

WELCOME TO MALMÖ !

Dear Colleagues,

We are pleased to welcome you to the Third Malmö Conference on Medical Imaging 2009. The conference is jointly organised by members of current and former research projects supported by the European Commission (EC) Euratom-Radiation Protection Research Programme.

Medical imaging is today an indispensable tool in modern healthcare. In a few years, the field has seen truly exciting advances exemplified by cone-beam/multi-slice computed tomography (CT), positron-emission tomography (PET), tomosynthesis – techniques which facilitate quantitative tomographic imaging – as well as diffusion-weighted magnetic resonance imaging (MRI), functional MRI, improved ultrasound technology etc. A major trend is to merge data and images from complementary techniques (e.g. PET/CT, SPECT/CT, projection X-ray/CT, X-ray/ultrasound). Today, imaging methods can reflect internal anatomy and dynamic body functions as well as cellular and molecular events involved in normal and pathologic processes in a way never seen before.

This conference will concentrate on X-ray and radionuclide imaging.

Tomographic imaging techniques reduce superimposed anatomy and/or uptake in the images and result in higher diagnostic accuracy, more accurate quantification and localisation compared to single projection imaging. Today, there are two trends in tomographic X-ray imaging, CT and tomosynthesis (which can be described as a limited angle tomography). The multislice CT approach has significantly shortened the scan-time and has improved the 3D spatial resolution and the temporal resolution, making it increasingly attractive for a wider range of diagnostic examinations and screening tests – unfortunately often at a price of a relatively high radiation dose. The tomosynthesis technique has the potential to produce 3D information with only a small fraction of the radiation dose needed in CT.

In nuclear medicine/molecular imaging, tomographic imaging is carried out using PET or SPECT mostly used in combination with CT. Due to their natures and high sensitivities, PET and SPECT are clearly the methods of choice for molecular imaging in human subjects. A relatively large number of imaging agents are potentially available for targeting specific biological processes and the field is now developing fast.

Advanced imaging contributes to an improved, faster and cheaper diagnosis and follow up of treatment. It also facilitates a detailed planning of surgery and radiation therapy. In radiation therapy of cancer, the spatial imaging using CT is standard for treatment planning and additional information is now obtained from PET and MRI. New functional and metabolic information will optimise the therapy and tailor it to the individual patient to improve curability and reduce side effects.

The topic of our conference is challenging. Although the benefits of medical X-ray and radionuclide imaging can hardly be overrated, the methods and choice of technical parameters in the imaging process are often still far from optimal. The

issue of radiation protection in medical imaging has attracted significant attention over the past years. It is obvious that CT examinations are responsible for a considerable part of the radiation dose to patients, and therefore considerable efforts have been made during recent years to find methods for reducing the dose and still maintaining the medical information in the images. Careful optimisation of exposure parameters in some investigations has even led to a decrease in patient exposure compared to conventional radiography (e.g. CT of colon).

Optimising the imaging conditions is crucial. To do that, it is important to understand the relation between diagnostic outcome of the imaging procedures and their physical and technical characteristics. In order to use radiation in such a way that sufficient diagnostic information is obtained at the lowest possible radiation dose to the patient, there is a need to advance our understanding of the fundamental physical phenomena of X-ray and radionuclide imaging.

The increasing role of medical imaging procedures in both diagnosis and therapy requires a supply of suitably trained scientific staff. This is necessary for an adequate support of the ongoing technological changes in healthcare and crucial for research, innovations and new creative applications.

This conference will cover a wide area of research: from traditional radiographic technologies to advanced methods for the evaluation of image quality and patient exposure with special emphasis on the development and evaluation of optimisation strategies.

We do hope that this conference, representing a continuation of a series of successful EC-meetings in the field of Medical Imaging, will contribute to the consolidation of the scientific premises to effectively use diagnostic X-rays and radioactive tracers with optimised image qualities and exposure levels.

Malmö, Munich and Göteborg, 7 June, 2009

Sören Mattsson Christoph Hoeschen Lars Gunnar Månsson Anders Tingberg

Meeting place for all events:

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www.siemens.se/medical

PROGRAMME

Meeting place for all events: Main lecture hall "Aulan", Clinical Research Centre (CRC), Entrance 72, Malmö University Hospital, Malmö, Sweden

Time **WEDNESDAY 24/6, 2009**

17.00- **Registration**

-19.00

19.00 **Get-together party at Clinical Research Centre. Live jazz music.**

Time **THURSDAY 25/6, 2009**

08.00- **Registration**

-08.30

Conference opening

08.30 **Welcome to the Third Malmö Conference on Medical Imaging**

Sören Mattsson

Official opening

*Bo Ahrén, Dean, Faculty of Medicine, Lund University and
Ann-Sofi Bennheden, Director of Malmö University Hospital*

Introduction to the conference

Anders Tingberg

Session 1:

Setting the scene

Chair: <i>Sören Mattsson</i>

Co-chair: <i>Christoph Hoeschen</i>

09.00 **Invited lecture:**

92. Trends in medical imaging

Andrew D A Maidment (Philadelphia)

09.30 **Invited lecture:**

61. Medical visualisation tools must be based on medical user requirements

Anders Persson (Linköping)

10.00 **Coffee/tea and fruit**

Invited lecture:

10.30 101. Future in imaging with focus on nuclear medicine

Katrine Åhlström Riklund (Umeå)

Session 2:

Session dedicated to the memory of Robert F Wagner

Assessment of clinical images

Chair: *Andrew D A Maidment*

Co-chair: *Lars Gunnar Månsson*

(Both given and family names are indicated for the presenting author)

- 11.00** **Invited lecture:**
2. Clinical relevance of the ROC and FROC paradigms for measuring imaging system effectiveness
Dev P Chakraborty (Pittsburgh)
- 11.30** **Invited lecture:**
76. Evaluating imaging systems – practical applications
Magnus Båth (Göteborg)
- 12.00** **LUNCH**
- 13.00** 74. Variations in eye contrast sensitivity when viewing medical images
Patrik Sund, M Båth, L G Månsson (Göteborg)
- 13.15** 75. ViewDEX – an efficient and easy-to-use software for observer performance studies
Markus Håkansson, S Svensson, S Zachrisson, A Svalkvist, M Båth, L G Månsson (Borås and Göteborg)
- 13.30** 63. Consistency of methods for analysing location-specific data
Federica Zanca, D P Chakraborty, G Marchal, H Bosmans (Leuven and Pittsburgh)
- 13.45** 20. Improved method of simulating dose reduction for digital radiographic systems
Angelica Svalkvist, M Båth (Göteborg)
- 14.00** **Invited lecture:**
3. A status report on free-response receiver operating characteristic (FROC) analysis
Dev P Chakraborty (Pittsburgh)
- 14.30** **Coffee/tea and fruit**

Session 3:
CT, SPECT/CT, PET/CT

Chair: *Arne Skretting*

Co-chair: *Gernot Ebel*

- 15.00** 99. Low-dose computed tomography in adolescent idiopathic scoliosis
Kasim Abul-Kasim (Malmö)
- 15.15** 91. Post-processing image filtration enabling dose-reduction in standard abdominal CT
Peter Leander, M Gunnarsson, M Söderberg, I Albertsson (Malmö and Linköping)
- 15.30** 13. Some discrepancy between phantom-estimated and patient's absorbed dose in head CT examinations
S Mockevičienė, Diana Adlienė (Kaunas)
- 15.45** 18. Criteria for establishing the shielding of multi-detector computed tomography (MDCT) rooms
Francis R Verdun, A Aroua, S Beachler, FO Bochud (Lausanne)
- 16.00** 46. A phantom investigation of tumour signal and noise in PET reconstructions with various smoothing filters
Arne Skretting, O Glomset, TV Bogsrud (Oslo)
- 16.15** 35. Uncertainty and sensitivity analysis of biokinetic models for radiopharmaceuticals
W B Li, Christoph Hoeschen (Neuherberg/Munich)
- 16.30** 80. Timing performance of the silicon PET insert probe
Andrej Studen, D Burdette, E Chesi, V Cindro, N H Clinthorne, E Cochran, B Grošičar, H Kagan, C Lacasta, V Linhart, M Mikuž, V Stankova, P Weilhammer, D Žontar (Ljubljana, Columbus, Ann Arbor, Valencia and Geneva)
- 16.45** **Invited lecture:**
77. Radiation exposure of patients and personnel from a PET/CT-procedure
Sigrid Leide-Svegborn (Malmö)
- 17.15** **Presentation by exhibitors** (*Chair: Anders Tingberg*)
Refreshments
- 18.45** **Introduction to poster session A** (*Magnus Båth and Francis R Verdun*)

19.00-
20.30

Poster session A and sandwiches/buffé
(Authors are expected to be present at their posters)

27. Liquid radiation detectors based on nanosilver surface plasmon resonance phenomena

Judita Puišo, J Laurikaitienė, I Prosyčevas (Kaunas)

44. Exposure requirements for contrast detection by projection radiography

FH Schöfer, Christoph Hoeschen (Neuherberg/Munich)

8. Does a flat-panel detector reduce the patient radiation dose in interventional cardiology?

Octavian Dragusin, R Breisch, C Bokou, J Beissel (Luxembourg)

64. Optimisation of beam quality for conventional urography using a Gd₂O₂S:Tb flat panel detector

S Zachrisson, J Hansson, Å Cederblad, K Geterud, Magnus Båth (Göteborg)

16. Use of the quasi-ideal observer model in the framework of mammography quality control

P Monnin, F Bochud, Francis R Verdun (Lausanne)

17. How reliable can be an automatic MTF and low contrast detectability assessment in CT when varying acquisition parameters?

F Mieville, S Beaumont, F Gudinchet, Francis R Verdun (Lausanne and La Roche sur Yon)

31. Evaluation of subjective assessment of the low-contrast visibility in constancy control of computed tomography

Anne Thilander-Klang, K Ledenius, J Hansson, P Sund, M Båth (Göteborg)

7. The simulation of 3D objects into breast tomosynthesis images

Eman Shaheen, F Zanca, F Sisini, G Zhang, K Smans, J Jacobs, H Bosmans (Leuven)

96. A Monte Carlo based model for simulation of digital chest tomosynthesis

Gustaf Ullman, D Dance, M Sandborg, G Alm Carlsson, A Svalkvist, M Båth (Linköping and Göteborg)

86. The effect of reduced breast compression in breast tomosynthesis: an observer study using clinical cases

Daniel Förnvik, I Andersson, T Svahn, P Timberg, S Zackrisson, A Tingberg (Malmö)

28. Monte Carlo simulations of the dosimetry of chest tomosynthesis
Angelica Svalkvist, S Zachrisson, L G Månsson, M Båth (Göteborg)
43. Effective dose to patients from chest examinations with tomosynthesis
Alexa von Wrangel, A Svalkvist, H Rismyhr-Olsson, Å Cederblad, M Båth (Göteborg)
9. Cu filtration for dose reduction in neonatal chest imaging
Kristien Smans, L Struelens, F Vanhavere, H Bosmans (Mol and Leuven)
11. Role of digital technologies in the decrease of radiation risks in X-ray diagnostics
Yuriy Kovalenko, S Miroshnichenko (Kiev)
10. Correction for the fields in boost irradiation and irradiation of recurrences of brain tumours with the aid of SPECT ^{99m}Tc -MIBI scintigraphy
O Butrim, Oksana Kozak, V Kozak (Kiev)
25. Investigation of radioiodine biokinetics with a population kinetics approach
Tilman Janzen, A Giussani, C Canzi, P Gerundini, U Oeh, C Hoeschen (Neuherberg/Munich and Milan)
107. A technique for on-site measurement of spatial resolution in PET images
Arne Skretting (Oslo)
68. Absolute quantification of activity content in PET images using the Philips Gemini TF PET/CT System
Marie Sydoff, H Uusijärvi, S Leide-Svegborn, S Mattsson (Malmö)
106. Biokinetics of ^{18}F -choline studied in four patients
Helena Uusijärvi, L-E Nilsson, A Bjartell, S Leide-Svegborn and S. Mattsson (Malmö)
105. Preliminary compartment model for biokinetics of ^{18}F -choline
Tilman Janzen, F Tavola, A Giussani, MC Cantone, I Veronese, H Uusijärvi, S Mattsson, C Hoeschen (Neuherberg/Munich, Milano and Malmö)
14. New calculations for internal dosimetry of beta-emitting radiopharmaceuticals
Maria Zankl, N Petoussi-Henss, H Schlattl, WB Li, A Giussani, C Hoeschen (Neuherberg/Munich)
57. Internal dose assessment of ^{99m}Tc -HTOC
Zhang Jianfeng (Beijing)

FRIDAY 26/6, 2009

Session 4:

Recent technological developments and their clinical impact

Chair: *Diana Adlienè*

Co-chair: *Thomas Mertelmeier*

- 08.30 **Invited lecture:**
93. Detectors for the future of X-ray imaging
Magnus Åslund (Stockholm)
- 09.00 **Invited lecture:**
87. Phase-contrast and dark-field imaging for improved contrast in medical X-ray diagnostics
Franz Pfeiffer, T Donath, O Bunk, C David, M Bech, T Jensen, E Hempel, T Weitkamp, G Le Duc, A Bravin (Garching, Villigen, Copenhagen, Forchheim and Grenoble)
- 09.30 30. Development of molecular phase-contrast X-ray stereoscopic imaging for accurate cancer diagnostics
Shu-Ang Zhou, A Brahme (Stockholm)
- 09.45 66. Dual-energy imaging with photon-counting silicon detectors
Erik Fredenberg, M Hemmendorff, B Cederström, M Lundqvist, M Åslund, M Danielsson (Stockholm and Solna)
- 10.00 **Coffee/tea and fruit**
- 10.30 41. Development of a multi-spectral, multi-geometry computational model for x-ray breast imaging
Nico Buls, I Wathion, L Mommaerts, C Breucq, J de Mey (Brussels)
- 10.45 83. Microdosing using AMS and PET for early biokinetic studies of pharmaceutical candidates in man
Kristina Stenström, M Sydoff (Lund and Malmö)

Session 5:

Imaging in radiotherapy

Chair: *Dev P Chakraborty*

Co-chair: *Sigrid Leide-Svegborn*

- 11.00 **Invited lecture:**
55. If you can't see it, you can't hit it: The role of biomedical imaging in radiation oncology
Wolfgang Schlegel (Heidelberg)

11.30 40. Semi-automatic tumour segmentation by selective navigation in a 3-parameter volume, obtained by voxel-wise kinetic modelling of ¹¹C-acetate
Ida Häggström, L Johansson, A Larsson, N Östlund, J Sörensen, M Karlsson (Umeå and Uppsala)

11.45 **LUNCH**

Session 6:

Tomosynthesis

Chair: *Madan M Rehani*

Co-chair: *Ingvar Andersson*

12.45 **Invited lecture:**

90. X-ray tomosynthesis – A new diagnostic modality
Anders Tingberg (Malmö)

13.15 48. Overview of two years of clinical experience of chest tomosynthesis at Sahlgrenska University Hospital
Jenny Vikgren, ÅA Johnsson, A Svalkvist, S Zachrisson, A Flinck, M Boijesen, S Kheddache, LG Månsson, M Båth (Göteborg)

13.30 84. Simulation of lung nodules for nodule detection studies in chest tomosynthesis
Angelica Svalkvist, M Håkansson, G Ullman, M Båth (Göteborg, Borås and Linköping)

13.45 15. A phantom study of nodule size evaluation with chest tomosynthesis and MDCT
ÅA Johnsson, A Svalkvist, Jenny Vikgren, M Boijesen, A Flinck, S Kheddache, M Båth (Göteborg)

14.00 50. Development and optimization of the maximum-likelihood-approach for image reconstruction in digital breast tomosynthesis
A Anane, Thomas Mertelmeier (Erlangen)

14.15 71. Main features of data geometry required for the tomographic reconstruction algorithm OPED
Oleg Tischenko, Y Xu, C Hoeschen (Neuherberg/Munich and Eugene)

14.30 88. Breast tomosynthesis. Clinical experience
Ingvar Andersson, D Förnvik, T Svahn, A Tingberg, P Timberg, S Zackrisson, S Mattsson (Malmö)

14.45 85. In-plane visibility of lesions using breast tomosynthesis
Pontus Timberg, T Svahn, I Andersson, D Förnvik, B Hemdal, S Mattsson, M Båth, A Tingberg, M Ruschin (Malmö, Göteborg and Toronto)

15.00 70. Comparing the diagnostic accuracy of dual-view digital mammography and a dual-view combination of breast tomosynthesis and digital mammography in a free-response observer performance study
Tony Svahn, I Andersson, S Zachrisson, S Svensson, P Timberg, D Förnvik, A Tingberg, D Ikeda, S Mattsson, D Chakraborty (Malmö, Göteborg, Stanford and Pittsburgh)

15.15 **Coffee/tea and fruit**

Session 7:
Radiation Safety in Medicine

Chair: *Dieter Regulla*

Co-chair: *Michael Moores*

15.45 **Invited lecture:**

1. Radiation protection in newer imaging technologies
Madan M Rehani (IAEA and ICRP)

16.15 56. Patient doses in interventional cardiology in Bosnia and Herzegovina
Adnan Beganović, L Lincender, M Spužić, M Kulić, M Gazdić-Šantić, A Skopljak-Beganović, A Drljević, S Džanić, B Bašić (Sarajevo)

16.30 53. Studies of patient doses in interventional radiological examinations
Svetlana Sarycheva, M Balonov, V Golikov, S Kalnicky (St.Petersburg)

16.45 82. Are exposure index values consistent in clinical practice? A multimanufacturer investigation.
Marie-Louise Butler, L Rainford, J Last, PC Brennan (Dublin and Sydney)

17.00 67. *Image rejects – Radiographic challenges*
Dag Waaler, B Hoffmann (Gjøvik)

17.15 22. Survey of computed tomography doses in the republic of Belarus
Siarhei A Kharuzhyk, S A Matskevich, A E Fljustin, E V Bogushevich, S A Ugolkova (Minsk, Gomel and Vitebsk)

17.30 34. Patient peak skin doses from cardiac interventional procedures
Dejan Žontar, D Kuhelj, D Škrk, U Zdešar (Ljubljana)

17.45 100. Recent international developments within automated collection and distribution of estimated patient radiation exposures
Jonathan Kruger (Lund)

18.00- **Invited lecture:**

18.15 108. Current exposures in diagnostic radiology – time to consider potential impact on radiation protection, epidemiology and biology
Dieter Regulla and C Hoeschen (Neuherberg/Munich)

19.30 **Conference Dinner at the City Hall**

SATURDAY 27/6, 2009

Session 8:

**QA, QC, Mammography, interventional, CT, dental,
paediatric, reference doses**

Chair: *Keith Faulkner*

Co-chair: *Maria Zankl*

- 08.30** **Invited lecture**
26. Efficient quality assurance programs in radiology and nuclear medicine
Michael Sandborg, A Gustafsson, J Nilsson Althen (Linköping)
- 09.00** **Invited lecture**
4. A clinical audit programme for diagnostic radiology. The approach adopted by the International Atomic Energy Agency
Keith Faulkner, H Järvinen, P Butler, ID McLean, M Pentecost, M Rickard, B Abdullah (Newcastle, Helsinki, Reston, Vienna, Washington, Sydney, Kuala Lumpur)
- 09.15** **Invited lecture**
5. Web based tools for quality assurance and radiation protection in diagnostic radiology
B Michael Moores, P Charnock, M Ward (Liverpool)
- 09.30** 51. X-ray beam quality test inversed from a digital X-ray image
Lada Bumbure, Y Dekhtyar, T Kirsanova, K Stalidzane (Riga)
- 09.45** 33. Recently revised DRLs in nuclear medicine in Bulgaria and in Finland
Helinä Korpela, R Bly, J Vassileva, K Ingilizova, T Stoyanova, I Kostadinova, A Slavchev (Helsinki and Sofia)
- 10.00** **Coffee/tea and fruit**
- 10.30** 45. Relationship between noise and sharpness in in-plane CT-images for different reconstruction kernels
Kristine Eldevik, W Nordhøy, A Skretting (Oslo)
- 10.45** 23. Application of Statistica for analysis of large patient dose data sets obtained from RIS
Jason Fazakerley, P Charnock, R Wilde, R Jones, M Ward (Liverpool)
- 11.00** 38. Innovative method for objective evaluations of the quality of CT systems
Alexander Schegerer, C Brunner, H Schlattl, B Renger, W Dietz, C Hoeschen (Neuherberg and Munich)

11.15 59. The effect of different adaptation strengths on image quality and radiation dose using Siemens CARE Dose 4D
Marcus Söderberg, M Gunnarsson (Malmö)

11.30 42. Methods for monitoring patient dose in dental radiology
Ebba Helmrot, A Thilander-Klang (Linköping and Göteborg)

11.45 32. How to use effective dose in dental radiology?
Anne Thilander-Klang, E Helmrot (Göteborg and Linköping)

12.00 **Introduction to poster session B** (*Michael Sandborg and Helena Uusijärvi*)

12.15 **LUNCH and Poster session B**
(Authors are expected to be present at their posters)

47. Quality Control in a conventional X-ray laboratory - routine application of theoretical spectra
Jacob Nøtthellen, E Bilet (Oslo)

21. Management of patient doses and diagnostic reference levels in x-ray radiography in Lithuania
Julius Žiliukas, A Urbonienė, L Krynke (Vilnius)

98. Forward-scattered radiation from the compression paddle should be included when average glandular dose is estimated
Bengt Hemdal (Malmö)

58. The role of the resulting skin dose in complex mammography screening examinations
Inga Cibulskaitė, D Adlienė, J Laurikaitienė, G Adlys (Kaunas)

6. Quality assurance of micro-CT systems
Liesbeth Elout, N Buls, I Willekens, T Lahoutte, J de Mey (Brussels)

49. Comparison of organ doses and image quality between CT and Fluoro-CT scans in orthopedic applications
J Damet, M Sans-Merce, F Miéville, S Duc, Francis R Verdun, S Baechler (Lausanne and Geneva)

65. The effect of radiation dose reduction on clinical image quality in chest radiography of premature neonates using a dual-side readout technique computed radiography system
Anna Carlander, J Hansson, J Söderberg, K Steneryd, M Båth (Göteborg and Varberg)

73. Evaluation of three methods for determining CT dose profile – Presenting the Tritium method
Jonny Hansson, S Eriksson, A Thilander-Klang, M Båth (Göteborg)
36. Evaluation of image enhanced paediatric CT brain examinations
Kerstin Ledenius, F Stålhammar, L-M Viklund, C Fredriksson, A Forsberg, A Thilander-Klang (Göteborg and Linköping)
60. Simulated dose reduction by adding virtual noise to measured raw data – a validation study
Marcus Söderberg, M Gunnarsson, M Nilsson (Malmö)
54. Comparison of dose area product values for CAG examinations over a period of 10 year in a hospital in the Netherlands. The influence of parameter settings on the DAP values
Willy Hummel (Leeuwarden)
62. Harmonization of the appearance of digital radiographs from different vendors by means of common external image processing
Lars Larsson, E-L Engman, M Båth, L G Månsson (Skövde, Göteborg and Linköping)
78. Quality control and patient dosimetry in dental cone beam CT
Jenia Vassileva, D Stoyanov (Sofia)
97. Comparison of image quality in Siemens Sensation 64 slice and 16-slice multidetector CT of wrists with metallic implants
L Hörberg, L Ekelund, Mikael Gunnarsson (Malmö)
12. Complex X-ray-ultrasonic examination as the way of reduction of dose exposure on the patient at the stage of primary diagnostics
Yulia Mironova, L Urina (Simferopol and Kiev)
29. Ten years of occupational exposure monitoring in Bosnia and Herzegovina
B Bašić, Adnan Beganović, D Samek, A Skopljak-Beganović (Sarajevo)
81. Mammography practice in Serbia: evaluation and optimisation of image quality and technical aspects of mammography imaging chain
D Kosutic, Olivera Ciraj-Bjelac, D Arandjic (Belgrade)
102. A phantom study to show the importance of compression in conventional diagnostic X-ray examinations
Marie-Louise Olsson, A Tingberg, S Mattsson (Malmö)
103. Comparison of different detectors in X-ray equipment using Intulo a radiation dose-management system
Marie-Louise Olsson, A Tingberg, M Nilsson (Malmö)

14.30 Coffee/tea and fruit

**Session 9:
Optimisation in digital radiology and nuclear medicine**

Chair: *Anne Thilander-Klang*

Co-chair: *Anders Tingberg*

- 15.00** 37. Optimisation of effective dose and image quality in colon examinations
Karin Berner, M Båth, P Jonasson, J Cappelen-Smith, P Fågelstam, J Söderberg (Uppsala, Göteborg and Varberg)
- 15.15** 52. Determination of the detective quantum efficiency of gamma camera systems: a Monte Carlo study
Ida Eriksson, S-Å Starck, M Båth (Karlstad, Jönköping and Göteborg)
- 15.30** 19. Fluoroscopy-guided procedures in cardiology: are we reducing patient exposure over time?
Eleni-Theano Samara, A Arouna, J C Stauffer, F Bochud, FR Verdun (Lausanne)
- 15.45** 89. A European study of patient dosimetry in diagnostic radiology – protocol development and findings
H Gfirtner, PA Kaplanis, B Michael Moores, P Schneider, J Vassileva (Neuburg/Inn, Nicosia, Liverpool, Fulda and Sofia)
- 16.00** 72. A practical approach to prioritise optimisation of radiological examinations - Introducing the 4-bit concept
Jonny Hansson, P Jonasson, P Sund, LG Månsson, M Båth (Göteborg)
- 16.15** **Invited lecture**
104. Minimizing Activity and Dose with Enhanced Image quality by Radiopharmaceutical Administrations (MADEIRA)
Christoph Hoeschen, S Mattsson, MC Cantone, M Mikuz, C Lacasta, G Ebel, N Clinthorne, A Giussani (Neuherberg, Malmö, Milano, Ljubljana, Valencia, Göttingen, Ann Arbor)
- 16.30-17.00** **Summary and highlights of the conference**
Poster awards and Young Scientists award