PhD Projects 2015

Project 1.
Title: Complex geometry from an operator-theoretic viewpoint.
Supervisor: Dr. Z.A. Lykova; 2nd supervisor: Prof. N.J. Young

The project is to use operator theory to discover and prove results about the geometry and function theory of domains in \( \mathbb{C}^n \). Students should have a basic knowledge of complex analysis in one variable and of linear operators on Hilbert space. A typical task is to construct an analytic function from a disc in \( \mathbb{C} \) to a concrete set in \( \mathbb{C}^n \) meeting some specifications. Problems of this type arise in engineering, though the present project is pure mathematical in outlook.

Project 2.
Title: Homology of topological algebras
Supervisor: Dr. Z.A. Lykova

The project is to solve questions on the structure and properties of topological and operator algebras from the viewpoint of homological algebra. Students should have a basic knowledge of functional analysis and algebra. I am particularly interested in the homological problems that arise in noncommutative geometry. A typical task is to study homological properties and cyclic-type cohomology of topological algebras. The theory has applications in many branches of mathematics, including the theory of de Rham homology in differential geometry, automatic continuity theory and \( K \)-theory.