

Pan-African School of Materials (PASMAT)

A collaboration between AUST-Abuja and RISE-AMSEN#*

Abuja, Nigeria

September 5-17, 2011

The Pan-African School of Materials (PASMAT) will introduce selected African postgraduate students to phase diagrams and advanced concepts in the fatigue and fracture of materials. The two-week school will be held at the African University of Science and Technology in Abuja (AUST-Abuja). The first week will focus on fatigue and fracture. This will be taught by Prof. Wole Soboyejo (Princeton and AUST). The second week will present basic materials concepts required for the calculation of phase diagrams, as well as examples of the applications of phase diagrams in materials science and engineering. This will be taught by Prof. Lesley Cornish (Witwatersrand and AMSEN). The courses are open to postgraduate students who are currently engaged in materials-related masters and doctorate programs in science and engineering.

Interested students should send a CV and a one-page description of their thesis research to Ms. Tracey Odigie at tracey@aust.edu.ng by August 22, 2011.

Tentative Program

Monday 5 September

Afternoon/evening Arrival in Abuja

Tuesday 6 September

Morning Welcome breakfast

Morning *Introduction to Mechanical Properties*

Afternoon *Mechanisms of Fracture*

Wednesday 7 September

Morning *Fundamentals of Linear Elastic Fracture Mechanics*

Afternoon *Fundamentals of Elastic-Plastic Fracture Mechanics*

Thursday 8 September

Morning *Toughening Mechanisms*

Afternoon *Introduction to Fatigue*

Friday 9 September

Morning *Fracture Mechanics and Fatigue*

Afternoon *Environmentally-Assisted Fatigue*

Saturday 10 September

Morning *Creep and Creep-Fatigue Interactions*

Afternoon *Failure Analysis and Practical Scanning Electron Microscopy Session at SHESTCO*

Sunday 11 September

Morning Overview of course
tbd Optional campus and Abuja tours

Monday 12 September

Morning *Introduction to Phases, and Applications of Phase Diagrams*
Afternoon *Simple Binary Phase Diagrams*

Tuesday 13 September

Morning *Introduction to the Interpretation of Microstructures*
Afternoon *Relating Microstructures to Phase Diagrams*

Wednesday 14 September

Morning *More Complex Binary Phase Diagrams*
Afternoon *Application of Binary Phase Diagrams to the Real World*

Thursday 15 September

Morning *Introduction to Ternary and Higher Order Phase Diagrams*
Afternoon *Examples of Ternary and Higher Order Phase Diagrams*

Friday 16 September

Morning *Applications of Ternary and Higher Order Phase Diagrams*
Afternoon *Interpretation of Higher Order Microstructures*

Saturday 17 September

Morning Overview of course
Afternoon Closing reception and departure from Abuja

Instructors

Week 1 (6-11 September)

Wole Soboyejo

Vice President - Academic, Research and Innovation, and Professor, Department of Materials Science and Engineering, AUST-Abuja

Professor of Mechanical and Aerospace Engineering and the Princeton Institute for the Science and Technology of Materials (PRISM), Princeton University

Week 2 (12-17 September)

Lesley Cornish

Director, DST/NRF Centre of Excellence in Strong Materials, and Professor, School of Chemical and Metallurgical Engineering, University of the Witwatersrand

Director, African Materials Science and Engineering Network (RISE-AMSEN)

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* African University of Science & Technology, Abuja, Nigeria, <http://aust.edu.ng/>

#Regional Initiative in Science and Education: African Materials Science and Engineering Network, <http://siq.ias.edu/rise/amsen>