# Seminar

## Targeted Maximum Likelihood Estimation, integrating machine-learning, to evaluate the effects of longitudinal interventions including dynamic regimes: A case study from HIV

Targeted Maximum Likelihood Estimation (TMLE) provides an approach for estimating the causal effects of longitudinal interventions with several attractive properties. TMLE uses estimates of both the propensity score (as used in inverse probability weighting) and of a series of outcome regressions (as can be used in parametric G-computation). Machine-learning methods, such as Super Learning (an ensemble approach) can be used to estimate both the propensity score and outcome regressions. TMLE, which is a double robust semiparametric efficient estimator, has the potential to reduce bias and variance and to improve the validity of statistical inferences compared to alternative approaches. However, as with other methods, challenges remain, particularly when some treatment regimes of interest have poor data support given confounder values. This workshop will provide an introduction to implementation of TMLE with Super Learning. Methods will be illustrated using applied case studies drawn from HIV implementation science. A brief introduction to the R-package ltmle, which can be used to implement all methods described in the workshop, will also be provided.

**Dr Maya L Petersen MD PhD**
Chair, Division of Biostatistics
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Dr. Maya L. Petersen is an Associate Professor of Biostatistics and Epidemiology and Chair of the Division of Biostatistics at the University of California, Berkeley. Dr Petersen's methodological research focuses on the development and application of novel causal inference methods to problems in health, with an emphasis on longitudinal data and adaptive treatment strategies (dynamic regimes), machine learning methods, and study design and analytic strategies for cluster randomized trials. Dr Petersen's applied work focuses on developing and evaluating improved HIV prevention and care strategies in resource-limited settings. She currently serves as PI (with Dr Diane Havlir and Dr Moses Kamya) for the Sustainable East Africa Research in Community Health (www.searchendaids.com) consortium, and as PI (with Dr. Elvin Geng) for the ADAPT-R study (a sequential multiple assignment randomized trial of behavioural interventions to optimize retention in HIV care). More recently she has worked on mathematical modelling based decision support, and community-based testing models for the COVID-19 response.

**Thursday 22nd October**
**9:30 - 10:30am AEDT**

Please note this event will be held via Zoom videoconferencing:
https://monash.zoom.us/j/86803784497?pwd=enJrYnk4ak9WZms1ZXYyeGFMRzdRZz09

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