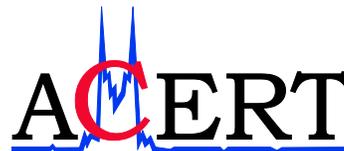# The 2018 ACERT Hands-On Tutorial Workshop on Denoising ESR Signals Via Wavelets

Cornell University

July 30-31, 2018
Cornell University
Ithaca, NY

ACERT

ACERT is pleased to announce a hands-on workshop on a set of revolutionary new methods for denoising experimental signals in ESR and related ESR techniques. These methods use signal processing based on wavelets rather than Fourier transforms or signal averaging; and they promise to be game-changing: we have been able to reduce data acquisition times for ESR experiments by one to two orders of magnitude, without a corresponding loss of sensitivity.

To help disseminate these methods to the ESR community, we will be conducting a hands-on workshop on July 30-31 on the Cornell University campus, ACERT's home.

Features:

Day One:

- Interactive Lectures on the Theory of Wavelet-Based Denoising and the Algorithms Developed for It

- Talks on Applications to Several Biophysical Methods (cw-ESR, DEER, ENDOR)

    Includes Specific Case Studies by ACERT Collaborators

    Real-Life Examples of How Researchers Apply the Methods

    to Address Their Experimental Needs

Day Two:

- "**B**ring **Y**our **O**wn **D**ataset" **TUTORIAL WORKSHOP**

    How to use our code on your own real-life datasets

Description of Workshop:

Day One has interactive lectures on the theory and practice of wavelet denoising. It begins with a talk on the principles of wavelet transforms, and how they differ from Fourier transforms. This will be followed by talks describing the denoising algorithms developed at ACERT, so that workshop participants will understand their theoretical basis and how they provide major improvements over signal-averaging. These talks are interactive: participants are encouraged to interrupt the speakers with requests for clarification.

The second half of Day One is another series of interactive talks, first about how the denoising methods are applied to various biophysical methods—cw-ESR, DEER, and ENDOR—followed by a series of case study talks by several ACERT collaborators. These researchers will provide "real-life" discussions of how they worked through the process: how they were able to follow through on applying the denoising methods, and what they were able to accomplish regarding their own research needs that they had not been able to accomplish earlier.

Day Two is the hands-on day. During the morning session, participants will work through how to denoise sample datasets that we will provide—datasets generated by cw-ESR, DEER, ENDOR, and ESRI. The new software will be provided. ACERT staff will provide assistance on the user interface to the algorithms. During the afternoon session, participants will then be encouraged to process a dataset that they bring with them. Hence, the "BYOD" subtitle for the workshop. In

addition, participants will have the opportunity to see denoising during real-time data acquisition, by visiting our spectrometer facilities.

Registration:

REGULAR: US$ 500.00
STUDENT: US$ 300.00

Registration includes breakfast/lunch/coffee breaks both days, dinner Monday

To encourage beginning researchers, we will be making available lower-cost on-campus housing in townhouse dorms for graduate students and postdoctoral students.

Lodging and payment details currently being finalized.