One Week Hands-on Course on

Modeling and Measurements of Musical Instruments

9th to 13th December, 2019

<u>Venue</u>: Classroom 23, Computer room 24, IIT Dharwad.

Indian Institute of Technology Dharwad, (IIT Dharwad)

Near to High Court Bench, Belur industrial area, Dharwad KA, 580011, INDIA.

This one-week course will focus on methods for discrete-time modeling and sound synthesis of musical acoustic systems, as well as common techniques for measuring the characteristics of musical instruments. The course will be oriented toward students with an existing background in digital signal processing (DSP). The initial emphasis will be on signal processing methods for efficient synthesis of simple string and wind instruments. Topics covered will include the use of delay lines to simulate wave propagation and digital waveguide techniques to properly account for associated discontinuities or boundary conditions. Measurement techniques to be covered will include approaches to determine admittances or impedances of string and wind instrument bodies, as well as experimental modal analysis and other imaging techniques to visualize the vibrations of systems.

9th December, 2019

- Invited Talks by Prof. G. Scavone, Prof. X. Serra, Prof. Preeti Rao, and Prof. Hema Murthy
- Panel Discussion anchored by Dr. Ajay Srinivasamurthy
- Musical Concert

Panel Members:

- Prof. Preeti Rao, , Dept. of Electrical Engineering, IIT Bombay, India
- Prof. Gary Scavone, Schulich School of Music, McGill University, Canada
- Prof. Xavier Serra, Music Technology Group, Universitat Pompeu Fabra, Barcelona, Spain
- Prof. Hema A Murthy, Dept. of Computer Science and Engineering, IIT Madras, India

Course (10th to 13th December) Content:

- Acoustic Modeling and Acoustic Wave Simulation
- String Instruments: Digital waveguide modeling, Karplus-Strong
- String Instruments: Commuted synthesis, piano hammer
- Wind Instruments: Pipe impulse response
- Measurements: Vibrational/acoustic measurement techniques

Resource Persons:

- Prof. Gary Scavone, Schulich School of Music, McGill University, Canada
- Prof. SRM Prasanna, Dept. of Electrical Engineering, IIT Dharwad, India

Course Coordinators:

- Prof. Dhiraj V. Patil, Dept. of Mechanical Engineering, IIT Dharwad, India
- Dr. Ajay Srinivasamurthy, Applied Scientist at Amazon.com, Bangalore, India

Registrations:

- Expected Participants: 3rd/4th year undergraduates in Engg. and Music Technology, ME/MTech/MS, Research scholars, Industrial persons.
- Participants are desired to have a strong background (3+ years of undergraduate curriculum) in two or more of the following: signal processing, programming, artificial intelligence/machine learning, music. Research scholars and musicians with an interest in technology are welcome.
- Please fill out the pre-registration form, if interested. (Limited seats). We will get back to you with further instructions by October 31, 2019.
- Participants need to arrange for their accommodation.

Pre-registration Form: https://forms.gle/S89psKShF47zRqJy7

For any questions, please contact the course coordinators:
- Prof. Dhiraj V. Patil (dhiraj@iitdh.ac.in)
- Dr. Ajay Srinivasamurthy (ajays.murthy@iitdh.ac.in)