ELECTRICAL AND COMPUTER ENGINEERING
UNIVERSITY OF MIAMI COLLEGE OF ENGINEERING

Florida Inventors Hall of Fame Committee
3702 Spectrum Boulevard, Suite 165
Tampa, Florida, 33612-9444

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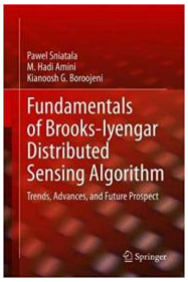
Dear Committee Members,

I am delighted to write this letter of nomination for Dr. S.S. Iyengar – Florida International University Distinguished University Professor, Director and Ryder Professor in the School of Computing and Information Sciences – for 2019 induction to the Florida Inventors Hall of Fame. Over a four-decade career, Dr. Iyengar has pioneered innovative technologies, which have positively impacted economic activities and intellectual enterprise within the State of Florida, the Nation, and around the world via the commercialization and dissemination of his popular research contributions.

Major Impact: Dr. Iyengar is co-inventor of the Brooks-Iyengar Hybrid Distributed Fusion Algorithm (B-I Algorithm) which, for the first time, unified the disparate fields of sensor fusion and Byzantine fault tolerance. According to Wikipedia – "*Brooks Iyengar algorithm was developed in 1996 has proved to be a defining paradigm for his research which has won major awards and has a global impact for generations to come. A case in point is a Test of Time research award was given to Dr. Iyengar in Atlanta recently (**2019**) and is considered to be a benchmark for technology transition in the field of application. This considered to be highest research award by **IEEE Congress on Cybermatics** in recognition to BI research and its impact **on billions of computer and internet users around the world**. For this major contribution and for others he is been well recognized for his scientific achievement by fellow of many professional organization such as IEEE, ACM, American association of advancement of science*." [Source: https://en.wikipedia.org/wiki/Sundaraja_Sitharama_Iyengar]



For his scientific discoveries, Dr. Iyengar has already been recognized with prestigious honors and awards, including the **Lifetime Achievement Award at the International Society of Agile Manufacturing**. He has been recognized by scientific societies and is a **Fellow of the National Academy of Inventors**, the IEEE, the ACM, the American Association of the Advancement of Science, the Society of Design and Process Program (SPDS), and the American Institute of Biological and Medical Engineering, among others. He received awards from **Florida Technology to Industry**, **the IBM Distinguished Faculty Award**, and is a **member of the European Academy of Science**.

Professor S. S. Iyengar's innovative contributions in the context of information processing of sensor technology, sensor design and data fusion software development are unique. His work continues to impact millions of users far beyond the State of Florida. His scientific discoveries are applied in software in major industries and educational materials across North America, Europe, and Asia. As a Founding Director of Discovery Lab (in Miami), his innovative work led to creation of the Telebot—a telepresence robot for assisting injured law enforcement officers – ranked second in Mashable's listing of *"14 innovations that improved the world in 2014"*, which garnered over 400 world-wide media articles and interviews for radio, television and print, and led to **US Patent 2018/ US9934613B2**, issued in March 2018, for ***Systems and Methods for Augmented Reality Interaction*.**

AISTAR—an AI driven intelligent integrated system now earmarked for IBM's Cognitive Event Automation for IBM Services. His work on this collaborative computer cognition and services invention has had major impact on IBM, resulting in one of the company's major monetary inflows from managed services and support over a highly diverse landscape of large data sets. When working in these challenging environments, encounters with issues and incidents are common. Dr. Iyengar's seminal work has enabled IBM to effectively and efficiently manage such unstructured incidents through innovative algorithms applied in incident management as part of IBM's IT Services Management Division. His work is enabling IBM to restore normal operations and resolve issues affecting business services within strict service-level agreement parameters despite the growing complexity and urgent demands for solutions. He has met this challenge through dynamic automation solutions driven by artificial intelligence (AI). Specifically, he was able to create an algorithm to automatically solve many of the problems faced by IBM, such as ***translation and impact to real-time applications*.** In

this dynamic environment it was necessary to properly solve the well-known cold-start problem and adaptively optimize recommending strategies of enterprise automation using interactive feedback in IT Automation Services. Dr. Iyengar's innovative solution for IBM required no explicit hierarchical information and no contextual information of the incident ticket in the ITAS system. ***The result was AISTAR—an AI driven intelligent integrated system now earmarked for IBM's Cognitive Event Automation for IBM Services***.

In addition to his work with IBM, Dr. Iyengar's other seminal works have positively affected the lives of a great number of Floridians. I have selected a few to highlight:

1. **Dr. Iyengar is co-inventor of the Cognitive Information Processing (CIM) Shell**, an architecture and engine which recognizes and responds to complex patterns in mission-critical, real-time applications. The CIM fuses disparate data streams (text and video) to create interactive inspection and visualization abilities with broad applications in the manufacturing, agricultural and petroleum spaces. **His patent (8572290 B1) with co-inventor Dr. S. Mukhopadhyay (LSU) as a "System and Architecture for Robust Management of Resources in a Wide-Area Network" has significant commercial impact**. His idea with Dr. Mukhyopadyay has reached the semifinals of a competition of $5Million as a part of the IBM Watson AI prize.

   Impact: CIM Shell technology laid the foundation for deployed technologies with markets into the billions of dollars. SpotCheck Tech's Online Diagnosis of Manufacturing Machines, licensed by Auto Predictive Coding, used by Novatec, ProphecySensorLytics had a Total Addressable Market (TAM) of $9.1B in 2014, expected to be over 24.7B by 2019 (ABIresearch); (2) DeepSAT Video Analytics/Image with TAM over $41B, is currently used by NASA Ames to provide decision support.

2. Dr. Iyengar has designed technology related software for ***optimal sensor placement techniques*** that ensure coverage and protection to a set of locations in real-time applications across a wide spectrum of industries.

   Impact: This work laid an intellectual foundation for new design policies and techniques in surveillance and telecommunications. This work spawned innovations by companies such as Motorola, TelCordia, and Boeing. New industrial and government applications are ongoing, saving millions of dollars annually.

3. **Dr. Iyengar was awarded US Patent (US 9576359 B2—*context-based algorithmic framework for identifying and classifying embedded images of follicle units*)**, which enables counting the number of hair follicle groups and number of follicles within each group based upon a microscopic image of a sample from a human scalp. Iyengar's algorithm is used to cluster the follicles and generate a neighboring connected graph to calculate the inter-object distances. Clinicians can generate a report providing information regarding density, placement, and percentage of hair follicle types and use the report to generate a hair follicle transplant strategy. The method is being used by the Hair Transplant Institute of Miami through co-inventor, Dr. Bernard Nusbaum.

Aside from his scientific and industrial work, Iyengar has played a key role in fostering the development of benchmark computer science programs in Florida and across the United States. He published more than 600 research papers, many of which have been foundational for countless patents, and authored, co-authored or edited 22 books. His h-index is 62 and has close to 20,000 citations.

In short, his work has impacted many federal agencies, including the National Science Foundation, where His work has been featured on the cover of the ***National Science Foundation's Breakthrough Technologies*** in both 2014 and again in 2016. Many industries around the world have benefitted by his discoveries and inventions. Dr. Iyengar's information including his full biography can be found at http://people.cis.fiu.edu/iyengar/ .

I strongly support Dr. S.S. Iyengar for selection as one of the talented 2021 inductees into the Inventors Hall of Fame.

Mei-Ling Shyu, Ph.D.
IEEE Technical Achievement Award Winner; Professor and Associate Chairman