

# IEEE Miami Section Seminar Announcement

## *"A Framework for Spectral Clustering of Edges in Digraphs"*

Thursday, April 25, 2024 | 5:00 PM to 6:00 PM EST

Location: EC 3930, 10555 W Flagler St, Miami, FL 33174

Zoom - Meeting ID: 896 2891 4109 | Passcode: QijU69



Dr. Kamal Premaratna,  
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**Abstract:** How do vertices and edges collaboratively exert influence in graphs? We develop a framework for edge spectral clustering that reveals how edges accomplish directed influence in directed graphs. In contrast to the ubiquitous vertex clustering which groups vertices, edge clustering groups edges by assigning edges that share a functional affinity to the same cluster thus forming an influence subgraph cluster. With a complexity comparable to that of vertex clustering, this framework presents three different methods for edge spectral clustering that reveal important influence subgraphs in graph data, with each method providing different insight into directed influence processes. Central to the edge clustering methods are three new graph Flow Laplacians that capture different directed flow processes and could potentially open new avenues in graph analysis and learning. Several diverse examples demonstrate the potential for widespread application of edge spectral clustering in exploratory data analysis.

**Speaker Bio:** Dr. Kamal Premaratne received his B.Sc. degree in Electronics and Telecommunication Engineering (1982) with First-Class Honors from University of Moratuwa, Moratuwa, Sri Lanka. He obtained his M.S. (1984) and Ph.D. (1988) degrees, both in Electrical and Computer Engineering and under the supervision of Professor Eliahu I. Jury, from the University of Miami, where he is presently a Professor. His research interests include uncertainty modeling, knowledge discovery from imperfect data, consensus dynamics in social networks, and network science and graph theory. Dr. Premaratne is a Fellow of IET (formerly IEE). He has received the Mather Premium (1992-1993) and the Heaviside Premium (1999-2000) from the Institution of Electrical Engineers (IEE), London, U.K., and the Eliahu I. Jury Excellence in Research Award (1991, 1994, 2001) and the Johnson A. Edosomwan Researcher of the Year Award (2014) from the College of Engineering, University of Miami. He has served as an Associate Editor of the IEEE TRANSACTIONS ON SIGNAL PROCESSING (1994–1996) and the Journal of the Franklin Institute (1993–2005).

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