



## **Deep Learning Program Opening Workshop August 12-16, 2019**

### **SPEAKER TITLES/ABSTRACTS**

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“Group-equivariant Representation by Jointly Decomposed Convolution”

Explicit encoding of group actions in data representation is desired for convolutional neural networks (CNNs) to successfully handle global deformations in input signals. In this talk, we introduce group-equivariant deep CNNs where the convolutional filters are jointly decomposed over steerable bases on the space and the group geometry simultaneously. This decomposition significantly reduces the model size and computational complexity while preserving network performance, and it also serves to regularize the convolutional filters by the truncation of bases expansion. The stability of the equivariant representation with respect to input variations is proved theoretically and also demonstrated on computer vision tasks where the datasets involve in-plane and out-of-plane object rotations. The work provides a general approach to achieve group equivariant features in deep CNNs with representation stability and computational efficiency.