkeley/LBNL*)

## SEPARATION CHEMISTRY AND TARGET PREPARATION FOR NUCLEAR CHEMISTRY EXPERIMENTS

Session Organizer: Heinz Walter Gaeggeler (*Paul Scherrer Inst*)

Heavy Element Program at Oak Ridge National Laboratory, Julie Ezold, Rose A. Boll, Leslie K. Felker (*ORNL*), invited  
Adventures in Californium Purification and Electrodeposition, Jonathan D. Burns, Rose A. Boll (*ORNL*)  
High Accuracy Fission Product Measurements for the Qualification NpO<sub>2</sub> Targets for the Production of Plutonium-238, Benjamin D. Roach, Jeffrey S. Delashmitt, Joseph M. Giaquinto, Ian C. Gauld, Ralph H. Ilgner, Tamara J. Keever, Rob R. Smith (*ORNL*)  
NPL's Programme for the Preparation of Neutron Deficient Lanthanides, Actinides and Other Elements, Simon Mark Jerome, Peter Ivanov, Cyrus Larijani (*National Physical Lab*), Patrick H. Regan (*National Physical Lab/Univ of Surrey*), David Parker (*Univ of Birmingham*)  
Fluorescent BINOL-Based Sensor for Thorium Recognition, Jun Wen, Xiao-Lin Wang, Sheng Hu, Tong-Zai Yang (*China Academy of Engineering Physics*)  
An Assessment on Hydrogen Isotopes Separation by Liquid Phase Catalytic Exchange Process, Ionita Gheorghie, Ciprian Bucur, Ionut Spiridon, Ioan Stefanescu (*Inst for Cryogenics and Isotopic Separation*)

## HEAVY AND SUPERHEAVY ELEMENTS RESEARCH

Session Organizers: Andreas Türler (*Paul Scherrer Inst*), Heinz W. Gaeggeler (*Paul Scherrer Inst*)  
From Medeleevium to Flerovium—Probing Relativistic Effects in Heavy and Superheavy Element Chemistry Experiments, Matthias Schaedel (*JAEA*), invited  
Mapping the N=152 Deformed Shell Closure with High-Precision Penning-Trap Mass Measurements of Transuranium Nuclides at TRIGA-TRAP, Dennis Renisch (*Johannes Gutenberg-Univ*), T. Beyer, K. Blaum (*Max-Planck-Institut für Kernphysik*), M. Block (*GSI Helmholtzzentrum für Schwerionenforschung*), Ch. E. Duellmann, K. Eberhardt (*Johannes Gutenberg-Univ*), M. Eibach (*Max-Planck-Institut für Kernphysik*), J. Grund (*Johannes Gutenberg-Univ*), Sz. Nagy (*Max-Planck-Institut für Kernphysik*), W. Noertershaeuser (*Technische Universität Darmstadt*), F. Schneider (*Johannes Gutenberg-Univ*)  
Toward the Aqueous Chemistry of Copernicium Utilizing Homologue Separations, Philip Raymond Mudder (*Univ of California, Berkeley*), Heino Nitsche (*University of Calif-Berkeley/LBNL*)

Recovery of Cm-248 from Cf-252 Decay, Leslie K. Felker, Laetitia Delmau (*ORNL*)

## ISOTOPES IN PLANT BIOLOGY: FUTURE SUSTAINABILITY IN ENERGY AND AGRICULTURE—

*Session Organizers:* Richard A Ferrieri (*BNL*), Ben Babst (*BNL*)

PhytoPET, PhytoBeta and PhytoSPECT: Radioisotope Imaging Systems Being Developed for Plant Biology Research, Andrew Gerard Weisenberger (*Thomas Jefferson National Accelerator Facility*), invited

Technologies for Quantitative, Non-Destructive, and 3D Imaging of Plant Function, Paul Vaska, David J. Schlyer, Craig L. Woody (*BNL*), invited

Live-Imaging Technologies at Center Stage: Can They Provide Practical Answers in Plant Nutrition?, Shu Fujimaki (*JAEA*), invited

Imaging Uptake, Transport, and Distribution of Radiotracers in Brassica Oleracea Using Positron Emission Tomography, Paul Andrew Ellison, Elizabeth O. Ahlers, Todd E. Barnhart, Tom Bryan, Alexander K. Converse, Samuel T. Doran, Jackson D. Hetue, Andrea M. Jedele, Katherine A. Lake, Robert J. Nickles, Paul H. Williams, Onofre T. DeJesus (*Univ of Wisconsin, Madison*), invited

Statistical Analysis of Carbon Fixation and Translocation in Arabidopsis Seedlings on Petri Dish by Using Positron-Emitting Tracer Imaging System (*PETIS*), Naoki Kawachi (*JAEA*), Atsushi Koyanagi (*Tokyo Univ of Science*), Nobuo Suzui, Yong-Gen Yin, Satomi Ishii (*JAEA*), Hiroaki Shimada (*Tokyo Univ of Science*), Shu Fujimaki (*JAEA*)

Combined 3D PET and Optical Projection Tomography Techniques for Root Phenotyping, Qiang Wang, Sergey Komarov, Aswin J. Mathews, Ke Li (*Washington Univ*), Christopher Topp (*Donald Danforth Plant Science Center*), Joseph A. O'Sullivan, Yuan-Chuan Tai (*Washington Univ*)

MRI-PET Measurements for Scoring Root Traits in the Soil, Siegfried Jahnke, Dagmar van Dusschoten, Ralf Metzner, Jonas Buehler, Gregor Huber, Daniel Pflugfelder, Matthias Streun, Simone Beer, Ulrich Schurr (*Fzj*), invited

**THURSDAY, AUGUST 28, 2014, 8:00 A.M.**

## ISOTOPE RECOVERY AND RECLAMATION

*Session Organizer:* Dorothea Schumann (*Paul Scherrer Inst*)

Accelerator Waste at PSI—A Source for Exotic Isotopes, Rugard Dressler, Dorothea Schumann (*Paul Scherrer Inst*), invited  
Preserving Pu-244 and Heavy Curium in Mark-18A Targets, Sharon Robinson, Bradley D. Patton (*ORNL*)

Separation of Isobaric Interferences in HR-ICP-MS, Niko Kivel, Heiko-Dirk Potthast, Dorothea Schumann (*Paul Scherrer Inst*)

Development of a New Versatile Analytical System for Isotope Analysis, Heiko Dirk Potthast, Niko Kivel (*Paul Scherrer Inst*)

Recycling of <sup>241</sup>AmBe Neutron Sources, Joseph R. Lapinskas (*QSA GLOBAL Inc.*)

Separation of 7-Be from the Cooling Water of a Neutron Spallation Source, Dorothea Schumann (*Paul Scherrer Inst*), Marin Ayranov (*EC, DG-Energy*), Tanja Stowasser (*Paul Scherrer Inst*)

## PRODUCTION AND APPLICATION OF ALPHA EMITTERS

*Session Organizers:* Alfred Morgenstern (*EC JRC*), Bryan Bednarz (*Univ of Wisconsin*)

<sup>213</sup>Bi-DOTATOC Receptor Targeted Alpha-Radionuclide Therapy Induces Remission in Neuroendocrine Tumors Refractory to Beta-Radiation—A First in Human Study, Frederik L. Giesel, Clemens Kratochwil (*Univ Hospital Heidelberg*), Frank Bruchertseifer (*Inst for Transuranium Elements, EC*), Walter Mier (*Univ Hospital Heidelberg*), Christos Apostolidis (*Inst for Transuranium Elements, EC*), Uwe Haberkorn (*Univ Hospital Heidelberg*), Alfred Morgenstern (*Inst for Transuranium Elements, EC*), invited

Large-Scale Production of Actinium-225, Jonathan W. Engle, Eva R. Birnbaum, Hong T. Bach, Michael E. Fassbender, Eric R. Olivas (*LANL*), David Denton, Saed Mirzadeh (*ORNL*), Dmitri Medvedev, Leonard Mausner (*BNL*), Francois M. Nortier, Kevin D. John (*LANL*), invited

Application of HPLC for Selective Separation of Accelerator-Produced <sup>225</sup>Ac from <sup>140</sup>La, and Other Lanthanide Radioisotopes, Joe M. Giaquinto, David Denton, John Cosgrove (*ORNL*), D. G. Medvedev (*BNL*), Ralph Ilgner, Sead Mirzadeh (*ORNL*), L. F. Mausner (*BNL*)

Targeted Liposomes Loaded with Actinium-225 for Antivascular Alpha-Particle Therapy, Stavroula Sofou (*Rutgers Univ*), invited

Radioactive Nanoparticles, Aleksander Jozef Bilewicz, Agata Piotrowska, Edyta Leszczuk, Lucja Janiszewska, Przemyslaw

# Thursday Technical Sessions

Kozminski (*Inst of Nuclear Chemistry and Technology*), Alfred Morgenstern, Frank Bruchertseifer (*Inst for Transuranium Elements, JRC*), invited

Investigation of Astatine Chemistry in Solution, Gilles Montavon (*Subatech*), Nicolas Galland (*CEISAM*), invited

Dosimetric Assessment of Radium-223 Radionuclide Therapy Using Whole Body Pharmacokinetic Modeling, Bryan P. Bednarz, Muhammed Bedir, Benjamin Cox, Stephen Graves, Sabrina Hoffman, Kurt Pedersen, Alexandra Schroeder, Natalie Weisse (*Univ of Wisconsin-Madison*)

## ISOTOPES IN PLANT BIOLOGY: FUTURE SUSTAINABILITY IN ENERGY AND AGRICULTURE—II

*Session Organizers:* Richard A Ferrieri (*BNL*), Ben Babst (*BNL*)

Use of  $^{14}\text{C}$  to Study Sugar Transport and Partitioning in Bioenergy Crop Sorghum, Abhijit Karve, David Alexoff, Dohyun Kim, Michael Schueller (*BNL*), David Braun (*Univ of Missouri, Columbia*), Ismail Dweikat (*Univ of Nebraska*), Benjamin Babst (*BNL*), invited

Carbon Partitioning in Soybean Leaves by Combined  $^{14}\text{C}$  and  $^{13}\text{C}$  Labeling, Lee G. Sobotka, R. C. Dirks, M. Singh, G. S. Potter, J. Schaefer (*Washington Univ*), invited

Allocation and Partitioning of Recently Fixed Carbon as  $^{14}\text{C}$  in Arabidopsis Thaliana, Abigail P. Ferrieri (*Max-Planck Institute for Chemical Ecology*), Beverly Agtuca (*State Univ of New York Environmental Science and Forestry*), Heidi M. Appel (*Univ of Missouri*), Richard A. Ferrieri (*BNL*), Jack C. Schultz (*Univ of Missouri*), invited

Mobility of Immune Ligands and Signal Molecules in the Model Plant Arabidopsis, Jean T. Greenberg, Joanna Jelenska, Nicolas Cecchini (*Univ of Chicago*), Sandra Davern, Robert Standaert, Saed Mirzadeh (*ORNL*), Andrew Gifford (*BNL*), invited

Short-Lived Radioisotopes to Investigate if Fungal Symbionts in Plants are Parasites or Mutualists, Chantal D. Reid, Greg Bonito (*Duke Univ*), Larry Cumberbatch (*Duke Univ/Triangle Univ Nuclear Lab*), Andrii Gryganskyi (*Duke Univ*), Alex Crowell, Calvin R. Howell (*Duke Univ/Triangle Univ Nuclear Lab*), invited

Providing Foundational Knowledge of Resource Allocation and Stem Growth Regulation in Bioenergy Crops, Benjamin A. Babst (*BNL*), David Braun (*Univ of Missouri, Columbia*), David Alexoff, Youwen Xu, Wenchao Qu (*BNL*), Anna Kunert (*Johannes Gutenberg Univ*), Michael Schueller, Ryan Tappero, Lisa Miller (*BNL*), invited

## APPLICATIONS OF RESEARCH AND INDUSTRIAL ISOTOPES

*Session Organizer:* Meera Venkatesh (*IAEA*)

Radiotracer Generators for Application in Process Industries, Tor Bjørnstad (*IFE/Univ of Oslo*), Liv Stavsetra, Kristin Fure, Are Haugan (*IFE*), invited

Gamma Irradiators for Radiation Treatment of Materials: Effectiveness and Economics, Chuanzhen Wang, Wei Peng (*SQHL*), invited

Applications and Impact of Radiotracers and Nucleonic Measurement Systems for Investigation of Sediment Transport, Jefferson Vianna Bandeira, Lecio Hannas Salim (*Brazilian Nuclear Energy Commission*), Patrick Brisset (*IAEL*), Catherine E. Hughes (*ANSTO*), invited

Polarized  $^3\text{He}$  Spin Filters for Neutron Science, Thomas Richard Gentile (*NIST*), invited

Development of Radioactive Nano Particles for Industrial Application, Sung-Hee Jung (*KAERI*), Sung-Ho Choi (*Hannam Univ*), Jin-Ho Moon, Jong-Bum Kim (*KAERI*), Min-Seok Oh, Sang-Ei Seo (*Hannam Univ*)

Investigation of the Impact of Dense Vertical Internals on Hydrodynamics in Bubble Column Reactors Using Advanced Measurement Techniques, Mohammed Khloofah Almesfer (*King Khalid Univ*), Muthanna Al-Dahhan (*Missouri Univ Sci Tech*)

Utilization of Enriched Stable Isotopes to Increase Isotope Reactor Output and Improve the Quality of Radioisotope Sealed Sources, Robert N. Brososky (*QSA Global, Inc*)

Research on Cobalt-60 Spiral CT for Studying Fuel Sphere's Motion Law in HTGR, Ximing Liu, Zhifang Wu, Peng Cong, Jichen Miao (*Tsinghua Univ*)

## THURSDAY, AUGUST 28, 2014, 10:20 A.M.

### CLOSING PLENARY

*Session Organizer:* Paul T. Dickman (*ANL*), Rolf Zeisler (*NIST*), Stephen P. LaMont (*LANL*)

Emerging Applications of Nuclear and Isotopic Techniques in the Environmental Sciences, Timothy Ernest Payne (*ANSTO*), invited

The Future of Molecular Imaging: A Radiochemist's Perspective, Henry F. VanBrocklin (*Univ of California San Francisco*), invited





# ANS

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August 24-28, 2014 • Chicago, IL • Hyatt Regency Chicago

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Unless noted otherwise, registration includes the Technical Program Expo, Opening Reception, Closing Banquet and the Meeting Publication.

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Exhibitor comp/full meeting included

Exhibitor comp/booth only included

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x \$200.00 \$ \_\_\_\_\_

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### Special Events

#### SUNDAY, AUGUST 24, 2014

Additional Ticket: Opening Reception in Expo \_\_\_\_\_

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#### WEDNESDAY, AUGUST 27, 2014

Additional Ticket: Closing Banquet \_\_\_\_\_

x \$140.00 \$ \_\_\_\_\_

#### THURSDAY, APRIL 28, 2014

Technical Tour: Argonne National Laboratory 12:30 p.m. - 4:30 p.m. (Limited availability) \_\_\_\_\_

x \$45.00 \$ \_\_\_\_\_

Technical Tour: Fermilab 12:30 p.m. - 5:30 p.m. (Limited availability) \_\_\_\_\_

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### Please Register On-Site After Tuesday, August 19, 2014

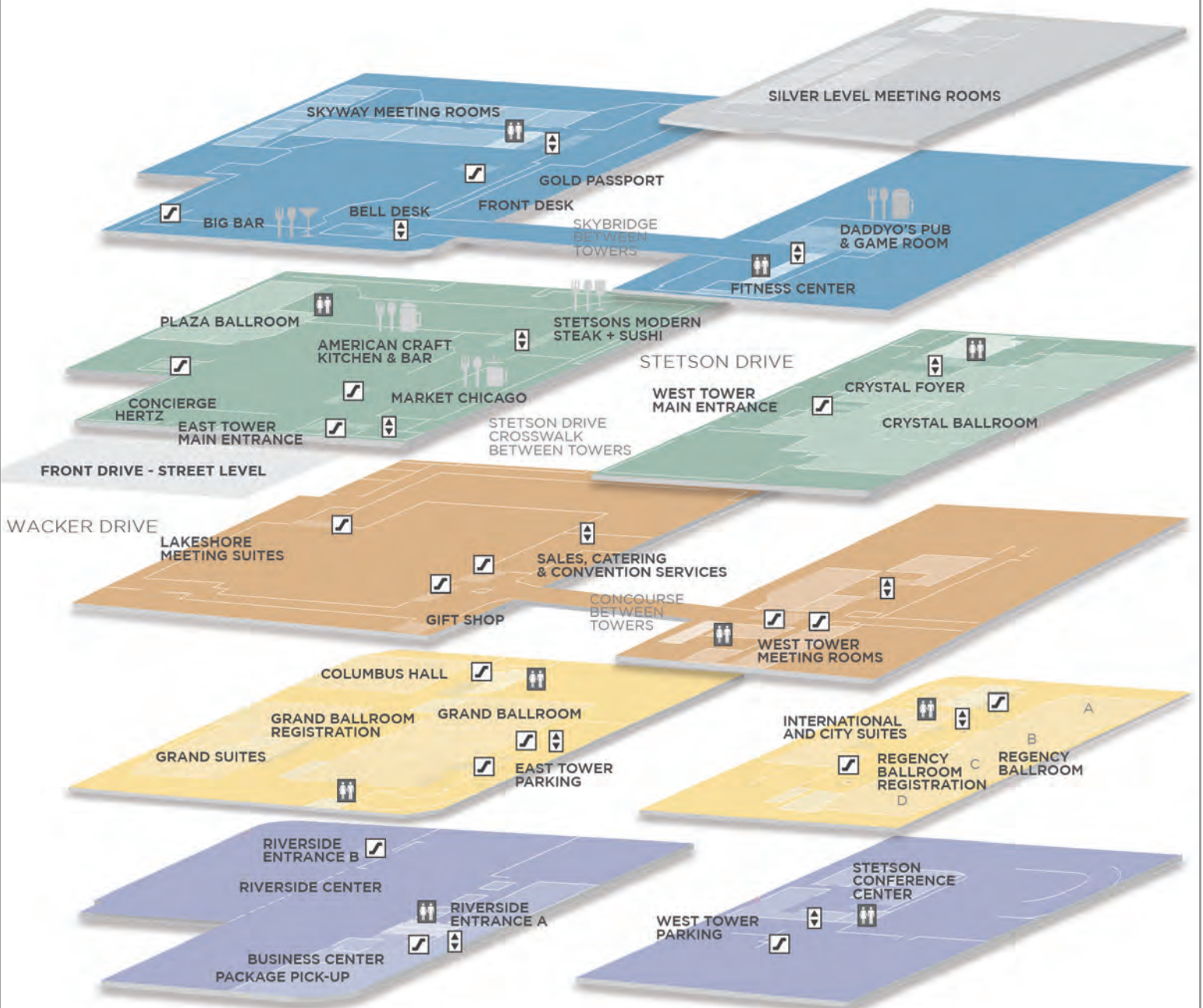
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