Abstract:

Dynamical sampling is a term describing an emerging set of problems related to recovering signals and evolution operators from space-time samples. For example, one problem is to recover a function $f$ from space-time samples $\{(A_t f)(x_i)\}$ of its time evolution $f_t = (A_t f)(x)$, where $\{A_t\}_{t \in \mathbb{T}}$ is a known evolution operator and $(x_i, t_i) \in \mathbb{R}^d \times \mathbb{R}^+$. Another example is a system identification problem when both $f$ and the evolution family $\{A_t\}_{t \in \mathbb{T}}$ are unknown. Applications of dynamical sampling include inverse problems in sensor networks, and source term recovery from physically driven evolutionary systems. Dynamical sampling problems are tightly connected to frame theory as well as more classical areas of mathematics such as approximation theory, and functional analysis. In this talk, I will describe a few problems in dynamical sampling, some results and open problems.