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EMS Series of Lectures in Mathematics
Edited by Ari Laptev (Imperial College, London, UK)

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Hans Triebel

PDE Models for Chemotaxis and Hydrodynamics in Supercritical Function Spaces

European Mathematical Society

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6. Mathematical Treatment of the Axioms of Physics. ... To treat in the same manner [foundations of geometry], *by means of axioms, those physical sciences in which mathematics plays an important part; in the first rank are the theory of probabilities and mechanics.*

The organic unity of mathematics is inherent in the nature of this science, for mathematics is the foundation of all exact knowledge of natural phenomena.

(David Hilbert, Lecture delivered before the international congress of mathematicians at Paris in **1900**, [Hil02], [Rei70, Chapter X]).

The purposes of the meeting are twofold:

1. To exhibit the vitality of mathematical research and to indicate some of its potential major growing points: these include some of the major classical problems (the Riemann Hypothesis, the Poincaré Conjecture, the regularity of three-dimensional fluid flows) as well as some of the recently developed major research programs like those associated with the names of Langlands and Thurston.

2. To point up the growing connections between the frontiers of research in the mathematical sciences and cutting–edge developments in such areas as physics, biology, computational science, computer science, and finance.

(Felix E. Browder, president of the AMS, announcing the meeting 'Mathematical Challenges of the 21st Century', Univ. California, Los Angeles, **2000**, [Bro00]).