

## Program MMND 2014

### Day 1

Monday, 20<sup>th</sup> October

8:00 Registration/Coffee

8:20 Welcome address (Anatoly Rozenfeld and Paolo Colautti )

### ***Session 1: Synchrotron Microbeam Radiation Therapy -Overview***

*Chairs: Jean-Francois Adam and Michael Lerch*

#### **8:30 Invited Speaker 1**

Daniel Häusermann

Australian Synchrotron, Victoria, Australia

[THE AUSTRALIAN SYNCHROTRON IMAGING AND MEDICAL BEAMLIN: UP AND RUNNING, WHERE TO?](#)

#### **9:00 Invited Speaker 2**

Elke Bräuer-Krisch

European Synchrotron Radiation Facility, Grenoble, France

[THE CURRENT STATUS OF THE MRT VETERINARY TRIAL AT THE ESRF AND FUTURE PERSPECTIVES](#)

#### **9:30 Invited Speakers 3**

Michael Lerch & Marco Petasecca (on behalf of 3DMiMiC)

Centre for Medical Radiation Physics, University of Wollongong, Australia

[SILICON MINIDOSIMETERS AND REALTIME MONITORS FOR SYNCHROTRON MICROBEAM RADIATION THERAPY](#)

10:00 Morning Tea

### ***Session 2: Synchrotron MRT-Dosimetry-1***

*Chairs: Elke Bräuer-Krisch and Daniel Häusermann*

#### **10:30 Talks**

10:30 Jean-Francois Adam

Grenoble Institut des Neurosciences - Université Joseph, Grenoble, France

[MEDICAL PHYSICS ISSUES IN CONTRAST-ENHANCED SYNCHROTRON STEREOTACTIC RADIOTHERAPY CLINICAL TRIALS](#)

10:45 Andrew Stevenson

Imaging and Medical Beamline, Australian Synchrotron, Victoria, Australia

[QUANTIFYING RECOMBINATION EFFECTS FOR FREE-AIR ION CHAMBERS AT THE IMAGING & MEDICAL BEAMLIN, AUSTRALIAN SYNCHROTRON](#)

- 11:00 Christopher Poole  
University of Melbourne, Department of Obstetrics & Gynaecology, Royal Women's Hospital, Melbourne  
[A HIGH RESOLUTION IN-BEAM MONITOR FOR MICROBEAM RADIOTHERAPY](#)
- 11:15 Chris Hall  
Imaging and Medical Beamline, Australian Synchrotron, Victoria, Australia  
[RADIOCHROMIC FILM DENSITOMETRY FOR MICROBEAM X-RAY IRRADIATION](#)
- 11:30 Iwan Cornelius  
Centre for Medical Radiation Physics, University of Wollongong, Australia  
[LARGE AREA THIN SILICON DETECTORS FOR ONLINE BEAM MONITORING IN MICROBEAM RADIATION THERAPY](#)
- 11:45 Pauline Fournier  
Centre for Medical Radiation Physics, University of Wollongong, Australia  
[EXPERIMENTAL DETERMINATION OF THE ENERGY DEPENDENCE OF A SILICON SINGLE STRIP DETECTOR DEDICATED TO MICROBEAM RADIATION THERAPY APPLICATIONS](#)

### ***Session 3: Synchrotron MRT-Radiobiology***

*Chairs: Moshi Geso and Moeava Tehei*

#### **12:00 Invited Speaker 4**

Roger Martin  
Peter MacCallum Cancer Centre, Melbourne, Australia  
[NEW DNA-BINDING ANTIOXIDANTS AS TOPICAL RADIOPROTECTORS: MECHANISM OF RADIOPROTECTION](#)

12:30 Lunch

### ***Session 3: Synchrotron MRT-Radiobiology (continuation)***

#### **13:30 Talks**

- 13:30 Jeff Crosbie  
University of Melbourne Department of Obstetrics & Gynaecology, Victoria  
[AN EVALUATION OF BIOLOGICAL DOSE EQUIVALENCE BETWEEN SYNCHROTRON MICROBEAM RADIATION THERAPY AND CONVENTIONAL BROADBEAM RADIATION USING CLONOGENIC AND CELL IMPEDANCE ASSAYS](#)
- 13:45 Pavel Lobachevsky  
Peter MacCallum Cancer Centre, Melbourne, Australia  
[IMPLICATIONS OF THE SCATTERED RADIATION OF THE SYNCHROTRON BEAM FOR INVESTIGATION OF BYSTANDER EFFECTS](#)
- 14:00 Alesia Ivashkevich  
Radiation Oncology, Canberra Hospital, Australia  
[ADVANCES IN BIOLOGICAL DOSIMETRY](#)
- 14:15 Olga Martin  
Peter MacCallum Cancer Centre, Melbourne, Australia  
[SYNCHROTRON BROAD BEAM AND MRT RADIATION INDUCES DNA DAMAGE IN NORMAL MOUSE TISSUES DISTANT FROM THE IRRADIATED VOLUME](#)

14:30 Christopher Poole  
University of Melbourne, Department of Obstetrics & Gynaecology, Royal Women's Hospital, Melbourne  
[DETERMINING MICRODOSIMETRIC SPREAD AMONGST CELLS SUBJECT TO MICROBEAM RADIOTHERAPY USING MONTE CARLO SIMULATION](#)

### **Session 4: Synchrotron MRT-Dosimetry-2**

*Chairs: Marco Petasecca and Jeff Crosbie*

14:45 Jean-Francois Adam  
Grenoble Institute des Neurosciences - Université Joseph, Grenoble, France  
[PRECLINICAL TRIALS IN MINIBEAM STEREOACTIC RADIOSURGERY: A REPORT ON THEORETICAL AND EXPERIMENTAL DOSIMETRY AND DOSE ESCALATION PROTOCOLS](#)

### 3:00 Afternoon Tea

### **Session 4: Synchrotron MRT-Dosimetry-2 (continuation)**

15:30 Elizabeth Kyriakou  
University of Melbourne Department of Obstetrics & Gynaecology, Victoria  
[USE OF OPTICAL MICROSCOPY METHOD TO CALCULATE PVDR'S FOR SYNCHROTRON MRT](#)

15:45 Jayde Livingstone  
Imaging and Medical Beamline, Australian Synchrotron, Victoria, Australia  
[CHARACTERISATION OF A HIGH SPATIAL RESOLUTION SYNTHETIC SINGLE CRYSTAL DIAMOND DETECTOR FOR DOSIMETRY IN SYNCHROTRON MICROBEAM RADIATION THERAPY](#)

16:00 Bjarne Stugu  
Department of Physics and Technology, University of Bergen, Norway  
[HIGH RESOLUTION FAST BEAM-MONITORS FOR MICROBEAM RADIATION THERAPY](#)

16:15 Mathew Cameron  
Centre for Medical Radiation Physics, University of Wollongong, Australia  
[CHARACTERISATION OF A NOVEL 3D SILICON SINGLE STRIP DETECTOR FOR MICROBEAM RADIATION THERAPY \(MRT\) QUALITY ASSURANCE](#)

16:30 Angela Kok  
SINTEF MiNaLab, Oslo, Norway  
[MICROMACHINING AND MICROFABRICATION FOR MICRODOSIMETRY](#)

16:50 Anatoly Rozenfeld  
Closing remarks

**Day -2**

**Tuesday 21<sup>st</sup> October**

8:00 Registration/Coffee

***Session 1: Micro- and Nano-Dosimetry in Hadron Therapy***

***Chairs: Anatoly Rozenfeld and Giulio Magrin***

**8:30 Invited Speaker 5**

Paolo Colautti

INFN Laboratori di Legnaro, Italy

[MICRODOSIMETRY OF THERAPEUTIC HADRON BEAMS](#)

**9:00 Invited Speaker 6**

Michael Scholz

GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany

[THE RELEVANCE OF DAMAGE CLUSTERING ON THE NANOMETER AND MICROMETER SCALE IN THE LOCAL EFFECT MODEL \(LEM\) AND THE GIANT-LOOP BINARY-LESION \(GLOBLE\) MODEL](#)

**9:30 Invited Speaker 7**

Reinhard Schulte

Division of Radiation Research, Loma Linda University, Loma Linda, USA

[NANODOSIMETRIC CHARACTERIZATION OF MIXED RADIATION FIELDS: STATUS AND PERSPECTIVES](#)

10:00 Morning Tea

**10:30 Talks**

10:30

Valeria Conte

LNL-INFN, viale dell'Università, Legnaro, Italy

[EXPERIMENTAL NANODOSIMETRY: THE LINK BETWEEN PHYSICS AND RADIOBIOLOGY](#)

10:45

Anatoly Rozenfeld

Centre for Medical Radiation Physics, University of Wollongong, Australia

[EXPERIMENTAL SOLID STATE MICRODOSIMETRY – PRESENT AND FUTURE](#)

11:00

Giulio Magrin

EBG MedAustron GmbH, Wiener Neustadt

[DIAMOND DETECTORS FOR RADIATION QUALITY MEASUREMENTS IN ION-BEAM THERAPY–SIMULATIONS AND EXPERIMENTAL TESTS](#)

11:15

Julia-Maria Osinga

Department of Dosimetry for Radiation Therapy and Diagnostic Radiology, Physikalisch-Technische Bundesanstalt (PTB), Germany

[ABSORBED DOSE TO WATER MEASUREMENTS IN A CLINICAL CARBON ION BEAM USING WATER CALORIMETRY – PROJECT OUTLINE AND PRELIMINARY EXPERIMENTS](#)

## **Session 2: Heavy Ion and Proton Therapy: Physics and Implementation**

*Chairs: Carl Rossi and Sabine Reinhardt*

- 11:30      **Mark Reinhard**  
Australian Nuclear Science and Technology Organisation (ANSTO), Australia  
AUSTRALIAN HADRON THERAPY PROJECT
- 11:45      **John Boldeman**  
Boldeman Consulting, Cronulla, Australia  
[TWO OPTIONS FOR AN AUSTRALIAN PARTICLE THERAPY FACILITY](#)
- 12:00      **David Hinde**  
Department of Nuclear Physics, Research School of Physics and Engineering,  
Australian National University, Australia  
[CAPABILITIES AND APPLICATIONS OF AUSTRALIA'S HEAVY ION ACCELERATOR FACILITY](#)
- 12:15      **Edward Simpson**  
Department of Nuclear Physics, Research School of Physics and Engineering,  
Australian National University, Australia  
[RECENT ADVANCES IN UNDERSTANDING THE REACTIONS OF LITHIUM ISOTOPES](#)
- 12:30      **Alisher Kadyrov**  
Department of Imaging and Applied Physics, Curtin University, Australia  
[ACCURATE CALCULATIONS OF STOPPING POWER FOR PROTON THERAPY](#)

## **12:45 Lunch and Poster Session**

### **Posters**

#### **Reinhard Schulte**

Division of Radiation Research, Loma Linda University, Loma Linda, USA  
[MACRO- AND NANODOSIMETRIC EVALUATION OF THE PHASE II PROTON CT SCANNER WITH GEANT4 SIMULATIONS](#)

#### **Haider Meriaty**

Nuclear Services, ANSTO, Australia  
[SECONDARY STANDARD DOSIMETRY LABORATORY \(SSDL\) – ANSTO](#)

#### **Claudiu Porumb**

Centre for Medical Radiation Physics, University of Wollongong, Australia  
A NOVEL DUAL-VERIFICATION QUALITY ASSURANCE SYSTEM FOR EXTERNAL BEAM  
RADIOTHERAPY

#### **Kaiyang Li**

Centre for Medical Radiation Physics, University of Wollongong, Australia  
PETIPIX: AN ULTRA HIGH SPATIAL RESOLUTION SMALL ANIMAL PET SCANNER

#### **Zhangbo Han**

Centre for Medical Radiation Physics, University of Wollongong, Australia  
BRACHYVIEW: AN IN BODY IMAGING SYSTEM FOR REAL TIME QA IN HDR BRACHYTHERAPY

#### **Maegan Gargett**

Centre for Medical Radiation Physics, University of Wollongong, Australia  
MONTE CARLO SIMULATION OF THE DOSE RESPONSE OF A NOVEL 2D SILICON DIODE ARRAY  
FOR USE IN HYBRID MRI-LINAC SYSTEMS

## ***Session 3: Particle Therapy Imaging***

*Chairs: Yujin Qi and Stefano Agosteo*

### **13:30 Invited Speaker 8**

Taiga Yamaya

National Institute of Radiological Sciences, Japan

[DEVELOPMENT OF A NOVEL OPEN-TYPE PET SYSTEM FOR 3D DOSE VERIFICATION IN PARTICLE THERAPY](#)

### **14:00 Talks**

14:00 Stephan Helmbrecht

Institute of Radiation Physics, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany

[PARTICLE THERAPY PET – 12 YEARS OF CLINICAL EXPERIENCE AND FUTURE PERSPECTIVES](#)

14:15 Hsiao-Ming Lu

Massachusetts General Hospital, Harvard Medical School, Boston, USA

[SINGLE DETECTOR BASED PROTON IMAGING AND ITS APPLICATION IN REDUCING PROTON BEAM RANGE UNCERTAINTY](#)

14:30 Reinhard Schulte

Division of Radiation Research, Loma Linda University, Loma Linda, USA

[EMERGING TECHNOLOGIES FOR PARTICLE THERAPY PLANNING AND VERIFICATION: STATUS AND FUTURE OF PROTON IMAGING](#)

14:45 Dieter Roehrich

Institute of Physics and Technology, University of Bergen, Bergen, Norway

[EXTREMELY HIGH-GRANULARITY DIGITAL TRACKING CALORIMETER FOR PROTON COMPUTED TOMOGRAPHY](#)

### **15:00 Afternoon Tea**

### **15:30 Invited Speaker 9**

Carl Rossi

Scripps Proton Therapy Center, San Diego CA, USA

[INTENSITY-MODULATED PROTON THERAPY-BRIEF OVERVIEW](#)

## ***Session 4: Radiobiological Models in Hadron Therapy & Nanoparticles for Dose Enhancement***

*Chairs: Reinhard Schulte and Roger Martin*

### **15:50 Talks**

15:50 Moeava Tehei

Centre for Medical Radiation Physics, University of Wollongong, Australia

[SYNTHESIS OF POTENTIAL THERANOSTIC SYSTEM CONSISTING OF METHOTREXATE-IMMOBILIZED \(3- AMINOPROPYL\)TRIMETHOXSILANE COATED A-BI<sub>2</sub>O<sub>3</sub> NANOPARTICLES FOR CANCER TREATMENT](#)

- 16:05 **Sally McKinnon**  
Centre for Medical Radiation Physics, University of Wollongong, Australia  
[GEANT4 SIMULATION OF DOSE ENHANCEMENT OF A PROTON BEAM BY NANOPARTICLES](#)
- 16:20 **Moshi Geso**  
RNIT, Australia  
[MICRODOSIMETRY WITH ALANINE EMBEDDED WITH NANOPARTICLES](#)
- 16:35 **Mai Fukahori**  
Research Center for Charged Particle Therapy, National Institute of  
Radiological Sciences  
[ESTIMATION OF THE RECTAL AND URETHRAL NORMAL TISSUE COMPLICATION PROBABILITY  
PARAMETERS IN CARBON ION THERAPY FOR PROSTATE CANCER AND BIOLOGICAL  
CONSIDERATION](#)
- 16:50 **Michael Douglass**  
Department of Medical Physics, Royal Adelaide Hospital, Adelaide, Australia  
[DEVELOPMENT, TESTING AND APPLICATION OF A COMPLETE CELL GROWTH, IRRADIATION,  
REPAIR AND DEATH MODEL](#)
- 17:05 **Sianne Oktaria**  
Centre for Medical Radiation Physics, University of Wollongong, Australia  
[INDIRECT RADIO-CHEMO-BETA THERAPY: AN INNOVATIVE AND TARGETED APPROACH TO  
INCREASE BIOLOGICAL EFFICIENCY OF X-RAYS BASED ON ENERGY](#)
- 17:20 **Anatoly Rozenfeld**  
Closing Remarks

## Day-3

Wednesday 22<sup>nd</sup> October

ARDENT: Special Program

8:00 Registration/Coffee

### **Session 1: Monte Carlo Simulations on Micro-and Nano-scale**

*Chairs: Susanna Guatelli and Zdenka Kuncic*

#### **8:30 Invited Speaker 10**

Sebastien Incerti

Centre National de la Recherche Scientifique (CNRS), France

[THE GEANT4-DNA PROJECT: OVERVIEW AND STATUS](#)

#### **8:50 Talks**

8:50

Carmen Villagrasa

Institut de Radioprotection et Sûreté nucléaire (IRSN), France

[A MULTISCALE SIMULATION TOOL FOR ASSESSMENT OF RADIATION-INDUCED BIOLOGICAL DAMAGE IN ION BEAMS](#)

9:10

Rui Qiu

Department of Engineering Physics, Tsinghua University, Beijing, China

[DEVELOPMENT AND APPLICATION OF MULTI-SCALE PHANTOMS FOR CHINESE REFERENCE MAN AND WOMAN](#)

9:30

Maegan Gargett

Centre for Medical Radiation Physics, University of Wollongong, Australia

[MONTE CARLO SIMULATION OF THE EFFECTS OF A 1 T TRANSVERSE MAGNETIC FIELD ON A CLINICAL IMRT DOSE DISTRIBUTION](#)

9:45

Leyla Moghaddasi

Department of Medical Physics, Royal Adelaide Hospital, Adelaide, Australia

[MONTE-CARLO MODEL DEVELOPMENT FOR EVALUATION OF CURRENT CLINICAL TARGET VOLUME DEFINITION FOR GLIOBLASTOMA USING BORON NEUTRON CAPTURE THERAPY](#)

10:00 Morning Tea

### **Session 2: Space Dosimetry**

*Chairs: Paolo Colautti and Anatoly Rozenfeld*

#### **10:30 Invited Speaker 11**

Jeff Sutton

NSBRI, Houston, USA

[OVERVIEW OF THE SPACE MEDICINE PROGRAM AT THE NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE](#)



## 10:50 Invited Speaker 12

Larry Pinsky

School of Physics, University of Houston, USA

WHAT HAVE WE LEARNED IN TWO YEARS OF MEDIPIX IN SPACE ON THE ISS AND FUTURE PLANS

## *Session 3: Advancements in Radiation Detectors for Dosimetry*

*Chairs: Dieter Roehrich and Gareth Moorhead*

## 11:10 Invited Speaker 13

Stefano Agosteo

Politecnico di Milano, Dipartimento di Energia, Sezione di Ingegneria

Nucleare, Milano, Italy

EXPERIMENTAL MICRODOSIMETRY AT THE NANOMETRE LEVEL

## 11:30 Talks (ARDENT students updates)

11:30

Linh Tran

Centre for Medical Radiation Physics, University of Wollongong, Australia

3D-MESA "BRIDGE" SILICON MICRODOSIMETER FOR RBE STUDIES IN C-12 RADIATION THERAPY

11:45

David Bolst

Centre for Medical Radiation Physics, University of Wollongong, Australia

CHARACTERISATION OF NOVEL SILICON MICRODOSIMETER FOR RBE DETERMINATION IN HEAVY ION THERAPY

11:55

Stuart George

Centre for Medical Radiation Physics, University of Wollongong and CERN

MAPPING THE ASYMMETRY IN THE SAA FLUXES USING THE MEDIPIX PARTICLE-by-PARTICLE DIRECTIONAL INFORMATION

12:05

Alvin Sashala Naik

Politecnico di Milano, Department of Energy, Milan, Italy

MONTE CARLO SIMULATIONS FOR NEUTRON DOSIMETRY AND SPECTROMETRY USING CR-39 TRACK DETECTORS

12:15

Vincenzo Monaco

University of Torino, Italy

APPLICATION OF ULTRA-FAST SILICON DETECTORS AS BEAM MONITORS IN CHARGED PARTICLE THERAPIES

12:30

Chris Cassel

Centre for Medical Radiation Physics, University of Wollongong, Australia

DOSIMETRY OF PULSED NEUTRON RADIATION FIELDS

12:40 Lunch

## ***Session 4: Advancements in X-ray Radiation Detectors for Imaging***

*Chairs: Chris Hall and Jeff Crosbie*

### **13:40 Invited Speaker 14**

Gareth Moorhead

CSIRO Manufacturing Flagship, Australia

HIGH SPEED X-RAY FLUORESCENCE IMAGING WITH THE MAIA DETECTOR

## ***Session 5: Laser Driven Proton Therapy***

*Chairs: Mark Reinhard and Alberto Fazzi*

### **14:00 Invited Speaker 16**

Sabine Reinhardt

Ludwig-Maximilians Universität München, Germany

A PIXEL DETECTOR SYSTEM FOR CLINICAL PHOTON AND LASER-ACCELERATED PROTON BEAMS

### **14:30 Christopher Ilgner**

Helmholtz-Zentrum Dresden-Rossendorf, Germany

THE CENTER FOR HIGH-POWER RADIATION SOURCES at HZDR – RESEARCH AND INSTRUMENTATION BEYOND MEDICAL THERAPY

### **14:45 Rhys Preston**

CSIRO Mineral Resources National Research Flagship and CMRP, Australia

PORTABLE DETECTORS FOR NEUTRON SURVEY IN MIXED RADIATION FIELDS

15:00 Afternoon Tea

## ***Session 6: Innovative MOS based Detectors for QA Dosimetry***

*Chairs: Dean Cutajar and Peter Metcalfe*

### **15:30 Invited Speaker 17**

Enrico Giulio Villani

STFC Rutherford Appleton Laboratory, Particle Physics Dept., UK

A MONOLITHIC 180 nm CMOS DOSIMETER FOR IN VIVO MEDICAL APPLICATIONS

### **15:50 Talks**

#### **15:50 Miguel Angel Carvajal Rodriguez**

ECsens, CITIC-UGR, Electronics Department, University of Granada, Spain

COMMERCIAL MOSFETS AND RADFETS ELECTRICAL AND DOSIMETRIC CHARACTERIZATION

#### **16:05 Wei Loong Jong**

Clinical Oncology Unit, Faculty of Medicine, University of Malaya, Malaysia

INTERFACE DOSIMETRY IN PHANTOM USING MOSKIN DETECTOR UNDER MEGAVOLTAGE PHOTON BEAMS

- 16:20 Mohamamd Javad Safari  
Clinical Oncology Unit, Faculty of Medicine, University of Malaya, Malaysia  
[INVESTIGATION OF THE RADIATION DOSE DELIVERY TO THE SKIN AND EYE LENS OF A PHANTOM DURING INTERVENTIONAL CEREBRAL ANGIOGRAPHY PROCEDURES](#)
- 16:35 Tina Pfeiler  
Heinrich Heine University of Dusseldorf, Germany  
[BIOLOGICAL DOSE ASSESSMENT USING FLUORESCENT NUCLEAR TRACK DETECTORS IN ION BEAM CANCER THERAPY](#)

### **Session 7: MRI LINAC Program**

*Chair: Jeremy Booth and Mauro Carrara*

#### **16:50 Invited Speakers 18**

- Peter Metcalfe & Amy Walker  
Centre for Medical Radiation Physics, University of Wollongong, Australia  
[DISTORTION CORRECTION FOR MRI TREATMENT PLANNING AND MRI LINACS](#)
- 17:20 Anatoly Rozenfeld  
Closing remarks

## **Day-4**

**Thursday, 23<sup>rd</sup> October**

**8:00-16:30 Social Program**, Options available on the Home Page

**18:30-19:00 Pre Dinner drinks**

### **Conference Dinner**

**19:15-19:45 Guest Speaker**, Dr Carl Rossi, “[INTESNITY-MODULATED PROTON THERAPY OF PROSTATE CANCER](#)”, after entree.

**20:30-20:50 Guest Speaker**, Prof Geoff Taylor, “From the enigmatic to the obscure: the God particle, Dark Matter and the Large Hadron Collider”, after main meal.

**22:00 End of Dinner**