



CiRA OPEN SEMINAR SERIES FROM PIXELS TO PRINCIPLES: DEVELOPING APPROPRIATE CELL REPRESENTATIONS TO STUDY THE INTRACELLULAR ORGANIZATION AND DYNAMICS OF hiPS CELLS

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At the Allen Institute for Cell Science, we investigate the principles of cellular organization in human induced pluripotent stem cells (hiPSCs) and how these principles change during differentiation and disease. To visualize this dynamic organization, we used CRISPR/Cas9 to generate a large collection of endogenously tagged hiPSC lines. This talk will present the computational workflows we have developed to analyze high-resolution 3D live images from these cells. I will focus on our advanced methods for cellular representation, including the use of spherical harmonics to model cell and nuclear shape, and diffusion autoencoders to study how hiPSC-derived endothelial cells respond to shear stress.

Matheus joined the Assay Development team at the Allen Institute for Cell Science in the summer of 2018. Prior to joining the Allen Institute, he was a research staff member at IBM Research Brazil, where most of his work applied to deep learning and data analysis for the oil & gas industries. From 2012 to 2016, Matheus was a Postdoc in the Developmental and Cell Biology Department at the University of California, Irvine, working with Dr. Susanne Rafelski. He received his B.S. in Physics at the Federal University of São Carlos (Brazil) and M.Sc. and Ph.D. in Computational Physics from the University of São Paulo (Brazil), under the supervision of Dr. Luciano da Fontoura Costa, in which his PhD thesis was "Modeling Geographical Biological Networks."

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Registration



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