Dr. Delio MUGNOLO
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Educational Curriculum	<oldest year> <grade> in <area>, <university>, <city>, <country> <most recent year> <grade> in <area>, <university>, <city>, <country>
Professional Experience	<year> to <year> <position> at <institution> <year> to <year> <position> at <institution> <year> to today <position> at <institution>
Current research interest	- Spectral Theory of graphs and quantum graphs - Forms and extensions - Operator semigroups - Heat conduction and wave equations - Nonlinear difference operators
Research methods	- Operator theory, gradient flows, spectral surgery
Publications	G Berkolaiko, JB Kennedy, P Kurasov, D Mugnolo, Edge connectivity and the spectral gap of combinatorial and quantum graphs, J. Phys. A, 2017 JB Kennedy, P Kurasov, G Malenová, D Mugnolo, On the spectral gap of a quantum graph, Ann. H. Poincaré, 2016 D Mugnolo, Parabolic theory of the discrete p-Laplace operator, Nonlinear Analysis, 2013

Title of the talk: Surgery of quantum graphs: eigenvalues and heat kernels

Abstract of the talk (10 lines):
Quantum graphs are collections of intervals glued at their endpoints in a network-like fashion, along with differential operators acting upon them. We consider elliptic equations associated with these structures: while the eigenvalues of Laplacians may in principle be found as the zeros of a (transcendental) secular equation, this task is hard to pursue. Since a pioneering paper by Nicaise, much attention has been devoted to derive a-priori spectral estimates that only depend on global quantities of combinatorial (like edge connectivity, total edge or vertex number), metric (like total length or diameter) or hybrid (like girth or the Cheeger constant) nature. We well review some recent advances in this field based on simple surgery principles that allow for spectral and heat kernel comparison of two different graphs. This is joint work with Gregory Berkolaiko, James Kennedy and Pavel Kurasov.