

MIT Bioinformatics Seminar

Integration, modularity and network analysis for understanding disease

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The availability of large multi-modal biological datasets invites researchers to deepen our understanding in basic science and medicine, with the goal of personalized analysis. While inquiry of each data type separately often provides insights, integrative analysis has the potential to reveal more holistic, systems-level findings. We demonstrate the power of integrated analysis in disease by developing algorithms on several levels, including subtyping based on multiple omics for the same cancer; identifying and ranking driver genes in an individual's tumor based on expression and mutation profiles; and predicting a healthy individual's future risk of developing cancer based on data from routine periodical checkups. Modularity and network analysis are recurring themes in our studies.