

Numerical analysis

Numerical Analysis research at Birmingham covers a wide range of areas related to the design, analysis and implementation of robust and accurate numerical algorithms for solving mathematical problems coming from real-life applications.

These include numerical methods for partial differential and boundary integral equations, dynamical systems, numerical methods for uncertainty quantification, numerical linear algebra, approximation theory, algorithms for large-scale problems, and development of research software.

The applications of interest include problems in computational fluid dynamics, plasma dynamics and ecology, electromagnetics, linear elasticity, fuel cell modelling, topology optimization, financial modelling and biological fluid mechanics.

The research interests of the members of the group are given below.

Dr Alex Bespalov

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Numerical solution of partial differential and boundary integralequations; numerical methods for uncertainty quantification; finiteelement and boundary element methods; applications to electromagnetics, linear elasticity, and fluid dynamics.

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Dr Daniel Loghin

Lecturer

Numerical linear Algebra, iterative methods for linear and nonlinear systems, finite element methods, computational fluid dynamics.

[Profile \(/staff/profiles/maths/loghin-daniel.aspx\)](/staff/profiles/maths/loghin-daniel.aspx)

Dr Natalia Petrovskaya

Lecturer

Applied numerical analysis and computer simulation of complex physical and engineering problems. Expert in computational mathematics. The design and exploration of new numerical methods. Examples include computational plasma dynamics, computational aerodynamics and computational ecology.

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Members of the group contribute to the organisation of the IMA Conference on Numerical Linear Algebra and Optimization hosted by the University of Birmingham biannually since 2007.

The group has research collaborations with Mathematical Biology group and with Theoretical & Computational Optimization group within the School of Mathematics at the University of Birmingham.

There exist collaborative links with the following institutions:

- Brunel University
- University of Leicester
- University of Manchester
- University of Oxford
- Rutherford Appleton Laboratory
- ETH Zurich (Switzerland)
- Pontificia Universidad Católica de Chile (Chile)
- Université de Valenciennes (France)