

# Einladung zum Würzburger Mathematischen Kolloquium

Julius-Maximilians-Universität Würzburg • Fakultät für Mathematik und Informatik

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## Understanding shape optimization with fine-scale structures

Mittwoch, 10. Dez. 2014 • 16:15 Uhr

Raum SE 40, Mathematik Ost, Emil-Fischer-Str. 40, Campus Hubland-Nord

### Inhaltsangabe

Various problems in engineering and biology are concerned with the optimal shape or geometry of particular structures. Examples include the design of composite materials or the optimal layout of networks such as the blood vessel system. Those problems (or at least simplified versions) can be formulated as a minimization problem of appropriately chosen objective functionals. These functionals are highly non-convex, which manifests in countless local minima and very fine-scale structures of geometries with low energy. Thus, it is very difficult to obtain insight by numerical methods. Nevertheless, one can gain some qualitative and quantitative understanding of optimal geometries by borrowing techniques from the mathematical analysis of pattern formation in physical contexts. Those techniques amount to proving a lower and an upper bound for the minimum value of the functional and involve the construction of near-optimal geometries. I will explain the basic ideas and how they can be applied to shape optimization problems.



[www.mathematik.uni-wuerzburg.de/kolloquium.html](http://www.mathematik.uni-wuerzburg.de/kolloquium.html)

Zu diesem Vortrag laden wir Sie herzlich ein.  
Im Anschluss an die Vorträge Kaffee und Tee im Foyer vor dem SE 40.

Die Dozentinnen und Dozenten der Mathematik

