



MECA SENS 2017
SKUKUZA, SOUTH AFRICA, 19-21 SEPTEMBER 2017

Final program

MECA SENS Spring School: Monday 18 September		
Room: Ndau		Foyer
08:15 - 9:30	Dr Tom Holden (Canada) Fundamentals of neutron diffraction	
09:30 - 10:45	Dr Don Brown (LANL, USA) Fundamentals of X-ray and synchrotron radiation and its value addition in material science	
10:45 - 12:00	Dr Ondrej Muransky (ANSTO, Australia) The role of numerical analysis in the assessment of weld residual stresses	
12:00 - 12:45	Lunch	
12:45 - 14:00	Dr Saurabh Kabra (ISIS, UK) Capabilities of in-situ loading investigations using neutron diffraction/imaging towards elucidating fundamental and industry related problems in material science	
14:00 - 15:15	Dr Vladimir Luzin (ANSTO, Australia) Neutron stress scanning with high spatial resolution for surface engineering applications	
15:15 - 15:30	Coffee	
15:30 - 17:00	Dr Sven Vogel (LANL, USA) Introduction to Texture Analysis and Microstructure Characterization using Diffraction Data	
17:00 - 17:50	Prof Phil Withers (University of Manchester, UK) Completing the picture: Correlative imaging and diffraction	
17:50 - 18:05	Dr Andrew Venter (Necsa, SA) Diffraction based residual stress capabilities available to South African researchers	
18:30 -	Conference Welcome Function	Registration and Check-in

Tuesday 19 September					
Room: Ndlopfu			Room: Ndau/Nari		
08:30 - 08:45	Registration				
08:45 - 08:50	Chair: Cev Noyan	Andrew Venter	Foreword		
08:50 - 09:10		Kelvin Kemm	Official Opening		
09:10 - 09:15		Don Brown	Welcome		
09:15 - 10:00		Phil Withers	Alain Lodini Plenary: Insights into fracture mechanics: what can x-ray diffraction and imaging tell us?		
10:00 - 10:30	Coffee break				
10:30 - 11:00	Deformation & Modelling Chair: Axel Steuwer	Kristián Máthias	Application of in-situ experimental methods for revealing deformation mechanisms in advanced magnesium alloys	Supriyo Ganguly	Control of residual stress and microstructure in large scale additive manufacturing
11:00 - 11:20		Braham C.	Stress partitioning and phase behavior in a pearlitic steel studied using high energy X-ray synchrotron radiation	*Anderson L.S.	Investigating the residual stress distribution in Selective Laser Melting produced Ti-6Al-4V using neutron diffraction
11:20 - 11:40		*Brügger A.	Internal Mechanics of Parallel Wire Cable Strands	Bernard D.	The influence of high welding speed on the residual stresses and microstructure in friction stir welded AA5182-H111
11:40 - 12:00		Connolly M.J.	In Situ Neutron Transmission Bragg Edge Measurement of Strain Fields Near Fatigue Cracks Grown in Hydrogen	Dahal J.	Development of Phase Stresses During Additive Manufacture of 304L Stainless Steel
12:00 - 12:20		*Khodja M.	Stress Evaluation of Adhesively Bonded Lap Joints with Aluminium 2024-T3 Adherents Using FEA	Cabeza Sánchez S.	Residual stress fields in additively manufactured Ni superalloy 718 as built and after release from baseplate
12:20 - 12:40		An K.	Micromechanical behavior in additively manufactured textured Inconel 718	Newby M.	Synchrotron XRD Evaluation of Residual Stresses Introduced by Laser Shock Peening for Steam Turbine Blade Applications
12:40 - 12:50	Conference photo				
12:50 - 14:15	Lunch				
14:15 - 14:45	Techniques & Instruments Chair: Chedly Braham	Chris Wensrich	Practical demonstration of Bragg-edge neutron transmission strain tomography	Petr Sittner	Internal stresses, strains and phase fractions surrounding martensite band front in superelastic NiTi wire loaded in tension
14:45 - 15:05		Kabra S.	An update on the Engineering materials programme at ISIS neutron source: current status and future plans	Bolme C.	In situ x-ray diffraction of shock-driven deformation and phase transformation in titanium
15:05 - 15:25		Klaus M.	Improving the efficiency in energy-dispersive residual stress gradient analysis: How to gain maximum benefit with minimal expense?	*Brokx J.	Modelling pseudo-strain in inhomogeneous and anisotropic materials using Monte-Carlo neutron diffraction simulation
15:25 - 15:45		Krywka C.	Scanning X-ray Nanodiffraction – from strain mapping to in situ microscopy	Nsengiyumva S.	Influence of hydrogenation on residual stresses in oxygen-implanted Ti-6Al-4V alloy
15:45 - 16:05		Noyan I.C.	Precision and accuracy of stress measurement with a portable X-ray machine	Suzuki H.	Recent Progress on Structural Engineering Studies of Reinforced Concrete using Neutron Diffraction
16:05 - 16:30	Coffee				
16:30 - 17:00	Mechanical methods vs. diffraction Chair: Hahn Choo	John Bouchard	Why Multiple Methods are Best	Don Brown	In-Situ Phase Separation of U/Nb Alloys During Quenching
17:00 - 17:20		Apel D.	Analysis of multiaxial near-surface residual stress fields by energy- and angle-dispersive X-ray diffraction: Semi- versus nondestructive techniques	*Čapek J.	Study of twinning-detwinning effect in magnesium-aluminium binary alloys by the neutron diffraction
17:20 - 17:40		*Glaser D.	Evaluation of Residual Stresses Introduced by Laser Shock Peening using Different Measurement Techniques	Mashinini P.M.	Influence of laser power and traverse speed on weld characteristics of Laser beam Welded Ti-6Al-4V sheet
17:40 - 18:00		Woo W.	Residual stress distributions via high heat-input, different thermal expansion, and low transformation temperature weld cases	Muránský O.	On the measurement of bulk dislocation density using electron backscatter and synchrotron diffraction technique
18:00 -	Poster Session				

Wednesday 20 September

		Room: Ndlopfu	Room: Ndau/Nari	
09:00 - 09:45	Chair: Phil Withers	<p>Keynote:</p> <p>Andrzej Baczmanski</p> <p>Diffraction methods and scale transition model used to study evolution of the intergranular stress and micro-damage phenomenon during elasto-plastic deformation</p>		
09:50 - 10:20	Techniques & Instruments Chair: Jens Gibmeier	<p>Christoph Genzel</p> <p>Exploiting the features of energy-dispersive diffraction for depth-resolved residual stress analysis: From lab to synchrotron and back</p>	Processing & Welding Chair: Ke An	<p>Mark Newby</p> <p>Neutron Diffraction Evaluation of Residual Stress in Friction Welded Thick Walled Power Industry Components</p>
10:20 - 10:40		<p>Marais D.</p> <p>Alignment and calibration procedures of the Necsra neutron strain scanner</p>		<p>Doubell P.</p> <p>Neutron diffraction investigation of residual stresses in Nickel based austenitic weldments on creep resistant Cr-Mo-V material</p>
10:40 - 11:00		<p>*Ramadhan R.S.</p> <p>Neutron Transmission Strain Measurements on IMAT: Residual Strain Mapping in an AISiCp Metal Matrix Composite</p>		<p>Kiefer D.</p> <p>Fast temporal and spatial resolved stress analysis at laser surface line hardening of steel AISI 4140</p>
11:00 - 11:25	Coffee break			
11:25 - 11:55	Surface Modification and Coating Chair: Krzysztof Wierzbanski	<p>Vladimir Luzin</p> <p>Neutron through thickness stress measurements in two-phase coatings with high spatial resolution</p>	Deformation & Modelling Chair: Michael Fitzpatrick	<p>Xun-Li Wang</p> <p>Kinetics of twin boundary motion in ferromagnetic shape memory alloys</p>
11:55 - 12:15		<p>Coratella S.</p> <p>Synchrotron X-ray 2D Residual Stress Map in different Laser Shock Peened Edges</p>		<p>*Edward A.B.</p> <p>Calibration of Numerical Model for Shot Peening Simulation: Strain hardening measurement approach</p>
12:15 - 12:35		<p>Venter A.M.</p> <p>The influence of erosion wear on the residual stresses in WC-based alloy coatings</p>		<p>Kisi E.</p> <p>Force blocking by a shear defect in a 2-D granular system</p>
12:35 - 12:55		<p>*Ivanovic N.</p> <p>Effectiveness of Laser Shock Peening in Post processing Additive Manufactured Ti-6Al-4V</p>		<p>Fatoba O.S.</p> <p>Investigating stresses developed during mechanical forming of steel through Finite Element Analysis</p>
12:55 - 14:30	Lunch			
14:30 - 15:00	Microstructure & characterisation Chair: Ondrej Muransky	<p>Michael Preuss</p> <p>Synchrotron X-ray techniques for understanding Zirconium fuel cladding degradation</p>	Surface Modification and Coating Chair: Sven Vogel	<p>Kristina Langer</p> <p>The role of residual stress measurements in US Air Force aircraft sustainment programs</p>
15:00 - 15:20		<p>Brown D.W.</p> <p>Grain scale microstructure evolution characterization of ceramic nuclear fuels</p>		<p>Fatoba O.S.</p> <p>Numerical modelling and performance effects of laser deposited Ti-Al-Sn coating on ASTM A29 steel</p>
15:20 - 15:40		<p>Ruiz-Hervias J.</p> <p>Residual stress and diffraction line-broadening analysis of Al₂O₃/Y-TZP ceramic composites by neutron diffraction</p>		<p>*Ntsoane T.P.</p> <p>Depth-resolved strain investigation of plasma sprayed hydroxyapatite coatings exposed to simulated body fluid</p>
15:40 - 16:00		<p>Takajo S.</p> <p>In-situ Investigation of Microstructure Evolution during Annealing in Ti-6Al4V Alloy Produced by Additive Manufacturing</p>		<p>*Van Staden S.N.</p> <p>Effect of Varying Laser Shock Peening Parameters on Residual Stresses in Different Thicknesses of Aluminium Alloy Samples</p>
16:00 - 16:20				<p>*Eisensmith D.</p> <p>Preliminary Investigation of Part Refurbishment Using Laser Shock Peening</p>
16:20 - 16:45	Coffee			
16:45 - 17:00	Loading for bush drive			
17:00 -	Bush drive and Gala dinner			

Thursday 21 September

		Room: Ndlopfu	Room: Nda/Nari
09:00 - 09:45	Chair: Don Brown	Cev Noyan Keynote: Saint Venant's Principle and Effect of Complex Geometries in X-ray and Neutron Strain Analysis	
09:50 - 10:20	Deformation & Modelling Chair: Shu Yan Zhang	Michael Gharghoury In-Situ Neutron Diffraction Study of the Effect of Biaxial Stress on the Deformation of Zircaloy-4	Kenji Suzuki Diffraction plane dependence of micro residual strain by plastic deformation
10:20 - 10:40		*Naeem M. In-situ neutron diffraction deformation behavior of CrMnFeCoNi high-entropy alloy at low temperature	Sano M. Dislocation Density of Oxygen Free Copper with Compressive Strain applied at High Temperature
10:40 - 11:00		*Reid A. Qualitative Mapping of Axial Plastic Strain for a Roller Bearing undergoing Overloads using Bragg Edge Parameter Fitting	*Vhareta M. Residual stress measurements in leached polycrystalline diamond using X-ray diffraction and Raman spectroscopy techniques
11:00 - 11:25 Coffee break			
11:25 - 11:55	3D/4D characterisation Chair: Christoph Genzel	Daigo Setoyama Microstructural analysis of cold-reduced carbon steel by scanning 3DXRD microscopy and crystal plasticity finite element analysis	Hahn Choo The relationship between processing parameters and defect characteristics in a 3-D printed stainless steel alloy: A Synchrotron X-ray Tomography Study
11:55 - 12:15		Coules H. Three-dimensional full-tensor mapping of a residual stress field produced by high-pressure rolling	Vollert F. Effect of residual stress relaxation during sample preparation on the detectability of hot crack networks in LTT welds by means of μ CT
12:15 - 12:35		Vogel S.C. In situ Diagnostics of Melting/Solidification and Segregation during Crystal Growth by Energy-resolved and Conventional Neutron Imaging	Strantzla M. In-situ and quasi in-situ investigation of microstructure evolution of single and multiple additively manufactured SS 308 layers
12:40 - 12:50 12:50 - 13:15	Chair: Andrew Venter	Tom Holden Manuscript discussions Prize giving & Closing Don Brown	
13:15 - 14:45 Lunch			