

Extended Sessions and Informal Tutorial Descriptions

Hands-On Research in Complex Systems Advanced Study Institute
University of Buea, 2-12 August 2010

Extensions of Hands-On Sessions:

Coupled Oscillators: (Sen) Do it again and again with coupled oscillators.

Time series analysis of worm locomotion data: (Schoetz) Expand your skills from the Hands-On session by writing your own Matlab code for image recognition and tracking.

Time Delayed Electro-Optic Feedback System: (Roy) Come back for more chaos.

Chemical Patterns: (Tinsley) Get more in sync with chemical patterns.

Extended session on Turbulence (Schatz)

Extended session on Communicable Diseases (Ngonghala)

Extended session on Encryption (Patterson)

Extended introduction to Matlab: (Hunt, Boy)

General Topics:

Scientific Writing workshop: (Swinney) Do you have a half-written manuscript, or do you want to start one? Discuss techniques for good scientific writing.

Scientific Oral Presentation workshop: (Swinney) Give a 4 minute long presentation to a small group and get feedback. Discuss what makes a good oral presentation.

How to make a good scientific poster: (Schoetz) Learn what it takes to make a well-presented scientific poster. We will design a poster in the group in the form of an on site tutorial and distribute handouts that will help you design your posters in the future.

Introduction to LaTeX (Rodenborn). Prepare manuscripts for journals using LaTeX.

Grant Opportunities in Africa (Patterson)

Current events in Science: (Schowalter) Discuss current events in science. What's hot in soft condensed matter, high energy physics, biology, chemistry, quantum cryptography.

Modeling:

Solving Simple PDEs: (Boy) Learn to solve partial-differential equations using Matlab.

Modeling Design Discussion: (Shattuck) Get feedback on your current and future modeling efforts and discuss how to design and implement a good model or simulation.

Numerical simulations of nonlinear systems using xppaut: (Sethia) **xppaut** can be used for a variety of nonlinear problems. Learn to use it to simulate nonlinear electronic circuits.

Hardware:

Electronic Digital design for \$99: (Shattuck) From counters to cpus, learn to build any digital circuit using the Nexys2 FPGA and the vhdl programming language.

Experimental Design Discussion: (Shattuck) Get feedback on your current and future experiments and discuss how to design a Good Experiment.

Dynamic measurements with strain gages and accelerometers: (Goldman) Learn all you need-to-know about strain gauges and accelerometers.

Data Analysis:

Particle tracking: (Shattuck) Write your object tracking code in Matlab.

Education:

Teaching Freshmen to Solve Science Problems Using a Computer: (Schatz) Learn the basics of VPython, including many instructional tips.

Peer Instruction: Interactive Engagement in the Classroom: (Schatz)

Hands-On tutorials on lecture demonstration: (Chieze Ibeneche) Experiment with three inexpensive demonstrations that nicely illustrate physical principles and are easy to set up at home. We will choose a few participants to perform the demos at the last afternoon's Demonstration Session.

Low Reynolds number Demonstrations: (Talbot) Learn the science behind low Reynolds number flow and prepare to perform a demonstration at the last afternoon's Demonstration Session.