



# Oberwolfach Seminar

## Beyond Numerical Homogenization

Organizers: Daniel Peterseim, Augsburg  
Houman Owhadi, Pasadena  
Date (ID): 09 – 15 June 2019 (1924b)  
Deadline: 31 March 2019

### Programme

*Numerical homogenization:* Identification of accurate and localized basis functions for approximating the solution space of elliptic operators (including prototypical PDEs with arbitrary rough coefficients without periodicity and scale separation).

Interpretations in the following fields and their interplay/connections: homogenization theory, variational multiscale analysis, theory of finite elements, domain decomposition methods, optimal recovery, polyharmonic splines, Bayesian/probabilistic numerics, Gaussian process regression, game/decision theory.

*Beyond:* Multiresolution analysis: operator adapted wavelets, fast direct multilevel solvers.

Kernels/computational statistics: compression, inversion and approximate PCA of dense kernel matrices, sparse and rank revealing representations of inverse operators and Gaussian processes, screening effect.

Uncertainty quantification: sparse compression of expected solution operators, statistical numerical approximation.

Eigenvalue problems: Anderson localization, Wannier functions, multilevel methods.

Inverse Problems/Learning: de-noising, learning kernels.

Concerning introductory reading please see the website of the seminar:

[www.mfo.de/occasion/1924b](http://www.mfo.de/occasion/1924b)

The seminar takes place at the Mathematisches Forschungsinstitut Oberwolfach. The Institute covers board and lodging. By the support of the Carl Friedrich von Siemens Foundation travel expenses can be reimbursed up to 150 EUR in average per person (against copies of travel receipts). The number of participants is restricted to 25.

### Applications including

- full name and address, incl. e-mail address
- short CV and publication list
- present position, university
- name of supervisor of Ph.D. thesis
- a short summary of previous work and interest
- title, ID and date of the intended seminar

should be sent preferably by e-mail (with attachments in pdf format) via [seminars@mfo.de](mailto:seminars@mfo.de) until 31 March 2019 to:

Prof. Dr. Dietmar Kröner  
Mathematisches Forschungsinstitut Oberwolfach  
Schwarzwaldstr. 9 – 11  
77709 Oberwolfach  
Germany

