

Author: Pamela M. Chiroque-Solano

Title: Beyond Prediction: Can AI Make Treatment Decisions?

Description Proposal:

Two patients receive the same treatment, yet only one improves. Current AI models often predict outcomes but rarely explain how treatment decisions should be made under uncertainty. This discussion asks whether healthcare AI should move beyond prediction toward individualized decision-making by integrating clinical evidence, molecular biology, and Bayesian decision theory.

The session introduces integrated Predicted Individual Treatment Effects (iPITE): a framework combining clinical trials, genomic information, and uncertainty-aware models to estimate patient-level treatment response and optimize treatment strategies.

Core Research Questions

- How should AI transform uncertain patient-level predictions into clinically actionable treatment decisions?
- How can molecular evidence (genomics, transcriptomics, epigenomics) improve individualized treatment recommendations rather than function as auxiliary predictors?
- How should uncertainty from high-dimensional models be propagated into treatment recommendations?
- How do we validate treatment recommendations when predictive accuracy does not imply clinical usefulness?
- What defines decision validity in AI-assisted medicine?

Central Question for Debate

A model that predicts well does not necessarily recommend well. Should healthcare AI be evaluated by predictive accuracy—or by the quality of treatment decisions it enables?