

International Conference on Advances in Nuclear Forensics:

*Countering the Evolving Threat of
Nuclear and Other Radioactive
Material out of Regulatory Control*

7–10 July 2014, Vienna, Austria

PROGRAMME



Organized by the



IAEA

International Atomic Energy Agency

Organized by the



IAEA

International Atomic Energy Agency

In cooperation with the



ITWG

Nuclear Forensics

**Nuclear Forensics International
Technical Working Group**



INTERPOL

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Global Initiative to Combat
Nuclear Terrorism

**Global Initiative to Combat
Nuclear Terrorism**



Conference:

President: HE S.J. le Jeune d'Allegeershecque,
United Kingdom

IAEA Conference Secretariat

Scientific Secretary: D.K. Smith

Scientific and Administrative Support:

T. Bull
P. Gizowska
R. Schlee
N. Vorhofer
B. Fischer
L. Leroy

Conference Coordination: M. Khaelss
M. Neuhold

Editor: R. McRae

Location of the Conference:

International Atomic Energy Agency
Vienna International Centre (VIC)
M-Building
Wagramer Strasse 5
1400 Vienna, Austria
Tel: +43 1 2600 0

Working Language: English

Resolutions: No resolutions may be submitted for
consideration on any subject; no votes
will be taken.

Programme Committee

Chair:

K. Mayer

European Union

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Netherlands

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Russian Federation

P.R. Mogafe

South Africa

S. Fendrich

United States of America

H. Dion

United States of America

TIMETABLE

Monday, 7 July 2014

08:00	Registration	
10:00–12:00	Opening Session (Board Room A)	
12:00–13:30	Lunch Break	
13:30–15:00	Plenary Session 1A (Board Room A)	Historical Evolution of Nuclear Forensics
15:00–15:30	Hosted Coffee Break	
15:30–16:50	Plenary Session 1B (Board Room A)	Nuclear Forensic Resources in the Legal and Nuclear Security Context
16:50–17:10	Information Session (Board Room A)	
17:10–18:00	Panel Session 1C (Board Room A)	Nuclear Forensic Capabilities within a National Nuclear Security Infrastructure
18:00–20:00	Welcome Reception (M Ground Floor)	

Tuesday, 8 July 2014

09:00–10:40	Technical Session 2A (Parallel Session) (Board Room A)	Nuclear Forensic Capabilities as an Element of a National Response Plan
09:00–10:40	Technical Session 2B (Parallel Session) (Room M3)	Nuclear Forensic Science: Signatures of Nuclear Material I
10:40–11:10	Hosted Coffee Break	
11:10–12:30	Technical Session 2C (Parallel Session) (Board Room A)	Approaches to Nuclear Forensic Examinations
11:10–12:30	Technical Session 2D (Parallel Session) (Room M3)	Data Compilation Tools for Supporting Nuclear Forensics Interpretation I
12:30–14:00	Lunch Break and Poster Viewing Session I	
14:00–15:20	Technical Session 2E (Parallel Session) (Board Room A)	Experiences in Laboratory Analyses and Data Interpretation
14:00–15:20	Technical Session 2F (Parallel Session) (Room M3)	Exercises and Cooperation
15:20–15:50	Hosted Coffee Break	
15:50–17:10	Technical Session 2G (Board Room A)	Integration of Existing National Resources into Nuclear Forensic Capabilities
17:10–18:00	Panel Session 2H (Board Room A)	Discussion on Integration of Existing National Resources into Nuclear Forensic Capabilities

Wednesday, 9 July 2014

09:00–10:40	Technical Session 3A (Parallel Session) <i>(Board Room A)</i>	Nuclear Forensic Science: Signatures of Nuclear Material II
09:00–10:40	Technical Session 3B (Parallel Session) <i>(Room M3)</i>	Nuclear Forensic Science: Synergies with Other Disciplines I
10:40–11:10	<i>Hosted Coffee Break</i>	
11:10–12:30	Technical Session 3C (Parallel Session) <i>(Board Room A)</i>	Data Compilation Tools for Supporting Nuclear Forensics Interpretation II
11:10–12:30	Technical Session 3D (Parallel Session) <i>(Room M3)</i>	Nuclear Forensic Science: Radiochronometry
12:30–14:00	<i>Lunch Break and Poster Viewing Session II</i>	
14:00–15:20	Technical Session 3E (Parallel Session) <i>(Board Room A)</i>	Confidence in Nuclear Forensics Findings
14:00–15:20	Technical Session 3F (Parallel Session) <i>(Room M3)</i>	Nuclear Forensic Science: Synergies with Other Disciplines II
15:20–15:50	<i>Hosted Coffee Break</i>	
15:50–17:10	Technical Session 3G <i>(Board Room A)</i>	Nuclear Forensics Awareness and Education
17:10–18:00	Panel Session 3H <i>(Board Room A)</i>	Nuclear Forensic Science: The Next 5 Years

Thursday, 10 July 2014

09:00–10:20	Technical Session 4A <i>(Board Room A)</i>	International and Regional Cooperation in Nuclear Forensics
10:20–10:50	<i>Hosted Coffee Break</i>	
10:50–12:00	Round Table Session 4B <i>(Board Room A)</i>	Nuclear Forensics: Where Science Meets Policy
12:00–12:30	Closing Session <i>(Board Room A)</i>	

Display of posters

Posters will be on display throughout the conference in the Poster Exhibition area outside Board Room A (M Building, 2nd floor).

Poster sessions will be held during lunch breaks from 13:00 to 14:00 on Tuesday and Wednesday. Poster authors are requested to be at their poster during their assigned poster session (see list at the end of this programme).

Commercial exhibits

Commercial exhibits will be shown throughout the conference in the exhibition areas on the Ground Floor and 1st Floor of the M Building.

MONDAY, 7 JULY 2014

08:00

Registration and distribution of
conference material

10:00–12:00

OPENING SESSION

HE S.J. le Jeune d'Allegeershecque

Conference President

Ambassador

Resident Representative of the United
Kingdom of Great Britain and Northern
Ireland to the IAEA

Opening remarks

Y. Amano, IAEA

Director General

Opening statement

HE G. Berdennikov, Russian Federation

S. Limage, United States of America

Global Initiative to Combat Nuclear Terrorism
(GICNT)

Introductory remarks by the GICNT

A. King, INTERPOL

International Criminal Police Organization

Introductory remarks by INTERPOL

K. Mayer, European Union

B. Garrett, United States of America

Nuclear Forensics International
Technical Working Group (ITWG)

Introductory remarks by the ITWG

K. Mrabit, IAEA

Director, Division of Nuclear Security
Department of Nuclear Safety and Security

Introductory remarks by the IAEA

12:00-13:30

Lunch Break

MONDAY, 7 JULY 2014

13:30–15:00 **PLENARY SESSION 1A:**
Historical Evolution of Nuclear Forensics
(Board Room A)

Co-Chair: **M. Caspers, Germany**
Co-Chair: **H. Yoo, Republic of Korea**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
117	S. Niemeyer L. Koch	United States of America	Historical Evolution: A Technical Viewpoint [Invited Paper]
118	V. Kuchinov	Russian Federation	Development of Nuclear Forensics in Russia [Invited Paper]
119	HE K. Nederlof	Netherlands	Historical Evolution: A Political Viewpoint [Invited Paper]
44	T. Fanghänel K. Mayer Zs. Varga M. Wallenius T. Wiss	European Union	20 Years of Nuclear Forensics: Between R&D and Case Work

15:00–15:30 Break

15:30-16:50 **PLENARY SESSION 1B:**
**Nuclear Forensic Resources in the Legal
and Nuclear Security Context**
(Board Room A)

Co-Chair: **W. Zidan, Egypt**
Co-Chair: **A. Pavlenishvili, Georgia**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
72	M. Wallenius K. Mayer	European Union	Nuclear Forensics Awareness and Understanding [Invited Paper]
120	I. Khripunov	United States of America	International Legal Framework for Strengthening Nuclear Security [Invited Paper]
121	M. Nicholas	IAEA	Analysis of Incidents Reported during 2007-2012 to the IAEA's Incident and Trafficking Database [Invited Paper]
60	Zs. Stefanka Á. Vincze K. Horváth	Hungary	Nuclear Security Legislation in Hungary – Overview of the National Response Plan to Events with Nuclear or other Radioactive Material out of Regulatory Control

MONDAY, 7 JULY 2014

16:50–17:10	INFORMATION SESSION: Brief Conference Overview and Explanation of an Interactive Exercise that Provides Participant Input for Panel Session 3H “Nuclear Forensic Science: The Next 5 Years” <i>(Board Room A)</i> D.K. Smith, IAEA Scientific Secretary	
17:10–18:00	PANEL SESSION 1C: Nuclear Forensic Capabilities within a National Nuclear Security Infrastructure <i>(Board Room A)</i>	
Co-Chair:	G. Emi-Reynolds, Ghana	
Co-Chair:	M. Senzaki, Japan	
Panellists:	R. Floyd	Australia
	J.E. de Souza Sarkis	Brazil
	L. Paredes Gutiérrez	Mexico
	S. Limage	United States of America
	K. Mrabit	IAEA

18:00-20:00 Welcome Reception

(M Building Ground Floor)

TUESDAY, 8 JULY 2014

09:00–10:40 **TECHNICAL SESSION 2A:**
Nuclear Forensic Capabilities as an
Element of a National Response Plan
(Parallel Session)

(Board Room A)

Co-Chair: **M. Kostor, Malaysia**

Co-Chair: **I. Balan, Republic of Moldova**

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
48	F.M.G. Wong T. Hinton D.K. Smith	United States of America	Overview of Nuclear Forensics in Support of Investigations
97	A.P. Muhulo S. Mdoe P. Pantaleo L. Kifanga	United Republic of Tanzania	United Republic of Tanzania National Response Plan for Nuclear Security Events Toward Utilizing Nuclear Forensics to Combat Illicit Trafficking of Nuclear Materials
84	P.R. Mogafe B.L. Kokwane P. Tshidada A.L. Matshiga	South Africa	South Africa's Nuclear Forensics Response Plan Step 1 – In Support of Nuclear Security Investigations
30	M. Abuissa M. Osman M. Yossif I. Abdalla	Sudan	Lessons Learned from Muleta Incident
38	W.P. Daeng Beta	Indonesia	Opportunity and Challenge of Nuclear Forensics in Indonesia

TUESDAY, 8 JULY 2014

09:00–10:40

TECHNICAL SESSION 2B:
Nuclear Forensic Science: Signatures of
Nuclear Material I
(Parallel Session)

(Room M3)

Co-Chair: J.E. de Souza Sarkis, Brazil

Co-Chair: T. Hinton, Canada

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
10	A.T.L. Wotherspoon L. Vance J. Davis J. Hester D. Gregg, G. Griffiths I. Karatchevtseva Y. Zhang T. Palmer E. Keegan N. Blagojevic E. Loi D.M. Hill M. Reinhard	Australia	Investigating Macro- and Micro-Scale Material Provenancing Signatures in Uranium Ore Concentrates/Yellowcake
77	D. Ho Mer Lin D. Manara Zs. Varga L. Fongaro A. Nicholl E. Ernstberger A. Berlizov P. Lindqvist-Reis T. Fanghänel K. Mayer	Singapore	Exploring Spectroscopic and Morphological Data as New Signatures for Uranium Ore Concentrates
94	Y-G. Zhao M. Lin T-X.Wang L-C. Zhu X-H. Zhao	China	Attribution of Uranium Ore Concentrates by Rare-Earth Element Signature
45	J. Krajko Zs. Varga M. Wallenius K. Mayer	European Union	$^{143}\text{Nd}/^{144}\text{Nd}$ Ratio – A Powerful Signature for Origin Assessment of Natural Uranium Products

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
53	Zs. Varga S-H. Han J. Krajko M. Wallenius K. Song K. Mayer	European Union	Measurement of Sulphur Isotopic Ratio for the Nuclear Forensic Investigation of Uranium Ore Concentrates (Yellow Cakes)
10:40-11:10	Break		

TUESDAY, 8 JULY 2014

11:10–12:30 **TECHNICAL SESSION 2C:**
Approaches to Nuclear Forensic
Examinations
(Parallel Session)

(Board Room A)

Co-Chair: **V. Stebelkov, Russian Federation**

Co-Chair : **B. Sandstrom, Sweden**

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
122	C. Nogueira de Oliveira R. Hlavacka	IAEA	Radiological Crime Scene Management [Invited Paper]
36	G.A. Graham S.E. McOmish K. Rayment R. Robson R. Baldwin	United Kingdom	Developing Traditional Forensic Science Exploitation of Contaminated Exhibits Recovered from a Nuclear Security Event
23	E. Hrnccek J. Krajko G. Rasmussen A. Nicholl K. Mayer	European Union	Strategies for DNA Analysis from Contaminated Forensic Samples
8	D.M. Hill K. Toole T. Evans E. Young A. Goodman-Jones C. Chang P. Roffey M. Reinhard	Australia	Translating Research Findings into Operational Capabilities in Nuclear Forensics: The Australian Experience

TUESDAY, 8 JULY 2014

11:10–12:30 **TECHNICAL SESSION 2D:**
Data Compilation Tools for Supporting
Nuclear Forensics Interpretation I
(Parallel Session)

(Room M3)

Co-Chair: **D. Dimitrov, Bulgaria**

Co-Chair: **A. Singh Gill, India**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
67	A. El-Jaby T. Hinton F. Doucet S. Jovanovic	Canada	Overview of Canada's National Nuclear Forensics Library Development Programme
28	O. Gaidar V. Tryshyn V. Kushka S. Lopatin K.B. Knight T.M. Kayzar M. Robel	Ukraine	Developing a Nuclear Forensics Library in Ukraine: The Pilot Project Stage
16	A. Luksic A.C. Misner J. Watts J.D. Olivas	United States of America	Populating a National Nuclear Forensics Library: Lessons Learned
25	M. Robel I.D. Hutcheon M.J. Kristo R.E. Lindvall N.E. Marks	United States of America	The Uranium Sourcing Database Project: Practical Insights into the Establishment and Application of a National Nuclear Forensics Library
<hr/>			
12:30-14:00	Lunch Break and Poster Viewing Session I		

TUESDAY, 8 JULY 2014

14:00–15:20 **TECHNICAL SESSION 2E:**
Experiences in Laboratory Analyses and
Data Interpretation
(Parallel Session)

(Board Room A)

Co-Chair: **R. Chiappini, France**
Co-Chair: **E. van Zalen, Netherlands**

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
5	G. Nicolaou G. Melanofthalmidou I. Lantzou	Greece	Identification of Unknown Nuclear Material
82	I.D. Hutcheon A.N. Nelwamondo M. Sharp R. Williams P.R. Mogafe J.J. Hancke L.E. Borg Z. Dai G. Eppich A. Gaffney V. Genetti G. Klunder R.E. Lindvall N.E. Marks E.C. Ramon M. Robel S. Roberts K. Schorzman	United States of America	Characterization of Nuclear Material Interdicted in South Africa
62	V. Stebelkov	Russian Federation	Informativeness of Microparticle Analysis for Nuclear Forensics
17	A. Luksic A.C. Misner J. Watts J.D. Olivas	United States of America	Characterization of US Plutonium: Understanding Our Data

TUESDAY, 8 JULY 2014

14:00–15:20 **TECHNICAL SESSION 2F:**
Exercises and Cooperation
(Parallel Session)

(Room M3)

Co-Chair **J. Vaclav, Slovakia**
Co-Chair: **H. Le Quang, Viet Nam**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
98	H. Kroeger J-T. Eishch	Germany	Periodical Radiological Crime Scene Management Exercises in Germany
86	J.F. Blankenship É. Kovács-Széles	United States of America	The Nuclear Forensics International Technical Working Group (ITWG): The Evidence Working Group
47	J. Borgardt F.M.G. Wong	United States of America	Galaxy Serpent: A Web-Based Table-Top Exercise for National Nuclear Forensics Libraries
124	M.S. Zulkipli	Malaysia	Tiger Reef: Cross-Disciplinary Training Workshop and Tabletop Exercise, 4-7 February 2014, Kuala Lumpur, Malaysia [Invited Paper]
15:20-15:50	Break		

TUESDAY, 8 JULY 2014

15:50–17:10 **TECHNICAL SESSION 2G:**
Integration of Existing National Resources
Into Nuclear Forensic Capabilities

(Board Room A)

Co-Chair: **D.M. Hill, Australia**
Co-Chair: **M. Sinaga, Indonesia**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
81	F. Dimayuga E. Inrig	Canada	Establishing Canada's National Nuclear Forensics Laboratory Network
91	G. Kochev V. Stebelkov A. Kuchkin	Russian Federation	The Network of Russian Analytical Laboratories for Support of Nuclear Forensics
26	N. Shinohara Y. Kimura K. Sato N. Toda Y. Shinoda Y. Funatake M. Watahiki Y. Kuno	Japan	Development of Nuclear Forensic Capabilities in Japan
63	K. Pyuskyulyan V. Atoyan	Armenia	Armenian Nuclear Forensic Lab

17:10–18:00 **PANEL SESSION 2H:**
Discussion on Integration of Existing
National Resources into Nuclear Forensic
Capabilities

(Board Room A)

Co-Chair **D.M. Hill, Australia**
Co-Chair: **M. Sinaga, Indonesia**

Moderator: **M. Curry, United States of America**

Panellists: **K. Pyuskyulyan** **Armenia**
 F. Dimayuga **Canada**
 N. Shinohara **Japan**

18:00 Adjourn

WEDNESDAY, 9 JULY 2014

09:00–10:40 **TECHNICAL SESSION 3A:**
Nuclear Forensic Science: Signatures of
Nuclear Material II
(Parallel Session)
(Board Room A)

Co-Chair: **S.B. Butt, Pakistan**

Co-Chair : **T. Fanghänel, European Union**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
125	S. LaMont	United States of America	Nuclear Forensic Science: An Emerging Discipline [Invited Paper]
31	É. Kovács-Széles T.C. Nguyen S. Szabo K. Talos L. Lakosi	Hungary	Identification of High Confidence Nuclear Forensic Signatures by Analysis of Spent Fuel Samples and other Nuclear Materials
61	V. Stebelkov A. Kuchkin S. Arkhipov M. Lomakin	Russian Federation	Detection and Distinguishing of Uranium Particles and Plutonium Particles by Using Alpha Autoradiography
103	T-X. Wang S. Zhang Y-G. Zhao Y. Zhang Y. Shen F. Wang	China	Development of a SIMS Method for Measurement of Oxygen Isotope in Nuclear Forensic Applications
55	M. Wilkerson W.S. Kinman S.A. Kozimor A.L. Pugmire B.L. Scott A.L. Tamasi G.L. Wagner J.R. Walensky	United States of America	Probing Forensic Signatures of Nuclear Materials

WEDNESDAY, 9 JULY 2014

09:00–10:40 **TECHNICAL SESSION 3B:**
Nuclear Forensic Science: Synergies with
Other Disciplines I
(Parallel Session)

(Room M3)

Co-Chair : **M. Nizamska, Bulgaria**

Co-Chair : **I. Roger, INTERPOL**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
11	Y. Panteleev	Russian Federation	Analytical Capabilities of the V.G. Khlopin Radium Institute in View of Nuclear Forensics Challenges
88	P. Thompson	United Kingdom	i2®©: Investigative and Interpretive Radiochemistry - The Precursor to Nuclear Forensics
15	K.S. Grabowski K.C. Fazel D.L. Knies	United States of America	Capabilities of Hybrid SIMS-SSAMS System for Nuclear Forensics Applications
80	F. Pointurier O. Marie	France	Use of Micro-Raman Spectrometry for Nuclear Forensics
85	E.O. Granovskaya K.V. Kotenko Y.E. Kvacheva B.A. Koukhtha	Russian Federation	Forensic Medical Aspects of Radiation Accidents Investigation
10:40-11:10	Break		

WEDNESDAY, 9 JULY 2014

11:10-12:30 **TECHNICAL SESSION 3C:**
Data Compilation Tools for Supporting
Nuclear Forensics Interpretation II
(Parallel Session)

(Board Room A)

Co-Chair: **J. Salas Kurte, Chile**

Co-Chair: **S. Biramontri, Thailand**

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
57	S. LaMont M. Brisson H. Dion E. Fei S. Fendrich	United States of America	Strategies and Considerations for Developing a National Nuclear Forensic Library
27	Y. Kimura N. Shinohara Y. Funatake M. Watahiki Y. Kuno	Japan	National Nuclear Forensics Library at Japan Atomic Energy Agency
64	D. Chamberlain Y. Tang J. Morman J. Canaday J. Steeb S. Naik Y. Tsai V. Sullivan K. Carney M. Finck D. Cummings J. Gigilio J. Summers	United States of America	Resources and Forensics Signatures to Help Determine the Origin of Sealed Radiological Sources
90	G. Kochev V. Kryuchenkov A. Kuchkin V. Stebelkov	Russian Federation	Mechanism of Identification of Seized Materials without Creation of Nuclear Forensics Library

WEDNESDAY, 9 JULY 2014

11:10–12:30 **TECHNICAL SESSION 3D:**
Nuclear Forensic Science:
Radiochronometry
(Parallel Session)

(Room M3)

Co-Chair: **K. Peräjärvi, Finland**
Co-Chair: **M.B.L. Ong, Singapore**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
14	R. Williams I.D. Hutcheon M.J. Kristo A. Gaffney G. Eppich S.A. Goldberg J.J. Morrison R. Essex	United States of America	Radiochronometry by Mass Spectrometry: Improving the Precision and Accuracy of Age-Dating for Nuclear Forensics
78	A. Hubert M. Mendes J. Aupiais F. Pointurier	France	Advances in Nuclear Forensics Analysis at CEA/DIF: Radiochronology Studies
12	E. Keegan A. Stopic G. Griffiths	Australia	Protactinium-231 (231Pa) Measurement for Isotope Chronometry in Nuclear Forensics
13	L. Lakosi C.T. Nguyen J. Zsigrai	Hungary	Uranium Age Dating by Gamma Spectrometry
12:30-14:00	Lunch Break and Poster Viewing Session II		

WEDNESDAY, 9 JULY 2014

14:00-15:20 **TECHNICAL SESSION 3E:**
Confidence in Nuclear Forensics Findings
(Parallel Session)

(Board Room A)

Co-Chair: **P. Chakrov, Kazakhstan**

Co-Chair: **P.R. Mogafe, South Africa**

<i>No. of Paper</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
49	L. Tandon L. Colletti L. Ortega K. Haynes P. Mason R. Essex K. Kuhn	United States of America	Challenges in Bulk Nuclear Forensics Sample Analysis
51	Zs. Varga K. Mayer A. Hubert I.D. Hutcheon W.S. Kinman M.J. Kristo F. Pointurier K.J. Spencer F.E. Stanley R. Steiner L. Tandon R. Williams	European Union	Preparation and Validation of a Uranium Age Dating Reference Material
29	C. Venchiarutti Zs. Varga A. Nicholl S. Richter J. Krajko K. Mayer Y. Aregbe	European Union	First Primary Reference Material for Uranium Age Dating in Nuclear Forensics
70	M. Totland I. Dimayuga A-M. Fillmore S. Thomson T. Shultz R. Turgeon	Canada	Atomic Energy of Canada Limited Prepares for Nuclear Forensic Analyses

WEDNESDAY, 9 JULY 2014

14:00–15:20 **TECHNICAL SESSION 3F:**
Nuclear Forensic Science: Synergies with
Other Disciplines II
(Parallel Session)

(Room M3)

Co-Chair: **A. Álvarez García, Spain**

Co-Chair: **I. Mirsaidov, Tajikistan**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
134	G.C. Eiden A.M. Duffin M. Liezers J. Ward R.W. Robinson G.L. Hart S.H. Pratt K.W. Springer D.C. Duckworth	United States of America	High Precision Isotopic Analysis of Actinide Bearing Materials: Performance of a New Generation of Purpose Built Actinide Multi-Collector ICPMS Instruments
104	L-C. Zhu T-X. Wang Y-G. Zhao X-Y. Jiang L-F. Zhao X-H. Zhao C-K. Xu	China	Studies on the Measurement of Impurities in Uranium Sample with ICP-MS
136	J.M. Schwantes O. Marsden	United States of America	Announcing the 4th Collaborative Materials Exercise (CMX-4) of the Nuclear Forensics International Technical Working Group (ITWG)
131	T. Bull D.K. Smith	IAEA	IAEA Coordinated Research Project: Application of Nuclear Forensics in Combating Illicit Trafficking of Nuclear and Other Radioactive Material [Invited Paper]
15:20-15:50	Break		

WEDNESDAY, 9 JULY 2014

15:50–17:10 **TECHNICAL SESSION 3G:**
Nuclear Forensics Awareness and
Education

(Board Room A)

Co-Chair: **F. Dimayuga, Canada**

Co-Chair: **A. Farhane, Morocco**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
19	I.D. Hutcheon L.E. Borg K. Hancke M.J. Kristo W.S. Kinman R.E. Lindvall P.R. Mogafe A.N. Nelwamondo E.C. Ramon L.R. Riciputi R. Steiner	United States of America	Building a Nuclear Forensic Analysis Capability in South Africa
9	G. Moore	United States of America	Educating Policy Students in Nuclear Forensics
21	S.K. Connelly W.B. Daitch	United States of America	Nuclear Forensics Expertise Development: Transferring Knowledge to the Next Generation
100	K.L. Smith G.J. Griffiths E.H. Loi D. Boardman M. Reinhard D.M. Hill	Australia	Australia's Experience in the ITWG Galaxy Serpent NNFL Table Top Exercise

WEDNESDAY, 9 JULY 2014

17:10-18:00 **PANEL SESSION 3H:**
Nuclear Forensic Science:
The Next 5 Years

Co-Chair: **W. Huang, China**

Co-Chair: **S. Clark, United States of America**

(Board Room A)

Panellists:	K.L. Smith	Australia
	J.E. de Souza Sarkis	Brazil
	V. Stebelkov	Russian Federation
	P.R. Mogafe	South Africa
	O. Marsden	United Kingdom
	T. Fanghänel	European Union
	D.K. Smith	IAEA

18:00 **Adjourn**

THURSDAY, 10 JULY 2014

09:00–10:20 **TECHNICAL SESSION 4A:**
International and Regional Cooperation
in Nuclear Forensics

(Board Room A)

Co-Chair: **É. Kovács-Széles, Hungary**

Co-Chair: **S-C. Kim, Republic of Korea**

<i>No. of Paper IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
127	S. Abousahl Z. Pajalova	European Union	Nuclear Forensics Activities supported by the EU CBRN Action Plan and EU CBRN Mitigation Centres of Excellence [Invited Paper]
56	H. Dion E. Fei	United States of America	International Cooperation to Advance Global Nuclear Forensics Capabilities
43	K. Mayer H. Dion J. Galy E. Fei W. Mei P. Alfonso A. Winterfield D. Smith	European Union	Capacity Building in Nuclear Forensics in South East Asia
76	V. Kushka V. Tryshyn	Ukraine	Developing a Nuclear Forensics Library in Ukraine: Legislation, Interaction and Regional Cooperation
10:20-10:50	Break		

THURSDAY, 10 JULY 2014

10:50-12:00 **ROUND TABLE SESSION 4B:**
Nuclear Forensics: Where Science Meets
Policy

(Board Room A)

Moderator: **K. Mrabit, IAEA**

Panellists: **W. Huang, China**
HE G. Berdennikov, Russian Federation
HE G. de Salazar Serantes, Spain
A. Harrington, United States of America
J.M. Palma López, AMERIPOL

12:00-12:30 **CLOSING SESSION**

(Board Room A)

HE S.J. le Jeune d'Allegeershecque
United Kingdom

President's findings

D. Flory, IAEA
Deputy Director General
Department of Nuclear Safety and Security

Closing remarks

POSTERS

POSTER SESSION I

Tuesday, 8 July 2014, 13:00-14:00

Poster authors are requested to be at their posters during their Poster Session

<i>No. of Poster IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
24	E. Hrncek J. Galy M. Wallenius K. Mayer M. Toma I. Krevica J. Zsigrai L. Holzleitner Zs. Varga A. Nicholl T. Wiss	European Union	European Nuclear Security Training Centre (EUSECTRA)
20	I. Balan	Republic of Moldova	Establishing of a Nuclear Forensics Capacity in Republic of Moldova
50	U.W.K.H. de Silva H.L.A. Ranjith	Sri Lanka	Sri Lankan Experience on Control of Illicit Trafficking of Radioactive Sources
7	M. Elbarody	Egypt	Role of Nuclear Forensics in Supporting National Organizations in Combating Against Smuggling of Nuclear Materials
108	L. Chelidze	Georgia	National Security System to Combat Nuclear and Radiation Threats in Georgia
109	O. Dorjkhaidav	Mongolia	The Use of the Radioactive Isotopes for Cheating in Gambling - An Interaction Between Different Authorities
100	K.L. Smith G.J. Griffiths E.H. Loi D. Boardman M. Reinhard D.M. Hill	Australia	Australia's Experience in the ITWG Galaxy Serpent NNFL Table Top Exercise
107	I. Smith	United Kingdom	Exercise Blue Beagle and Information Security
39	M. Mathuthu V. Tshivhase R. Olobatoke	South Africa	Nuclear Security Capacity Building at the Centre for Applied Radiation Science and Technology (CARST)
33	M. Nikolaki G. Takoudis S. Seferlis A. Clouvas S. Xanthos C. Potiriadis	Greece	Challenges in Identifying Radioactive Material in Scrap Metal

<i>No. of Poster IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
35	C. Boyd	Jamaica	Countering the Evolving Threat of Nuclear and Other Radioactive Material out of Regulatory Control: Jamaica's Experience
34	J. Ziliukas R. Ladygien• L. Pilkyt• R. Kievinas	Lithuania	Search and Investigation of Orphan Sources in Lithuania
65	A. Ahmed Tawfik	Egypt	Egyptian Framework for Implementing Nuclear Forensics Capabilities
66	M. Abdel-Geleel	Egypt	Threat of Radioactive Materials Out of Regulatory Control in Egypt; Orphan Sources
68	D Apriliani S. Suharyanta R. Alamsyah	Indonesia	Increasing Role of Nuclear Forensic to Support Nuclear Security Events Investigation in Indonesia
6	R.Y. Reyes W.G. Lim E.U. Tabora J.E. Seguis	Philippines	Nuclear Forensics – An Integral Part of the Philippines' National Response Plan for a Nuclear Security Event
92	E. Inrig N. Yanofsky A. El-Jaby T. Hinton F. Dimayuga J. Whitlock	Canada	Overview of the Canadian National Nuclear Forensics Capability Project
46	U. Mirsaidov	Tajikistan	Nuclear Forensics in the Republic of Tajikistan: Condition and Perspectives
40	K.B. Knight E.S. Vergino T.M. Kayzar M. Robel V. Tryshyn D.V. Kutniy O. Gaidar I.A. Malyuk	United States of America	Strengthening Nuclear Forensic Capabilities and Partnership through Collaborative Science in Ukraine
87	J. Vaclav	Slovak Republic	Nuclear Forensics Activities in the Slovak Republic
71	A. Farhane	Morocco	The Contribution of International Initiatives on Non Proliferation to the Enhancement of the Nuclear Forensics as a Fundamental Component of the International Nuclear Architecture

<i>No. of Poster IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
79	I. Trostel L. Paiva P. Saez F. Torres L. Bustamante	Chile	Investigative Police of Chile: Implementation of an Action Plan to Confront of Radiological Threats
137	J.M. Schwantes T. Morales E. Ashbaker J. Blankenship T. Bull A. Casella H. Dion M. Douglas G. Eiden O. Farmer E. Fei B. Garrett S. Gregory R. Hanlen D.M. Hill T. Hogg T. Hubler P. Karpus K.B. Knight L. Laverentiev N.E. Marks D. Meier L. Minnema A. Mitroshkov S. Morley M. Miner K. Olsen R. Pierson M. Robel P. Santi D.K. Smith P. Thompson M. Wallenius D. Vo	United States of America	International Workshop on Basic Nuclear Forensic Methodologies for Practitioners
138	S. Repanovici D. Dragusin	Romania	Nuclear Forensics Role and Capabilities in the Romanian Nuclear Security Infrastructure

POSTERS

POSTER SESSION II

Wednesday, 9 July 2014, 13:00-14:00

Poster authors are requested to be at their posters during their Poster Session

<i>No. of Poster IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
133	S.K. Aggarwal	India	Mass Spectrometry in Nuclear Forensics
132	M.M. Ndontchueng C.J.S. Gembou E.J.M. Nguelem A. Simo	Cameroon	Origins of ¹³⁷ Cs and ¹³³ Xe in Soils from two Campuses in University of Douala-Cameroon
41	A. Vesterlund H. Ramebäck D. Chernikova P. Cartemo K. Axell A. Nordlund C. Ekberg G. Skarnemark	Sweden	Characterization of Strong ²⁴¹ Am Sources
22	C. Venchiarutti S. Richter Zs. Varga R. Jakopic K. Mayer Y. Aregbe	European Union	REIMEP-22: Interlaboratory Comparison on U Age Dating
59	J. Wacker A. Luksic M. Brisson S. LaMont	United States of America	The US Nuclear Material Characteristics Data Dictionary – History and Development
54	R. Steiner W.S. Kinman R. Williams A. Gaffney K. Schorzman F. Pointurier A. Hubert M. Magara A. Okubo	United States of America	²³⁰ Th - ²³⁴ U Thorium Radiochronometry Method Comparison: A Tri-Lateral Round-Robin Exercise

<i>No. of Poster IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
52	Zs. Varga D. Ho Mer Lin M. Novak Z. Eke Z. Bodai A. Nicholl K. Mayer	European Union	Measurement of Organic Residues of Uranium Ore Concentrates (Yellow cakes) for Nuclear Forensic Investigations
89	P. Thompson	United Kingdom	Nuclear Material Families – An Extension to is it DU, NU, LEU or HEU?
83	K. Tsuchiya J.M. Schwantes P. Richard P. Roman	Japan	Neutron-Dose Control of First Responders Under Sampling and Categorization
32	K. Unlu J. Rim D. Peterson	United States of America	Novel Method for Rapid Extract of Radionuclides Using Polymer Ligand Film for Nuclear Forensics Applications
37	X. Liu	China	Determination of the Uranium Containing Particles from Swipe Samples by a Fission Track Method
69	H.A. Kalambuka B. Bhatt A. Dehayem-Massop	Kenya	Nuclear Forensics via Machine Learning Laser Based Spectral Analysis and Imaging
135	L.E. Sweet D.G. Abrecht D.D. Reilly J.M. Schwantes	United States of America	Contaminants of the Bismuth Phosphate Process as Signifiers of Nuclear Reprocessing History
93	K. Peräjärvi S. Ihantola J. Sand H. Toivonen J. Toivonen E. Hrncek A. Nicholl	Finland	In-field Detection and Analysis of α Radiation
96	J. Su	China	The Feasibility Analysis of the Materials of the Nuclear Explosion with the Fission Product Xenon
18	G.A. Brennecke L.E. Borg M.J. Kristo I.D. Hutcheon	United States of America	Gadolinium Isotopic Signatures in Nuclear Material
42	C.M. Watt P.G. Turner D.W. Thomas	United Kingdom	A Technical Nuclear Forensics Capability to Support the Analyses of Illicit Nuclear and Radioactive Materials

<i>No. of Poster</i> <i>IAEA-CN-218 -</i>	<i>Name</i>	<i>Designating Member</i> <i>State/Organization</i>	<i>Title of Paper</i>
73	A. Álvarez García M. Fernández N. Navarro E. Conde A. Quejido J. Quiñones	Spain	Potential and Limitations of ICP-QMS Technique for the Measurement of ^{230}Th

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IAEA Nuclear Security Series No. 15 (2011) (Co-sponsored by EUROPOL, ICAO, INTERPOL, UNICRI, UNODC and WCO)	Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control
IAEA Nuclear Security Series No. 6:	Combating Illicit Trafficking in Nuclear and other Radioactive Material, Technical Guidance
IAEA Nuclear Security Series No. 2:	Nuclear Forensics Support, Technical Guidance
IAEA TECDOC No. 1730	Application of Nuclear Forensics in Combating Illicit Trafficking of Nuclear and Other Radioactive Material
IAEA International Law Series No. 4 (2011)	The International Legal Framework for Nuclear Security
INFCIRC/274/Rev.1 (1980)	Convention on the Physical Protection of Nuclear Material
GOV/INF/2005/10–GC(49)INF/6 (2005)	Amendment to the Convention on the Physical Protection of Nuclear Material
IAEA/CODEOC/2004 (2004)	Code of Conduct on the Safety and Security of Radioactive Sources

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2014

25th Fusion Energy Conference (FEC2014)
13-18 October 2014, St. Petersburg, Russian Federation

Symposium on International Safeguards
20-24 October 2014, Vienna, Austria

International Conference on Challenges Faced by Technical and Scientific Support Organizations (TSOs) in Enhancing Nuclear Safety and Security
27-31 October 2014, Beijing, China

International Symposium on Nuclear and Related Techniques for Food Integrity, Traceability, Safety and Quality
10-14 November 2014, Vienna, Austria

International Conference on Occupational Radiation Protection: Enhancing the Protection of Workers - Gaps, Challenges and Developments
1-5 December 2014, Vienna, Austria

2015

International Experts Meeting on Strengthening Research and Development Effectiveness in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant
16-20 February 2015, Vienna, Austria

International Symposium on Isotope Hydrology: Revisiting Foundations and Exploring Frontiers
11-15 May 2015, Vienna, Austria

International Conference on Nuclear Security in a Computer World: Prevention, Detection and Resistance to Emerging Cyber Threats
1-5 June 2015, Vienna, Austria

International Conference on Operational Safety
9-12 June 2015, Vienna, Austria

International Conference on Management of Spent Fuel from Nuclear Power Reactors – An Integrated Approach to the Back-End of the Fuel Cycle
15-19 June 2015, Vienna, Austria

International Conference 'Women in Nuclear Meet Atoms for Peace' (23rd WiN Global Annual Conference)
24-28 August 2015, Vienna, Austria

International Conference on Global Emergency Preparedness and Response
19-23 October 2015, Vienna, Austria

International Conference on Clinical PET and Molecular Nuclear Medicine (IPET III): Trends in Clinical PET and Radiopharmaceutical Development
9-13 November 2015, Vienna, Austria

International Conference on Research Reactors: Safe Management and Effective Utilization
16-20 November 2015, Vienna, Austria

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International Atomic Energy Agency
IAEA-CN-218
Vienna International Centre
P.O. Box 100
Wagramer Strasse 5
1400 Vienna, Austria
Telephone No.: +43 1 2600 (0) plus extension
Telefax No.: +43 1 26007
Email: official.mail@iaea.org

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