7th MR in RT Symposium

June 23 - 25, 2019
Delta Hotels by Marriott Toronto
Toronto, Ontario, Canada

Scientific Committee

Co-chairs:

Teo Stanescu, Princess Margaret Cancer Centre, Canada
David Jaffray, Princess Margaret Cancer Centre, Canada

Membership of the Scientific Committee:

James Balter, University of Michigan, USA
Alejandro Berlin, Princess Margaret Cancer Centre, Canada
Caroline Chung, MD Anderson Cancer Center, USA
Jennifer Croke, Princess Margaret Cancer Centre, Canada
Laura Dawson, Princess Margaret Cancer Centre, Canada
Gino Fallone, Cross Cancer Institute, Canada
Carrie Glide-Hurst, Henry Ford Health System, USA
Ali Hosni, Princess Margaret Cancer Centre, Canada
Eric Leung, Sunnybrook Odette Cancer Centre, Canada
Ives Levesque, McGill University, Canada
Gary Liney, Ingham Institute, Australia
Cynthia Ménard, Le Centre hospitalier de l'Université de Montréal, Canada
Tufve Nyholm, Umeå University, Sweden
Uwe Oelfke, The Institute of Cancer Research, UK
Lars Olson, Lund University, Sweden
Parag Parikh, Henry Ford Health System, USA
Uulke van der Heide, Netherlands Cancer Institute, Netherlands
Jihong Wang, MD Anderson Cancer Center, USA

Local Organizing Committee

Jean-Pierre Bissonnette, Princess Margaret Cancer Centre
Bridge Chugh, Sunnybrook Odette Cancer Centre
Catherine Coolens, Princess Margaret Cancer Centre
Mary Hooey, Princess Margaret Cancer Centre
Ali Hosni, Princess Margaret Cancer Centre
Brian Keller, Sunnybrook Odette Cancer Centre
Teo Stanescu, Princess Margaret Cancer Centre
Beibei Zhang, Princess Margaret Cancer Centre

Sunday June 23, 2019

7:00-8:00 Breakfast and Registration

8:00-8:15 Welcome

8:15-9:30 MR Guidance: Current Clinical Status
Co-chairs: Laura Dawson, Chia-Lin Tseng

This session will provide current status of clinical therapeutic trials and clinical imaging trials that are open.
Panelists: Parag Parikh, Brian Keller, James Balter, Cynthia Ménard

9:30-10:30 Proffered Papers – Clinical I
Co-Chairs: Eric Leung, Peter Chung

1
MRI-Guided Focal HDR Brachytherapy as Monotherapy for Prostate Cancer: Early Feasibility and Quality of Life Results
Lisa Joseph[1,2] Peter Chung[1,2], Joelle Helou[1,2], Andrew Bayley[1,2], Charles Catton[1,2], Padraig Warde[1,2], Bernadeth Lao[1], Alexandra Rink[1], Akbar Beiki-Ardakani[1]. Jette Borg[1], Robert Weersink[1] Alejandro Berlin[1,2]
[1] Princess Margaret Cancer Centre, Toronto, ON
[2]University of Toronto, Toronto, ON

2
MRI-BASED QUANTITATIVE OXYGEN SENSORS FOR GUIDING HIGH DOSE-RATE BRACHYTHERAPY
Gregory Ekchian
Massachusetts Institute of Technology, Cambridge, MA

3
CHANGES IN APPARENT DIFFUSION COEFFICIENT (ADC) IN SERIAL WEEKLY MRI DURING RADIOTHERAPY IN PATIENTS WITH HEAD AND NECK CANCER: PRELIMINARY RESULTS FROM PREDICT-HN STUDY
Sweet Ping Ng[1,] Carlos Cardenas[2], Houda Bahig[3], Baher Elgohari[2], Amy Moreno[2], Shalin Shah[2], Adam Garden[2], Jack Phan[2], G Brandon Gunn[2], Steven Frank[2], David Rosenthal[2], William Morrison[2], JiHong Wang[2], Clifton Fuller[2]
[1]Peter MacCallum Cancer Centre, Melbourne, AU
[2]The University of Texas MD Anderson Cancer Center, Houston, TX
[3]Centre Hospitalier de l'Université de Montréal, Montreal, QC

4
INITIAL CLINICAL EXPERIENCE USING 4D-MRI BASED MR-GUIDED ONLINE ADAPTIVE SBRT ON A HIGH FIELD MR-LINAC
Eric Paulson[1], William Hall[1], X. Allen Li[1], Michael Straza[1], Beth Erickson[1], Christopher Schultz[1], Nikolai Mickevicius[1], Xinfeng Chen[1], Ergun Ahunbay[1]
[1]Medical College of Wisconsin, Milwaukee, WI

5
CLINICAL DOSIMETRIC BENEFIT OF THE FIRST 1.5T MR-LINAC SBRT TREATMENTS OF LYMPH NODE OLIGOMETASTASES COMPARED TO CONVENTIONAL CBCT-LINAC TREATMENT
Dennis Winkel[1], Gijsbert Bol[1], Anita Werensteijn-Honingh[1], Martijn Intven[1], Wietse Eppinga[1], Jochem Hes[1], Louk Snoeren[1], Bas Raaymakers[1], Ina Jürgenliemk-Schulz[1], Petra Kroon[1]
[1]UMC Utrecht, Utrecht, NL

6
RAPID AND ACCURATE AUTOMATIC CONTOURING OF QUANTITATIVE DIFFUSION-WEIGTHED MRI USING A DEEP CONVOLUTIONAL NEURAL NETWORK
Oliver Gurney-Champion[1], Jennifer Kieselmann[1], Kee Wong[2], Kevin Harrington[1], Uwe Oelfke[1]
[1]The Institute of Cancer Research and The Royal Marsden NHS Foundation Trust, London, UK
[2]The Royal Marsden NHS Foundation Trust, London, UK

10:30-11:00 Refreshment Break/Exhibitor Showcase

11:00-12:00 Where would you see MR-Guided Radiotherapy in 2025?
Chair: David Jaffray
Panelists: Caroline Chung, Percy Lee, Daniel Zips

Advances in our ability to conform radiation dose to complex targets has emphasized the need for accurate and precise delineation and characterization of disease and normal structures throughout the course of radiotherapy. Functional and anatomical changes in these structures leads to the paradigm of adaptive radiotherapy in which improvements in outcome come from highly personalized courses of care. Magnetic resonance (MR) imaging provides uniquely sensitive characterization of patient anatomy and is an emerging source of quantitative functional imaging information. Over the past 10 years, radiotherapy has made dramatic strides in integrating MR into clinical workflows, as well as, creating remarkable hybrid systems that are capable of both high performance MR imaging and delivering highly conformal radiation therapy dose distributions. Given the impressive pace, it has been suggested that all of radiotherapy will one day be guided by MR imaging. In this symposium, leaders in the field of image-guided radiotherapy will present their vision for the future of MR in radiotherapy followed by a panel discussion of the promise for patient care and the challenges to clinical realization.

12:00-13:00 Lunch

13:00-14:00 Proffered Papers – Clinical II
Co-Chairs: David Shultz, Ali Hosni

7
IMPLEMENTATION OF MRI-ONLY PLANNING AND TREATMENT FOR ACCELERATED PARTIAL BREAST IRRADIATION
Areti Marko, H Michael Gach, Olga Green, Imran Zoberi, Maria Thomas, Justin Park
Washington University in St. Louis-School of Medicine, Saint Louis, MO

8
TUMOUR DYNAMICS ASSESSMENT AND MACHINE LEARNING BASED CONTOUR PROPAGATION FOR POST-OPERATIVE MRI BASED ADAPTIVE GLIOBLASTOMA RADIOTHERAPY
James Stewart, Sten Myrehaug, Young Lee, Chia-Lin Tseng, Hany Soliman, Jason Xie, Mikki Campbell, Angus Lau, Arjun Sahgal, Mark Ruschin
Sunnybrook Odette Cancer Centre, Toronto, ON

9
MULTI-MODALITY DEFORMABLE IMAGE REGISTRATION FOR EXTERNAL-BEAM RADIOTHERAPY AND BRACHYTHERAPY DOSE ACCUMULATION
Aran Kim[1], Michelle Tremblay[1], Stina Svensson[2], Minna Wedenberg[2], Peter Chung[1], Tim Craig[1], Tony Tadic[1], Alejandro Berlin[1], Michael Velec[1]
[1]Princess Margaret Cancer Centre, Toronto, ON
[2]RaySearch Laboratories, Stockholm, SE

11
CARDIAC MRI LEFT VENTRICULAR MAPPING OF LEFT-SIDED BREAST CANCER PATIENTS TREATED WITH TANGENTIAL RADIOTHERAPY ALONE
Simon Tang[1], James Otton[1], Eng-Siew Koh[1], Robba Rai[1], Geoffrey Delaney[1], David Tran[1], Liza Thomas[2], Lois Holloway[1], Gary Liney[1]
[1]University of New South Wales Kensington, Sydney, AU
[2]University of Sydney, Sydney, AU

12
PRETREATMENT ADC SHOWS NO ADDED VALUE FOR THE PREDICTION OF LOCAL RECURRENCES IN HEAD AND NECK SQUAMOUS CELL CARCINOMA
Marielle EP Philippens, Juliette Driessen, Jeanine Vasmel, Remco de Bree, Chris HJ Terhaard
University Medical Center Utrecht, Utrecht, NL

45
QUALITY ASSURANCE OF A COMPRESSED SENSING T2 MAPPING SEQUENCE FOR MULTIPARAMETRIC MRI IN PROSTATE CANCER
Yu-Feng Wang[1], Gary Liney[2], Robba Rai[2], Lois Holloway[2], Annette Haworth[1]
[1]University of Sydney, Sydney, AU
[2]Ingham Institute for Applied Medical Research, Sydney, AU

14:00-14:35 Proffered Papers (Clinical 1 Rapid Fire)
Chair: Catherine Coolens

13
CARDIAC SUBSTRUCTURE SEGMENTATION WITH DEEP LEARNING FOR IMPROVED CARDIAC SPARING
Eric Morris[1], Ahmed Ghanem[1], Ming Dong[2], Hajar Emami[2], Milan Pantelic[1], Eleanor Walker[1], Carri Glide-Hurst1
[1]Henry Ford Cancer Institute, Detroit, MI
[2]Wayne State University, Detroit, MI

14
CLINICAL EVALUATION OF A PROTOTYPE RECEIVER COIL CUSTOM DESIGNED FOR MR SIMULATION OF IMMOBILIZED PATIENTS
James Balter, Dinank Gupta, Michelle Kim, James Hayman, Karen Vineberg, Yue Cao
University of Michigan, Ann Arbor, MI

15
LUNG VOLUME EFFECT ON THORACIC CT-MR DEFORMATION IN MR-GUIDED RADIOTHERAPY (MRGRT) WITH A SWINE MODEL
Kathryn Mittauer, Mattison Flakus, Antonia Wuschner, Jessica Miller, Michael Lawless, Michael Bassetti, Jennifer Meudt, Dhanansayan Shanmuganayagam, John Bayouth
University of Wisconsin, Madison, WI

16
CROSS-MODALITY DEEP LEARNING: CONTOURING OF MRI DATA FROM ANNOTATED CTS ONLY
Jennifer Kieselmann[1], Oliver Gurney-Champion[1], Brian Hin[1], Simeon Nill[1], Clifton Fuller[2], Uwe Oelfke[1]
[1]The Institute of Cancer Research and The Royal Marsden NHS Foundation, London, UK
[2]MD Anderson Cancer Center, Houston, TX

17
THE EFFECT OF MAGNETIC FIELD ON DOSE DISTRIBUTION OF HDR CO-60 AND IR-192 SOURCES
Hassan Ali Nedaie
Tehran University of Medical Sciences, Tehran, IR

18
IMPLEMENTING AN ADAPTIVE MRI GUIDED RADIATION THERAPY PROGRAM USING A PHANTOM AND VOLUNTEERS
Eenas Omari, John Roeske, Tamer Refaat, Anil Sethi
Loyola University Chicago, Maywood, IL

14:35-15:05 Refreshment Break/Exhibitor Showcase

15:05-15:40 Proffered Papers (Clinical II Rapid Fire)
Chair: Robba Rai, Yu-Feng Wang

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TREATMENT RESPONSE ON MR DURING RADIOTHERAPY IN PATIENTS WITH HEAD AND NECK SQUAMOUS CELL CARCINOMA
Boris Peltenburg, Marielle Philippens, Remco de Bree, Chris Terhaard
University Medical Centre Utrecht, Utrecht, NL

20
AN IPEM INTERNATIONAL AUDIT OF MRI USE FOR EXTERNAL BEAM RADIOTHERAPY TREATMENT PLANNING
Richard Speight[1], Maria A. Schmidt[2], Gary Liney[3], Robert Johnstone[4], Cynthia L Eccles[5], Michael Dubec[5], Ben George[6], Ann Henry[1], Tufve Nyholm[7], Faisal Mahmood[8], Juha Korhonen Kymenlaakso[9],
Rick Sims[10], Rob H.N. Tijssen[11], Hazel McCallum[12]
[1]Leeds Teaching Hospitals NHS Trust, Leeds, UK
[2]Royal Marsden NHS Foundation Trust and Institute of Cancer Research, London, UK
[3]Ingham Institute for Applied Medical Research & Liverpool Hospital, Sydney, AU
[4]Guy's and St. Thomas' NHS Foundation Trust, London, UK
[5]The Christie NHS Foundation, University of Manchester, Manchester, UK
[6]University of Oxford, Oxford, UK
[7]Umeå University, Umeå, SE
[8]Odense University Hospital and University of Southern Denmark, Odense, GER
[9]Central Hospital and Aalto University, Kotka, FI
[10]Auckland Radiation Oncology, Auckland, NZ
[11]University Medical Center Utrecht, Utrecht, NL
[12]Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle, UK

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A DOSIMETRIC STUDY OF MR-DIRECTED SIMULTANEOUS INTEGRATED BOOST TO INTRAPROSTATIC GTV USING STEREOTACTIC BODY RADIOTHERAPY IN LOCALIZED PROSTATE CANCER
Astrid Billfalk-Kelly, Ning-Ning Lu, Vickie Kong, Alejandro Berlin, Tim Craig, Joelle Helou, Peter Chung
University of Toronto, Toronto, ON

22
DOSIMETRIC FEASIBILITY OF AN MR-LINAC SYSTEM FOR IMAGE-GUIDED CRANIAL RADIOSURGERY
Jochen Cammin[1], Gage Redler[2], Martha Malin[2], Tynan Stevens[2], Olga Green[1], Sasa Mutic[1], Bulent Aydogan[2]
[1]Washington University in St. Louis, St. Louis, MO
[2]University of Chicago, Chicago, IL

23
DEFORMABLE DOSE RECONSTRUCTION FOR A HYBRID CONE BEAM CT-MRI GUIDED ADAPTIVE RADIOTHERAPY WORKFLOW
Michael Velec, Tony Tadic, Jason Xie, Joanne Moseley, Tirth Patel, Michael Milosevic, Anthony Fyles, Kathy Han, Jennifer Croke
Princess Margaret Cancer Centre, Toronto, ON

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DOSIMETRIC FEASIBILITY OF UTILIZING THE VIEWRAY MR-LINAC SYSTEM FOR IMAGE GUIDED SPINE SBRT
Gage Redler[1], Tynan Stevens[1], Jochen Cammin[2], Martha Malin[1], Olga Green[2], Sasa Mutic[2], Bulent Aydogan[1]
[1] University of Chicago, Chicago, IL
[2]Washington University in St. Louis, St. Louis, MO

15:40-17:00 Will MR-Guided RT Reinvent Radiotherapy
Co-Chairs: Uulke van der Heide, Caroline Chung

Panelists: David Jaffray, Uwe Oelfke, Alejandro Berlin, Cynthia Ménard

17:00-18:00 Poster Viewing Session

19:00 Welcome Reception – The Fifth, 225 Richmond St. W., www.thefifth.com

Monday June 24, 2019

7:00-8:00 Breakfast and Registration

8:00-9:00 Industry Sponsors (Platinum Level) Symposium
Co-Chairs: Teo Stanescu, Warren Foltz

Potentials of on-board MRI: The UCLA Experience
ViewRay - Yingli Yang

Sunnybrook Odette Cancer Centre's Vision for MR in RT with Elekta Unity
Elekta - Chia-Lin Tseng

9:00-10:45 Proffered Papers – Reviewer's Choice
Co-Chairs: Jean-Pierre Bissonnette, Michael Milosevic

25
ON THE DEVELOPMENT OF REFERENCE DOSIMETRY SERVICE IN MRI GUIDED RADIOTHERAPY
Ilias Billas[1], Hugo Bouchard[2], Uwe Oelfke[3], Simon Duane[1]
[1]National Physical Laboratory, Teddington, UK
[2]Université de Montréal, Montreal, QC
[3]The Institute of Cancer Research, Sutton, National Physical Laboratory, Teddington, UK

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PRE-TRAINED RECURRENT INFERENCE MACHINES FOR RECONSTRUCTING DATA FROM THE MR-LINAC
Kai Lønning[1], Tessa Lindt[1], Matthan Caan[2], Jan-Jakob Sonke[1]
[1]Dutch Cancer Institute, Amsterdam, NL
[2]Universitair Medische Centra, Amsterdam, NL

27
QUANTIFYING THE VARIABILITY OF RESPIRATORY MOTION USING MULTIPHASIC 4D-MRI
Martin Fast, Tessa van de Lindt, Georgios Sotiropoulos, Christoph Schneider, Jan-Jakob Sonke
The Netherlands Cancer Institute, Amsterdam, NL

28
MAGNETIC RESONANCE SIGNATURE MATCHING (MRSIGMA) FOR REAL-TIME VOLUMETRIC MOTION TRACKING
Li Feng, Ricardo Otazo
Memorial Sloan Kettering Cancer Center, New York, NY

29
THE INFLUENCE OF THE LINEAR ACCELERATOR OF A 1.5T MR-LINAC ON DIFFUSION IMAGING DURING RADIATION TREATMENT
Ernst Kooreman, Petra van Houdt, Vivian van Pelt, Marlies Nowee, Uulke van der Heide
The Netherlands Cancer Institute, Amsterdam, NL

30
QUANTITATIVE IMAGING FOR PREDICTION OF LOCAL, REGIONAL AND DISTANT FAILURE IN LOCALLY ADVANCED HEAD AND NECK CANCERS
Yue Cao, Madhava Aryal, Peter Hawkins, Choonik Lee, Pin Li, Matt Schipper, Christina Chapman, Dawn Owen, Alek Dragovic, Michelle Mierzwa
University of Michigan, Ann Arbor, MI

31
QUANTIFYING THE EFFECTS OF RESPIRATORY VARIABILITY ON 4D-MRI GUIDED MID-POSITION LIVER SBRT
Tessa van de Lindt, Martin Fast, Jochem Kaas, Wouter van den Wollenberg, Uulke van der Heide, Jan-Jakob Sonke
Netherlands Cancer Institute - Antoni van Leeuwenhoek Ziekenhuis, Amsterdam, NL

32
SPATIAL ACCURACY, TEMPORAL EFFICIENCY, AND REPEATABILITY OF SELF-DIRECTED BREATH HOLD DURING MRI-GUIDED GATED RADIATION THERAPY
John Bayouth, Kathryn Mittauer, Patrick Hill, Eric Wallat, Andrew Baschnagel, Michael Bassetti
University of Wisconsin - Madison, Madison, WI

33
PROTON PENCIL BEAM SCANNING IN AN MRI SCANNER: MODELLING AND EXPERIMENTAL VERIFICATION
Brad Oborn[1], Sebastian Gantz[2], Sonja Schellhammer[2], Armin Luehr[3], Julien Smeets[4], Aswin Hoffmann[2]
[1]University of Wollongong, Wollongong, NSW
[2]OncoRay - National Center for Radiation Research in Oncology, Dresden, DE
[3]Helmholtz-Zentrum Dresden-Rossendorf, Dresden, DE
[4]Ion Beam Applications, Louvain la-Neuve, BE

34
AUTOMATED MRI-ONLY TREATMENT PLANNING USING DATA AUGMENTATION AND DEEP AUTOENCODER SIMILARITY MATCHING
Michael Lempart[1], Niklas Eliasson[1], Hunor Benedek[1,2], Christian Gustafsson[1,2], Lars E. Olsson[2]
1Skåne University Hospital, Lund, SE
2Lund University, Lund, SE

10:45-11:15 Refreshment Break/Exhibitor Showcase

11:15-12:15 MR-Driven Ecosystem
Chair: Lars Olsson

Panelists: Jihong Wang, Lauren Henke, Cynthia Eccles

12:15-13:15 Lunch

13:15-14:15 Proffered Papers – MRI-only Treatment Planning
Chair: Tufve Nyholm, N. Tyagi

35
A NOVEL AND RAPID APPROACH TO ESTIMATE PATIENT-SPECIFIC DISTORTIONS BASED ON MDIXON MRI
Steffen Weiss[1], Siamak Nejad-Davarani[2], Holger Eggers[1], Eliza Orasanu[1], Steffen Renisch[1], Carri Glide-Hurst[2]
[1]Philips Research, Hamburg, GER
[2]Henry Ford Health Cancer Institute, Detroit, MI

36
A MULTI-INSTITUTIONAL ANALYSIS OF A GENERAL PELVIS CONTINUOUS HOUNSFIELD UNIT (HU) SYNTHETIC CT SOFTWARE
Neelam Tyagi[1], Jani Keyrilainen[2], Ilyes Benslimane[3], Petra J Van Houdt[4], Marloes N.J. Frantzen-Steneker[4], Mo Kadbi[5], Aleksi Halkoa[5], Gerald Schubert[5], Uulke A Van der Heide[4]
[1]Memorial Sloan Kettering Cancer Center, New York, NY
[2]Turku University Hospital, Turku, FI
[3]Columbia university, New York, NY
[4]Netherlands Cancer Institute, Amsterdam, NL
[5]Philips Healthcare, Gainesville, FL

37
RAPID BRAIN AND PELVIS SYNTHETIC CT USING GENERATIVE ADVERSARIAL NETWORKS
Ming Dong[2], Siamak Nejad-Davarani[1], Carri Glide-Hurst[1]
[1]Henry Ford Health System, Detroit, MI
[2]Wayne State University, Detroit, MI

38
DOSIMETRIC MODELLING OF THE COUCH AND COIL STRUCTURES FOR UNITY MRI LINAC
Nina Tilly[1,3], Gerhard Feist[1], Klas Marcks von Würtemberg[1], Stefan Pencea[2], James Dolan[2], Nicholas Schupp[2], David Tilly[1,3,4]
[1]Elekta Instruments AB, Stockholm, SE
[2]Elekta Inc. St. Louis, MO
[3]Uppsala University, Uppsala, SE
[4]Akademiska Hospital, Uppsala, SE

39
MR-ONLY RADIOTHERAPY WITH MR-CBCT TREATMENT VERIFICATION FOR PROSTATE CANCER: FIRST UK CLINICAL IMPLEMENTATION
Jonathan Wyatt, Rachel Pearson, John Frew, Serena West, Michele Wilkinson, Karen Pilling, Rachel Brooks, Dean Ainslie, Andrew McNeil, Neil Richmond, Christopher Walker
Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK

10
PREDICTIVE VALUE OF ADC BEFORE CHEMORADIOTHERAPY FOR SURVIVAL IN ESOPHAGEAL CANCER
Keiichi Jingu, Maiko Kozumi, Takaya Yamamoto, Rei Umezawa, Noriyoshi Takahashi
Tohoku University Graduate School of Medicine, Sendai, JP

14:15-14:45 Proffered Papers (Rapid Fire) – MRI for Planning
Chair: Beibei Zhang

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UNCERTAINTY IN MRI SIMULATION SCANS FOR RADIOTHERAPY PLANNING: CNS AND LUNG CANCER
Monique Heinke[1], Lois Holloway[2], Robba Rai[1], Shalini Vinod[2]
[1]Sydney, AU
[2]South Western Clinical School, University of New South Wales, Liverpool, Australia, Sydney, AU

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GEOMETRICAL ANALYSIS OF TARGET DEFINITION ON CORRECTED MR IMAGES AND ITS EFFECT ON STEREOTACTIC RADIOSURGERY TREATMENT PLANNING
Ali Fatemi, Chunli (Claus) Yang, Madhava Kanakamedala
University of Mississippi Medical Center, Jackson, MS

42
IN SILICO ANALYSIS OF MR-ONLY PLANNING FOR SIMULATION-FREE MR-GUIDED SPINE SBRT
Olga Green, Soumon Rudra, Alex Price, Sasa Mutic, Clifford Robinson
Washington University School of Medicine, St. Louis, MO

43
ZERO TE BASED PSEUDO CT CONVERSION: TOWARD A SILENT PATIENT-FRIENDLY SOLUTION FOR BOTH HEAD AND PELVIS APPLICATIONS
Cristina Cozzini[1], Mikael Bylund[2], Sandeep Kaushik[1], Joakim H Jonsson[2], Josef A Lundman[2], Mathias Engström[1], Tufve Nyholm[2], Florian Wiesinger[1]
[1]GE Healthcare, Munich, GER
[2]Umeå University, Umeå, SE

44
THE IMPACT OF MRI GEOMETRIC DISTORTION IN STEREOTACTIC RADIOSURGERY
Ergys Subashi[1], Yang Sheng[2], Sharif Elguindi[1], John Kirkpatrick[2], Fang-Fang Yin[2], Yunfeng Cui[2]
[1]Memorial Sloan Kettering Cancer Center, New York, NY
[2]Duke University, Durham, NC

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RATE OF MRI UTILISATION IN THE SETTING OF PATIENTS BEING TREATED WITH RADIOTHERAPY IN THE CURATIVE SETTING
Simon Tang1, Viet Do[1], Doaa Elwadia[2]
[1]University of New South Wales, Kensington, AU
[2]Liverpool, AU

14:45-15:15 Refreshment Break/Exhibitor Showcase

15:15-16:25 Functional Imaging and Response Assessment
Chair: Kâmil Uludağ

Panelists: Yue Cao, Carri Glide-Hurst, Ives Levesque, David Fuller

16:25-17:00 Proffered Papers (Rapid Fire) – QA for MRI-Guided Radiotherapy
Co-Chairs: Olga Green, Eenas Omari

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INITIAL EXPERIENCE OF THE PERFORMANCE CHARACTERISTICS OF THE ELEKTA UNITY MR-LINAC
Ian Hanson
The Royal Marsden NHS Foundation Trust, London, UK

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ONLINE AND OFFLINE PATIENT SPECIFIC QUALITY ASSURANCE FOR AN MR-LINAC SYSTEM
Alex Price
Washington University in St. Louis, St. Louis, MO

48
COMPREHENSIVE DISTORTION ASSESSMENT IN A 0.35T MR-LINAC
Siamak Nejad-Davarani, Dongsu Du, Joshua Kim, Carri Glide-Hurst
Henry Ford Cancer Institute, Detroit, MI

49
COMPARISON OF IMAGE DISTORTION OF 1.5 T AND 3 T MR SCANNERS WITH AN ELEKTA G-FRAME AND PINS USING A GRID PHANTOM
Zhifei Wen, Tina Briere, Ping Hou, Dennis Mackin, R. Jason Stafford
MD Anderson Cancer Center, Houston, TX

50
A REPEATABLE PHYSIOLOGICAL 4D DEFORMABLE MOTION PHANTOM INSERT FOR EDGE DETECTION AND TRACKING IN MR-IGRT WORKFLOWS
Madeline Perrin[1], Nicholas Hartman[1], Kalin. I. Penev[2], Markus Glitzner[3], Cornel Zachiu[3], Enzo Barberi[1]
[1]Modus Medical Devices Inc., London, ON
[2]Western University, London, ON
[3]University Medical Center Utrecht, Utrecht, NL

51
HARMONIC ANALYSIS METHOD BASED GEOMETRIC DISTORTION QA PHANTOM DESIGN FOR SUB-MILLIMETER ACCURACY
Enzo Barberi[1], Mike Cole[1], Teo Stanescu[2]
[1]Modus QA, London, ON
[2]Princess Margaret Cancer Centre, University of Toronto, Toronto, ON

17:00-18:00 Proffered Papers – Dosimetry in Magnetic Field
Co-Chairs: Uwe Oelfke, Steven Thomas

52
TOWARDS REAL-TIME HIGH RESOLUTION DOSIMETRY IN AN MRI-LINAC: PROOF OF CONCEPT
Trent Causer[1], Sarah J. Alnaghy, Natalia Roberts[1], Urszula Jelen[2], Bin Dong[2], Marco Petasecca[1], Anatoly B. Rosenfeld[1], Peter Metcalfe[1], Brad M. Oborn[1]
[1]University of Wollongong, Wollongong, University of Wollongong, Wollongong, NSW
[2]Liverpool Hospital, Liverpool, UK

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CONSTRUCTION AND PERFORMANCE OF AN MR-COMPATIBLE WATER CALORIMETER
Mark D'Souza[1], Humza Nusrat[1], James Renaud[2], Gerrard Peterson[3], Niloufar Entezari[1], Arman Sarfehnia[4]
[1]Ryerson University, Toronto, ON
[2]National Research Council, Ottawa, ON
[3]Sunnybrook Health Sciences Centre, Toronto, ON
[4]University of Toronto, Toronto, ON

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SKIN DOSE MEASUREMENTS ON AN INLINE 1T MR-LINAC
Peter Metcalfe[1], Natalia Roberts[1], Elizabeth Patterson[1], Urszula Jelen[2], Gary Liney[2], Trent Causer[1], Lois Holloway[2], Michael Lerch[1], Anatoly Rosenfeld[1], Dean Cutajar[1], Brad Oborn[1]
[1]University of Wollongong, Wollongong, NSW
[2]Ingham Institute for Applied Medical Research, Sydney, AU

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DOSIMETRY FOR THE FIRST LIVE IRRADIATION ON THE AUSTRALIAN MRI-LINAC
Urszula Jelen[1], Bin Dong[1], Jarrad Begg[2], Natalia Roberts[3], Hilary Byrne[4], Tara Roberts[5], Paul Keall[4], Gary Liney[1]
[1]Ingham Institute for Applied Medical Research, Liverpool, AU
[2]Liverpool and Macarthur Cancer Therapy Centre, Liverpool, AU
[3]University of Wollongong, Wollongong, NSW
[4]University of Sydney, Sydney, AU
[5]Western Sydney University, Sydney, AU

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MAGNETIC FIELD CORRECTION FACTOR, KB, FOR A ROOS CHAMBER IN AN INLINE MRI-LINAC
Jarrad Begg, Urszula Jelen, Gary Liney, Lois Holloway
Ingham Institute for Applied Medical Research, Sydney, AU

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IMPROVING MEGAVOLTAGE X-RAYS RADIOTHERAPY EFFICACY: USING THERANOSTIC GADOLINIUOM-BISMUT NANOPARTICLES
Nader Riyahi Alam[1], Somayyeh Farahani[1], Soheila Haghgoo[2], Ziynab Derakhshan[1]
[1]Tehran University of Medical Sciences, Tehran, IR
[2]Food and Drug Control Research Center, Tehran, IR

19:00 Steamwhistle Brewery – Locomotive Hall, Bay 10
255 Bremner Ave, www.steamwhistle.com

Tuesday June 25, 2019

7:00-8:00 Breakfast and Registration

8:00-9:20 Proffered Papers – QA Methods and Novel Hardware
Chair: Oliver Jäkel, Marielle Philippens

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ONLINE GEOMETRIC FIDELITY INSPECTION FOR MR-GUIDED TREATMENTS ON 1.5T MRI-LINAC: VISUALIZING THE CUMULATIVE EFFECT OF GRADIENT ERRORS AND PATIENT SPECIFIC SUSCEPTIBILITIES
Rob Tijssen[1], Robin Vos[2], Marielle Philippens[1], Astrid van Lier[1], Bas Raaymakers[1], Cornelis van den Berg[1], Bjorn Stemkens[1]
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Sebastian Klüter[1], Amish Shah[2], Kristian Boye[3], Keith DeWyngaert[4], Anthony Doemer[5], Pierre Fau[6], Olga Green[7], Görkem Güngör[8], Alonso Gutierrez[9], Daan Hoffmans[10], Hugues Mailleux[6], Kathryn Mittauer[11], Eenas Omari[12], Miguel A. Palacios[10], Ryan Pennell[4], Tino Romaguera[9], Anil Sethi[12], Poonam Yadav[11], Maria Bellon[13], Rajiv Lotey[13], Carri Glide-Hurst[5]
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[3]Rigshospitalet Copenhagen, Copenhagen, DK
[4]New York Presbyterian Hospital, New York, NY
[5]Henry Ford Health System, Detroit, MI
[6]Institut Paoli-Calmettes, Marseille, FR
[7]Washington University in St. Louis, St. Louis, MO
[8]Acibadem Mehmet Ali Aydinlar University, Istanbul, TR
[9]Miami Cancer Institute, Miami, FL
[10]Amsterdam University Medical Center, Amsterdam, NL
[11]University of Wisconsin, Madison, WI
[12]Loyola University Chicago, Maywood, IL
[13]Viewray Inc., Mountain View, CA

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University Medical Center Utrecht, Utrecht, NL

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Ali Fatemi, Chunli (Claus) Yang, Madhava Kanakamedala
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University Medical Center Utrecht, Utrecht, NL

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A MASK-COMPATIBLE, RADIOLUCENT HEAD AND NECK RECEIVE ARRAY FOR MRI-GUIDED RADIOTHERAPY TREATMENTS AND PRE-TREATMENT SIMULATION
Stefan Zijlema[1], Luca van Dijk[1], Lovisa Westlund Gotby[2], Michel Italiaander[2], Rob Tijssen[1], Jan Lagendijk[1], Nico van den Berg[1]
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MR-ONLY RADIATION THERAPY: A NOVEL LIGHT-WEIGHT, FLEXIBLE COIL FOR HEAD AND NECK
Cristina Cozzini[1], Chad Bobb[2], Mathias Engström[3], Sandeep Kaushik[4], Molthen Robert[2], Dan Rettmann[5], Venkat Goruganti[6], Wen-Yang Chiang[6], Florian Wiesinger[1]
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[3]GE Healthcare, Stockholm, SE
[4]GE Healthcare, Bangalore, IN
[5]GE Healthcare, Rochester, MN
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INVESTIGATING THE EFFECTS OF A MAGNETIC FIELD ON THE ARCCHECK-MR ARRAY CALIBRATION
Alex Price
Washington University in St. Louis, St. Louis, MO

9:20-10:20 Proffered Papers – Data Modelling for Motion and Planning
Chair: Jan Lagendijk, Martin Fast

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EVALUATING CONDITIONAL GENERATIVE ADVERSARIAL NETWORK MODELS FOR HEAD AND NECK MR-ONLY RADIOTHERAPY TREATMENT PLANNING
Peter Klages, Ilyes Benslimane, Sadegh Riyahi, Jue Jiang, Margie Hunt, Joseph O. Deasy, Harini Veeraraghavan, Neelam Tyagi
Memorial Sloan Kettering Cancer Center, New York, NY

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GEOMETRICAL ANALYSIS OF INTERFRACTIONAL CHANGES OF INTERNAL TARGET VOLUMES USING REAL-TIME 4D-MRI OF MOVING LUNG TUMORS
Moritz Rabe[1], Mathias Düsberg[2], Christian Thieke[1], Sebastian Neppl[1], Sabine Gerum[1], Michael Reiner[1], Nils Henrik Nicolay[3], Heinz-Peter Schlemmer[4], Jürgen Debus[5], Julien Dinkel[1], Guillaume Landry[1], Katia Parodi[1], Claus Belka[1], Christopher Kurz[1], Florian Kamp[1]
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[2]Klinikum rechts der Isar, Technical University, Munich, GER
[3]University Hospital of Freiburg, Freiburg, GER
[4]German Cancer Research Center, Heidelberg, GER
[5]University Hospital of Heidelberg, Heidelberg, GER

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STREAMLINING MR SIMULATION USING SENSE PARALLEL IMAGING ACCELERATION COMBINED WITH COMPRESSED SENSING
Neelam Tyagi
Memorial Sloan Kettering Cancer Center, New York, NY

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RECONSOCKET: A LOW-LATENCY DATA STREAMING SOLUTION FOR REAL-TIME MRI-GUIDED RADIOTHERAPY
Pim Borman, Bas Raaymakers, Markus Glitzner
UMC Utrecht, Utrecht, NL

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REAL-TIME SLIDING WINDOW RECONSTRUCTION OF GOLDEN ANGLE STACK-OF-STARS ACQUISITION FOR CONTINUOUS 3D TUMOR TRAILING
Tom Bruijnen, Pim TS Borman, Jan JW Lagendijk, Bas W Raaymakers, Cornelis AT van den Berg, Markus Glitzner, Rob HN Tijssen
University Medical Center Utrecht, Utrecht, NL

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DEEP LEARNING BASED AUTO-SEGMENTATION OF TARGETS AND OARS FOR MR-ONLY PLANNING OF PROSTATE RADIOTHERAPY
Sharif Elguindi, Michael Zelefsky, Jue Jiang, Harini Veeraraghavan, Joseph Deasy, Margie Hunt, Neelam Tyagi
Memorial Sloan-Kettering Cancer Center, New York, NY

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10:50-12:00 AI in RT (Micro-symposium)
Chair: Teo Stanescu

Thomas Purdie
Chris McIntosh

12:00-12:35 Proffered Papers (Rapid Fire) – Deep Learning Applications
Chair: Chris McIntosh, Jennifer Kieselmann

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APPLICATION OF A CONVOLUTION MODEL TO CORRECT FOR THE INFLUENCE OF MAGNETIC FIELDS ON MEASURED TRANSVERSE SIGNAL PROFILES
Ann-Britt Ulrichs, Björn Delfs, Louisa Brettschneider, Björn Poppe, Hui Khee Looe
Carl-von-Ossietzky University of Oldenburg, Oldenburg, GER

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A CONVOLUTIONAL NEURAL NETWORK WITH ACGAN AUGMENTED DATA FOR TREATMENT RESPONSE PREDICTION USING LONGITUDINAL DIFFUSION MRI
Yu Gao, Vahid Ghodrati, Anusha Kalbasi, Jie Fu, Dan Ruan, Minsong Cao, Chenyang Wang, Fritz Eilber, Nicholas Bernthal, Susan Bukata, Sarah Dry, Scott Nelson, Mitchell Kamrava, John Lewis, Daniel Low, Michael Steinberg, Peng Hu, Yingli Yang
University of California, Los Angeles, Los Angeles, CA

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ESTIMATING 2D DEFORMATION VECTOR FIELDS FROM GOLDEN ANGLE RADIAL UNDERSAMPLED K-SPACE USING STACKED CONVOLUTIONAL NEURAL NETWORKS
Maarten Terpstra, Federico D'Agata, Bjorn Stemkens, Jan Lagendijk, Nico van den Berg, Rob Tijssen
University Medical Center Utrecht, Utrecht, NL

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Sebastian Neppl[1], Guillaume Landry[1], David Hansen[2], Ben Hoyle[1], Jochen Weller[1], Claus Belka[1], Katia Parodi[1], Florian Kamp[1], Christopher Kurz[1]
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[2]Software, Aarhus, DK

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Kevin N.D. Brou Boni[1], Ludovic Vanquin[2], Antoine Wagner[3], John Klein[2], David Pasquier[1], Nick Reynaert[3]
[1]Université Lille, CNRS, Centrale Lille, Centre de Recherche en Informatique Signal et Automatique de Lille, Lille, FR
[2]Lille, FR
[3]Université Libre de Bruxelles, Lille, FR

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UTILIZING A CONDITIONAL GENERATIVE ADVERSARIAL NETWORK FOR SYNTHETIC CT GENERATION IN MRI-GUIDED PROTON THERAPY FOR PROSTATE CANCER
Christopher Kurz[1], Cornelis AT van den Berg[2], Mark HF Savenije[2], Guillaume Landry[1], Claus Belka[1], Katia Parodi[1], Matteo Maspero[2]
[1]Ludwig-Maximilians-Universität München, Garching, GER
[2]University Medical Center Utrecht, Utrecht, NL

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LIVER SBRT ON THE MR-LINAC: QUANTIFYING THE DOSIMETRIC IMPACT OF THE ARMS-DOWN TREATMENT SETUP
Wouter van den Wollenberg, Peter de Ruiter, Edwin Jansen, Marlies Nowee, Jan-Jakob Sonke, Martin Fast
The Netherlands Cancer Institute, Amsterdam, NL

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MRI-BASED EVALUATION OF NORMAL TISSUE DEFORMATION AND BREATHING MOTION UNDER ABDOMINAL COMPRESSION
Maureen Lee, Anna Simeonov, Laura Dawson, Michael Velec
University of Toronto, Toronto, ON

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University of Mississippi Medical Center, Jackson, MS

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Jonathan Goodwin[1], Matthew Richardson[1], Kate Skehan[1], Peter Greer[1], John Simpson[1], Victoria Sherwood[2]
[1]Calvary Mater Newcastle, Newcastle, NSW
[2]Siemens Healthcare Pty. Ltd, Adelaide, AU

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Jonathan Wyatt
Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK

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Ali Fatemi[1], Edward Florez[1], Mark Haacke[2]
[1]University of Mississippi Medical Center, Jackson, MS
[2]Wayne State University, Detroit, MI

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[6]Cross Cancer Institute, Edmonton, AB
[7]University of Alberta, Edmonton, AB
[8]Canadian Agency for Drugs and Technologies in Health, Toronto, ON
[9]Centre Hospitalier de Université de Montreal, Montreal, QC
[10]Alliance of Regulators, Dieppe, NB

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[1]The University of Manchester, Manchester, UK
[2]The Christie NHS Foundation Trust, Manchester, UK

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Umeå University, Umeå, SE

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Jarryd Buckley[1], Robba Rai[2], Gary Liney[3], Jason Dowling[4], Lois Holloway[2], Peter Metcalfe[1], Paul Keall[5]
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[2]Liverpool Hospital, Sydney, AU
[3]Ingham Institute for Applied Medical Research, Sydney, AU
[4]CSIRO, Brisbane, AU
[5]University of Sydney, Sydney, AU

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Jonathan Wyatt, Hazel McCallum
Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK

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[1]University of Wisconsin-Madison, Madison, WI
[2]Aspirus Wausau Hospital, Wausau, WI

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Lars E. Olsson[1], Teo Stanescu[2]
[1]Lund University, Malmö, SE
[2]Princess Margaret Cancer Centre, University of Toronto, Toronto, ON

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University of Toronto, Toronto, ON

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[2]Institute of Cancer Research London, London, ON

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[1]University Medical Center Utrecht, Utrecht, NL
[2]MR Coils, Zaltbommel, NL

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Emilia Palmér[1], Anna Karlsson[1], Fredrik Nordström[1], Carl Siversson[2], Karin Petruson[1], Maria Ljungberg[1], Maja Sohlin[1]
[1]University of Gothenburg, Gothenburg, SE
[2]Spectronic Medical AB, Helsingborg, SE

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[1]University of Toronto, Toronto, ON
[2]Sunnybrook Research Institute, Toronto, ON

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[1]University of Toronto, Toronto, ON
[2]Princess Margaret Cancer Centre, Toronto, ON

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Nadia Harhen[1], Dan Coppens[1], Daniel Gareis[2], Hamid Amooi[2], Jeremy Carlson[1], Andrew Johnson[1]
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[2]NORAS MRI Products, Höchberg, GER

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[2]Lund University, Lund, SE
[3]Umeå University, Umeå, SE
[4]Skåne University Hospital, Lund, SE

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UCLA, Los Angeles, CA

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Loyola University Medical Center, Maywood, IL

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Christian Gustafsson[1,2], Lars E Olsson[2], Carl Siversson[3], Simon Lindgren[4], Tufve Nyholm[4]
[1]Skåne University Hospital, Lund, SE
[2]Lund University, Lund, SE
[3]Spectronic Medical AB, Helsingborg, SE
[4]University Hospital of Umeå, Umeå, SE

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Laura D'Alimonte, Ananth Ravi
University of Toronto, Toronto, ON

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