***Validation of 1D fluid dynamics models against pressure data***

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Cardiovascular dynamics have been modeled using a wide array of models ranging from simple lumped parameter models to advanced 3D fluid dynamics models. Common for all models is that they make a number of assumptions regarding the specific system they model. In the Engineering and Mathematical communities, the development of models has reached a fairly complex level, yet these models have not been used widely within the medical community. One of the major obstacles is the lack of methodologies for rendering models patient specific. To do so it is necessary to adapt models to the specific system studied. This is a complex task given the large inter-individual variation observed within patients. Moreover, for most studies only a few quantities can be measured. This lecture will highlight some attempts to analyze data using 1D cardiovascular modeling. Focus will be on studying how well 1D models predict pressure measurements. We show how to predict pressure area dynamics in ovine vessels of different caliber, how to use Kalman Filtering to estimate inflow into given data for pressure and area, and how to assess compliance comparing time-series and frequency methodologies.