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Partial Differential Equations in Ecology: Recent Advances and New Challenges

Guest Editor:

Prof. Dr. Sergei Petrovskii
School of Computing and Mathematical Sciences, University of Leicester, Leicester, UK

Deadline for manuscript submissions:
closed (31 July 2021)

Message from the Guest Editor

The application of partial differential equations (PDEs) in ecology has an 80-year long history, dating back to seminal works by Fisher (1937) and Kolmogorov et al. (1937) where nonlinear population waves were discovered and studied. A few decades later, Alan Turing's (1953) discovery of diffusive instability was applied to ecological pattern formation, which led to an upsurge of research on all aspects of the population dynamics in space and time using PDEs of diffusion-reaction type. Today, at appropriate spatial and temporal scales, PDEs remain a powerful modeling tool widely used to shed new light on some old problems and provide insights into new ones. This Special Issue will highlight recent advances in the application of PDE-based models in ecology and population dynamics. We welcome papers where traditional diffusion-reaction models are applied to problems of ecological significance. We especially welcome papers where the PDE framework is extended beyond the standard diffusion-reaction paradigm, e.g., to include cross-diffusion, nonlocal effects, time-delay, etc. Both analytical studies and simulation-based studies will be considered.

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Editor-in-Chief

Prof. Dr. Francisco Chiclana
School of Computer Science and Informatics, De Montfort University, The Gateway, Leicester LE1 9BH, UK

Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

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Contact Us

Mathematics Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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mathematics@mdpi.com
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