

# COLLOQUIUM

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## Inference for Dynamic Treatment Regimes

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### Abstract

Dynamic treatment regimes (or treatment policies) are used to operationalize multi-stage decision making in the medical field. Common approaches to constructing dynamic treatment regimes from data, such as Q-Learning, employ non-smooth functionals of the data. The non-smoothness leads to non-regular asymptotics under common data generating models. As a result methods that ignore the non-regularity have poor performance in small samples. In this talk, we present a bootstrap based method for constructing asymptotically valid confidence sets. This method is adaptive in the sense that it provides exact coverage when the true underlying generative model leads to regular asymptotics and is conservative otherwise. We discuss how a variety of modern statistical procedures exhibit this nonregularity and provide interesting statistical challenges in developing measures of confidence.

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