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Channing Network Science Seminar

October 17, 2014, 11:00am @ 5th-floor Conference Room

Speaker: **Kimberly Glass**, Ph.D
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Title: **Integrating Epigenetic Information Into Message-Passing Network Models**

Abstract: As the cost of DNA sequencing has fallen, studies are increasingly collecting multiple, independent types of 'omic data on biological samples. Integrating this information in an informed manner will play an essential role in furthering our understanding of cellular and disease mechanisms, allowing us to more fully model the complexity of the regulatory processes active in cells. Along these lines we recently developed PANDA (Passing Attributes between Networks for Data Assimilation), a powerful computational method for inference of gene regulatory networks using data integration. PANDA uses a message-passing approach to estimate the underlying regulatory network most consistent with the supplied biological information, including gene expression, transcription factor motif, and protein-protein interaction data. In this presentation I will show some of our recent work investigating how to further expand PANDA to include epigenetic information. In our analysis we find that, when supplied with an epigenetically-modified prior, PANDA is able to greatly improve the overall accuracy of the predicted regulatory networks as well as the accuracy of regulatory interactions specific to a particular cellular context. These improvements are most significant when applying PANDA to model regulatory events that occur outside promoter regions. Overall our results highlight PANDA's ability to capture the regulatory processes in the input data and to use that information to construct accurate regulatory network models.

hosted by: Yang-Yu Liu