

Special Issue on  
**Advances in Nonlinear Filtering and Sensor Data Fusion  
with Applications**

# CALL FOR PAPERS

Tracking, positioning, and navigation are relevant and ubiquitous problems which are of central interest with broad applications including both military and commercial realms. The ever-increasing proliferation of smartphones, mobile robots, and unmanned vehicles has largely increased the attention toward such problems. The inference problem under linear and Gaussian state-space models has been well studied following the foundational work of R. E. Kalman. However, the nonlinear stochastic process in general admits no closed-form solution but approximations; hence, suboptimal estimation must be performed of which the best known is approximate Bayesian filters. The approximation can be parametric, nonparametric, or a combination of both. In the parametric case, the posterior is represented by a family of functions that are fully characterized by certain parameters such as a variety of Gaussian or Gaussian sum filters. In the nonparametric case, the posterior can be approximated with Monte Carlo methods (e.g., particle filters), grid-based approaches, etc. However, multiobject multimodal posterior, system constraints, unknown input, distributed/parallel implementation, and imperfect sensors (false alarms, missed detection, etc.) remain great challenges to nonlinear filters and constitute highly active research topics in the field.

Meanwhile, the rapid development of the advanced sensors and their joint application (e.g., large scale wireless sensor networks (WSNs)) provide a foundation for new paradigms to address the challenges that arise in harsh environments with limited prior information. As a consequence, the signal processing community has showed gradual interest in novel data fusion/mining methods such as clustering, fitting, and learning, to incorporate statistical filtering techniques for substantial performance enhancement.

This special issue aims to solicit and disseminate recent advances on the new development in theory, algorithm, and protocols for nonlinear filtering and sensor data fusion techniques/approaches for tracking, positioning, and navigation. Both review articles and original contributions are welcomed.

Potential topics include but are not limited to the following:

- ▶ Parametric/nonparametric (approximate) Bayesian filters/smoothers
- ▶ Learning for state-space models, parameter estimation
- ▶ Indoor localization/positioning/fingerprinting
- ▶ Mobile robot/unmanned vehicle-based positioning and navigation
- ▶ Multiple/maneuvering/passive target detection/tracking, target trajectory estimation
- ▶ Distributed/WSN-based tracking/localization
- ▶ Multisource sensor data fusion
- ▶ Tracking/localization/navigation based applications and services

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/jece/signal.processing/nfsf/>.

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

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