



# Analysis Seminar

## Linear and Nonlinear Dispersive Equations in Domains with a Boundary

By

**Dionyssis Mantzavinos**  
(The University of Kansas)

**Abstract:** A plethora of physical phenomena are modeled by partial differential equations (PDEs). In the case of waves in water, optical fibers, Bose-Einstein condensates, or other media, one encounters the phenomenon of dispersion, namely waves of different frequencies propagating at different speeds. The associated PDEs are referred to as dispersive, and their analysis has been at the center of interest within the broader PDE/harmonic analysis/nonlinear waves communities during the past fifty years. In this talk, we will emphasize the importance of studying dispersive PDEs in the presence of nonzero boundary conditions. Such conditions are directly motivated by applications that take place in domains with a boundary, either in nature or in the laboratory. The relevant problems are known as initial-boundary value problems and their study turns out to be significantly more involved than the one of the more standard initial value problems, which take place on fully unbounded domains. Fundamental dispersive PDEs like the nonlinear Schrödinger and the Korteweg-de Vries equations will serve as motivating examples in order to guide us through the main steps of the analysis.

**Date:** Wednesday, March 12, 2025

**Time:** 15:40-16:40

**Place:** Mathematics Seminar Room, SA – 141 & ZOOM

To request the Zoom link, please send a message to [gokhan.yildirim@bilkent.edu.tr](mailto:gokhan.yildirim@bilkent.edu.tr)