# Mathematics Colloquium

## Dispersive PDEs with nonzero boundary conditions

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Friday, February 28, 2020
4:10 p.m. – 5:00 p.m.
Building 38 Room 202

### Abstract

Dispersive equations are partial differential equations (PDEs) of evolution type whose wave solutions of different wave numbers propagate at different speeds. Renowned examples of such PDEs include the nonlinear Schrödinger (NLS) and the Korteweg-de Vries (KdV) equations. Dispersive PDEs are typically studied in the initial value problem (IVP) setting, i.e. posed on the infinite line (non-periodic case) or the circle (periodic case) with initial data in some appropriate function space. Indeed, the well-posedness (existence and uniqueness of solution; continuous dependence on the initial data) of the IVP for many important dispersive equations has been studied extensively during the last fifty years or so, via a variety of techniques that often take advantage of fundamental results from the broader theory of Sobolev and related spaces. Thus, a main assumption for such techniques to be effective is that the functions involved decay to zero at infinity. Nevertheless, this may not be the case in many physical applications where (i) the initial data may not decay to zero at infinity, or (ii) the domain may involve a boundary (e.g. $x = 0$ in the case of the half-line) and hence a relevant boundary condition may need to be prescribed. The latter case, in particular, corresponds to the initial-boundary value problem (IBVP) setting. This talk will be devoted to a new approach for the analysis of dispersive PDEs in the "nonzero boundary conditions" setting, both in the case of IBVPs and in the case of IVPs with non-decaying initial data. This is joint work with G. Biondini, A. Fokas, A. Himonas and S. Li.

*About the speaker*: Dionyssios Mantzavinos received his BA, MA and Ph.D. in Mathematics from the University of Cambridge, U.K. His doctoral research was conducted under the supervision of Professor A.S. Fokas. He has held postdoctoral positions at the University of Notre Dame, SUNY Buffalo and the University of Massachusetts Amherst. His research interest lie in the broader area of nonlinear evolution equations of mathematical physics, addressing particularly the question of well-posedness of initial value and initial-boundary value problems.

Cookies will be provided before the talk at 4 p.m.
in the same room as the talk, Building 38 Room 202.