**2023 IWSHM Special Session Request Form**

**Dear Organizers, please follow the following template to create a Special Session outline:**

Special Session Title**: “Distributed and Quasi-distributed Fiber-optic and Electrical Sensors, and Associated Data Analysis and Management”**

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**Key words: Distributed fiber optic sensors; Sensing skins, sheets, and paints; Self-sensing materials; Dense arrays of active wave-propagation sensors; MEMS; Distributed/decentralized data analysis; Wireless nodes for dense arrays of sensors; Power harvesting for dense arrays of sensors**

**Scope of Session**

Damage frequently occurs in form of strain-field anomalies. Strain-sensitive sensors installed at location of damage have unusually high change in their output signal and thus, can detect the damage reliably. However, it is difficult to know the exact location of damage prior to its occurrence. To address this challenge, very dense arrays of sensors could be used. Their “omnipresence” on the structure and their high sensitivity to damage, makes them very promising for reliable and accurate detection, localization, and quantification of damage. Several innovative techniques for enabling distributed and quasi-distributed arrays of sensors emerged in the last decade or so: (i) 1D distributed fiber optic sensors, (ii) 2D distributed sensing skins, paints, and sheets based on nano-technologies, large-area electronics, photonic crystals (nanospheres), conductive polymers, etc., and (iii) 2D and 3D active wave sensing techniques, embedded MEMS, and self-sensing materials. The aims of this special session are (1) to assess the state of the art of the techniques enabling dense arrays of sensors, (2) to identify challenges related to their applicability in real-life settings and (3) to cross-fertilize the research field through an exchange of ideas. In a broader sense, the topic of the session includes data management and power harvesting techniques that can address the challenges related to execution, processing and analysis of large number of measurements performed by very dense arrays of sensors.