

## **Improving the Design and Discovery of Dynamic Treatment Strategies Using Recent Results in Sequential Decision-Making**

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In recent years, we have investigated algorithmic methods for automatically discovering and optimizing sequential treatments for chronic and life-threatening diseases. In this talk I will discuss two aspects of this work, first the problem of efficiently collecting data to learn good sequential treatment strategies, and second the problem of using data collected in multi-stage sequential trials to discover treatment strategies that are tailored to patient characteristics and time-dependent outcomes. The methods will be illustrated using our recent work on learning adaptive neurostimulation policies for the treatment of epilepsy. Brief examples will be drawn from some of our other projects, including developing dynamic treatment regimes for mental illness, diabetes and cancer.