

The 6<sup>th</sup> Italian-Australian Bilateral School and Workshop:

Photon and Neutron Applications to Biology and Nanoscale Systems

PROGRAM

Australian  
Synchrotron



*Embassy of Italy  
Lombardy*



Elettra Sincrotrone Trieste



**Monday, 19<sup>th</sup> May, 2014**

**School: Applications of Small Angle Scattering to the Study of Biological and Nanoscale Systems**

**9:00 Introduction to Small Angle X-ray Scattering (SAXS) and Wide Angle X-ray Scattering (WAXS)**

Dr Nigel KIRBY (Australian Synchrotron)

**9:45 SAXS/WAXS on the Australian Synchrotron Beamline**

Dr Stephen MUDIE (Australian Synchrotron)

**10:30 Morning Tea**

**11:00 Structural Biology from Protein Solution SAXS**

Dr Nathan COWIESON (Australian Synchrotron)

**11:45 Grazing Incidence SAXS**

Dr Sigrid BERNSTORFF (Elettra)

**12:30 Lunch**

**1:30 Data analysis techniques for Small Angle Scattering**

**Parallel Session 1 - Proteins** Dr Nathan COWIESON

**Parallel Session 2 - Materials** Dr Stephen MUDIE

**3:30 Afternoon Tea**

**4:00 Advanced Techniques** (Kirby, Mudie, Cowieson, Bernstorff)

**5:00 Beamline developments, how to apply for access, Q and A** (Kirby, Mudie, Cowieson, Bernstorff)

**6:00 BBQ Dinner: National Centre for Synchrotron Science Cafe**

**Tuesday, 20<sup>th</sup> May, 2014**

**Workshop: Photon and Neutron Applications to Biology and Nanoscale Systems**

**8:00: Registration** (National Centre for Synchrotron Science)

**8:45 Welcome and Workshop Opening** (Oliphant Lecture Theatre, NCSS)

Prof. Michael JAMES; Head of Science, Australian Synchrotron

Prof. Oscar Moze, Scientific Attache', Embassy of Italy

Consul General Marco Maria Cerbo, Consulate General of Italy in Melbourne.

Dr Mauro Zambelli, CEO of Kyma S.r.l.

**9.00 Opening Address**

Mr Cameron Slatyer (Manager International Strategy Section, Science, Research and Innovation Division, Department of Industry): *Italian-Australian Science Collaboration*

**9:20 Session 1: Applications of Small Angle Scatting to Nanoscale and Biological Systems**

9:20 Dr. Francesco SPINOZZI (Marche Polytechnic University): *Complementarity of small-angle X-ray and neutron scattering: solvation effects and quaternary structure of proteins in solution*

9:50 Dr. Cara DOHERTY (CSIRO): *Functionalisation of self-assembled nanomaterials*

10:10 Dr. Elliot GILBERT (ANSTO): *Quokka and food - Small-angle neutron scattering and discovering food structure at the nanoscale*

10:30 Dr. Sigrid BERNSTORFF (Elettra Sincrotrone): *Synchrotron radiation scattering methods for structural determinations on the nanoscale*

**11:00 Morning Tea (30 minutes)**

**11:30 Session 2: Soft X-ray Spectroscopy**

11:30 Dr. Alessandra GIANONCELLI (Elettra Sincrotrone): *Life science applications of the TwinMic soft X-ray spectromicroscopy beamline at Elettra*

12:00 Prof. Roland DE MARCO (University of the Sunshine Coast): *Transportation and accumulation of redox active species at the buried interfaces of plasticized membrane electrodes*

12:20 Prof. Feng WANG (Swinburne University): *Bridging synchrotrons and supercomputers: Recent collaboration studies of bioactive compounds*

12:40 Dr. Lars THOMSEN (Australian Synchrotron): *Organic electronics research performed on the soft X-ray spectroscopy branchline at the Australian Synchrotron*

**1:00 Lunch (60 minutes)**

**2:00 Session 3: Soft X-ray Spectroscopy / Optics and Sources**

2:00 Dr. Anton TADICH (Australian Synchrotron): *Surface transfer doping of novel materials measured using soft x-ray photoemission*

2:20 Dr. Andrea LOCATELLI (Elettra Sincrotrone): *Cathode lens microscopy of the graphene-metal interface: from nanoscale chemical imaging to micro-ARPES*

2:50 Dr. Andrew STEVENSON: *Characterisation of the IMBL wiggler-based X-ray beam for imaging/tomography and radiotherapy studies*

3:10 Dr. Daniele PELLICCIA: *Low dose multi-modal radiography with a grating interferometer: measuring absorption, phase and scattering maps*

**3:30: Afternoon tea (30 minutes)**

**4:00 Session 4: Applications of Infrared Microscopy to Studies of Biology and the Nanoscale**

4:00 Dr. Lisa Vaccari (Elettra Sincrotrone): *Synchrotron Radiation FTIR microscopy for life sciences at SISSI beamline*

4:30 Dr. PUSKAR, Ljiljana: *Synchrotron infrared microspectroscopy – from the micro to the nanoscale*

4:50 Prof. Elena IVANOVA: *Natural and bio-inspired antibacterial surfaces*

5:10 Dr. Kevin Prince (Elettra Sincrotrone): *Free electron lasers: the light sources of the future*

**6:00: Bus leaves for Workshop Dinner**

**6:30 – 10:00 Workshop Dinner**

**Wednesday, 21<sup>st</sup> May, 2014**

**8:45 Welcome and Workshop Opening (Oliphant Lecture Theatre, NCCS)**

**9.00 Session 5: X-ray Diffraction Imaging for Nanoscale and Biological Systems**

9:00 Dr. Flavio CAPOTONDI (Elettra Sincrotrone): *Coherent Diffraction Imaging Project at FERMI@Elettra: present status and research opportunities*

9:30 Mr. Nicholas PHILLIPS: *Ptychographic Fresnel Diffraction Tomography at the Nanoscale*

9:50 Dr. Mark JUNKER (La Trobe University): *A soft x-ray branchline and endstation for high resolution imaging of material and biological samples*

10:10 Dr. Michael JONES (La Trobe University): *Phase-diverse Fresnel Coherent Diffractive Imaging of Cellular Specimens*

**10:30 Morning tea (30 min)**

**11:00 Session 6: X-ray Microscopy / SAXS Studies of Nanoscale Systems**

- 11:00 Prof. Fulvia ARFELLI (University of Trieste and INFN): *X-ray imaging on different length scales of micro and nanosized markers and structures*
- 11:30 Dr Simon JAMES: *Quantification of ZnO nanoparticle uptake, distribution, and dissolution within individual human macrophages*
- 11:50 Mr. Mohammad Abul Kalam AZAD: *Quantitative mapping of polymyxin in rat and human kidney cells using X-ray fluorescence microscopy*
- 12:10 Dr. Dmitry SVERGUN (EMBL): *Synchrotron small angle X-ray scattering from macromolecular solutions and nanoparticles*

**12:40 – 1:30: Lunch (50 min)**

**1:30: Session 7: Biomedical Imaging / SAXS**

- 1:30 Dr. Giuliana TROMBA (Elettra Sincrotrone): *Biomedical imaging at the SYRMEP beamline of Elettra*
- 2:00 Dr. Christopher HALL (Australian Synchrotron): *Biomedical imaging and radiobiology using synchrotron X-ray beams*
- 2:20 Dr James PEARSON (Monash University / Australian Synchrotron): *Synchrotron microangiography progress at the IMBL*
- 2:40 Prof. Ben BOYD (Monash University): *Nanoscale structural aspects of lipid digestion with relevance to food and lipid based drug delivery elucidated using time resolved SAXS approaches*

**3:10: Afternoon tea (30 min)**

**3:40 Session 8: SAXS / Neutron Diffraction Studies of Nanoscale and Biological Systems**

- 3:40 Dr. Paolo FALCARO (CSIRO): *Patterning protocols for positioning nanoporous materials with exceptional surface area*
- 4:10 Dr. Chris GARVEY (ANSTO): *Diffraction methods in soft matter*
- 4:30 Mr. Mark WADDINGHAM (Melbourne University), *Utilising synchrotron X-ray diffraction to investigate the development of myocardial dysfunction in early diabetes*
- 4:50 Dr. Bridget INGHAM (Callaghan Innovation): *In situ synchrotron scattering studies of nanoparticle synthesis*
- 5:10 Dr Tracey HANLEY (ANSTO): *Photoresponsive lipid liquid crystal systems*

**5:30: Closing Remarks**

**5:45 Workshop Close**

