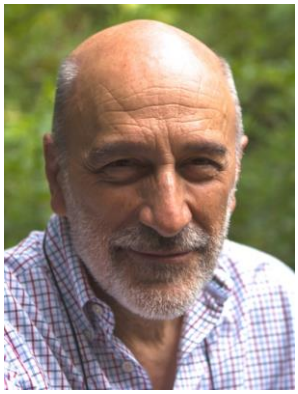
**Invited talk: Multivariate Measures of Statistical Dependence**

***Jose C. Principe, Ph.D.***
Distinguished Professor and Eckis Chair of Electrical Engineering
University of Florida

Statistical dependence is not univocally defined in probability theory. Currently we only have scalar measured of statistical dependence (correlation or mutual information). Since our interest now is on large dimensional spaces and huge parametric models, the current definitions have limitations. This talk will introduce a novel multivariate measure of statistical dependence that can be directly estimated from realizations of random processes. We will present the theory briefly and will discuss the functional maximum correlation algorithm to construct the optimal feature space for feature discovery directly from samples. We will also present several comparisons with state of the art algorithms.



Jose C. Principe (M'83-SM'90-F'00) is a Distinguished Professor of Electrical and Computer Engineering and Biomedical Engineering at the University of Florida where he teaches statistical signal processing, machine learning and brain computer interfaces modeling. He is Eckis Endowed Professor and the Founder and Director of the University of Florida Computational NeuroEngineering Laboratory (CNEL) www.cnel.ufl.edu. His primary area of interest is time series analysis in functional spaces, information theoretic learning and AI cognitive architectures.

Dr. Principe is an IEEE, AAAS, IABME, AIMBE and NAI Fellow. He was awarded the IEEE Neural Network Pioneer Award from the Computational intelligence Society, the IEEE Shannon-Nyquist Technical Achievement Award from the Signal Processing Society, the EMBS Career Achievement Award, and the Teacher Scholar of the Year from the U. of Florida. He was the past Chair of the Technical Committee on Neural Networks of the IEEE Signal Processing Society, Past-President of the International Neural Network Society, and Past-Editor in Chief of the IEEE Transactions on Biomedical Engineering. Dr. Principe has more than 1,000 publications and an H index of 100 (Google Scholar). He directed 108 Ph.D. dissertations and 65 Master theses. He wrote in 2000 an interactive electronic book entitled "Neural and Adaptive Systems" published by John Wiley and Sons and more recently co-authored several books on "Brain Machine Interface Engineering" Morgan and Claypool, "Information Theoretic Learning", Springer, and "Kernel Adaptive Filtering", Wiley, Correntropy Kalman Filtering, Cambridge Press.

**Invited talk: Responsible Adaptation of Large Generative AI Models for Domain Specific Learning**

***Ling Liu***
School of Computer Science
Georgia Institute of Technology

The human-like generative ability of LLMs has ushered in a new era of foundational models and generative AI (genAI), unlocking new possibilities and driving cross-domain innovations. However, the transformative potential of these genAI models is hindered by significant accessibility challenges: (i) Powered by over-parameterization, LLMs are requiring hundreds of GBs of GPU memory for learning and inference, hence facing deployment challenges on heterogeneous platforms and on learning for downstream tasks with proprietary data, making *equitable accessibility of genAI* for all a grand challenge. (ii) Large genAI models trained on massive public domain data may introduce problematic hallucinations, which can lead to misinformation and biased outcomes in mission-critical applications, making *responsible adaptation of genAI* models another grand challenge.

This keynote will present a responsible and resource efficient framework for adapting genAI to domain-specific learning, aiming to tackle the above mentioned two accessibility challenges. I will first review the pros and cons of existing augmentation generation techniques for mitigating hallucination-induced misinformation and inaccuracies and introduce the multi-genAI-agent collaboration framework for responsible deployment of genAI in mission critical applications. Next, I will describe scalable and resource-efficient federated finetuning framework and optimizations for learning downstream tasks on *proprietary* or *privacy-sensitive* datasets with a population of heterogeneous clients.

Ling Liu is a Professor in the School of Computer Science at Georgia Institute of Technology. She directs the research programs in the Distributed Data Intensive Systems Lab (DiSL), examining various aspects of Internet-scale big data powered artificial intelligence (AI) systems, algorithms and analytics, including performance, reliability, privacy, security and trust. Prof. Liu is an elected IEEE Fellow, a recipient of IEEE Computer Society Technical Achievement Award (2012), and a recipient of the best paper award from numerous top venues, including IEEE ICDCS, WWW, ACM/IEEE CCGrid, IEEE Cloud, IEEE ICWS. Prof. Liu served on editorial board of over a dozen international journals, including the editor in chief of IEEE Transactions on Service Computing (2013-2016), and the editor in chief of ACM Transactions on Internet Computing (since 2019). Prof. Liu is a frequent keynote speaker in top-tier venues in Big Data, AI and ML systems and applications, Cloud Computing, Privacy,

Security and Trust. Her current research is primarily supported by USA National Science Foundation under CISE programs, CISCO and IBM.