

Special Issue on  
**Fluctuations Enhanced Sensing**

# CALL FOR PAPERS

Fluctuation-Enhanced Sensing (FES) is an exciting and relatively new research field that promises to extend the range of information that can be extracted from a single sensor. In FES the stochastic fluctuations of the sensor signal, rather than its average value, are recorded and analyzed. Since components of such fluctuations are bound to be strongly correlated with the sensing mechanism at a microscopic level, proper analysis expands the amount of information to be extracted. Documented achievements are increased selectivity, sensitivity, and range of detectable agents.

Sensor interfaces and instrumentation in a FES system have to be specifically designed to extract and amplify the low frequency stochastic signal components, which are usually orders of magnitude weaker than the sensor signal. Then, selected statistical properties of the amplified noise are analyzed in order to generate a corresponding pattern as a "stochastic fingerprint" of the sensed agent. The power spectral density of the noise signal is often used as an output pattern, but FES has proved effective with higher-order statistics and other more advanced methods as well.

Many open questions must be addressed before FES can become a commercial technique. Such issues include the design of highly sensitive instrumentation and the most effective data analysis, the development of accurate physical models for the interpretation of the stochastic data depending on the sensor structure and sensing mechanisms, the selection of improved materials, and sensing configuration for maximizing sensitivity and selectivity.

With these aspects in mind, the purpose of this special issue is to solicit and select contributions that can form a comprehensive display of the state of the art in this field. Discussions can include critical comments and new approaches for the advancement of the FES approach as a whole as well as comparison with other advanced sensing techniques. Specific subfields, such as instrumentation, statistical theory, and sensor modeling (physical and chemical) new concepts are all welcome. Submissions about new experimental results and review articles describing the state of the art are also encouraged.

Potential topics include but are not limited to the following:

- ▶ Low noise instrumentation for FES
- ▶ New materials and structures for FES
- ▶ FES for gas and odor sensing
- ▶ Noise and fluctuations in physical, biological, and chemical sensors
- ▶ Magnetic sensing
- ▶ Quartz crystal microbalance as applied to sensors
- ▶ Models and algorithms for FES data analysis
- ▶ Sampling and hold FES
- ▶ Studies on temperature dependent measurements taken by FES sensors
- ▶ Reproducibility, memory, hysteresis of FES sensors
- ▶ FES with commercial sensors

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/js/lfnm/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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