



Mathematisches  
Forschungsinstitut  
Oberwolfach



# Oberwolfach Seminar

## Variational and Information Flows in Machine Learning and Optimal Transport

Organizers: Wuchen Li, Columbia  
Bernhard Schmitzer, Göttingen  
Gabriele Steidl, Berlin  
Francois-Xavier Vialard, Paris  
Date (ID): 19 – 25 November 2023 (2347b)  
Deadline: 1 September 2023

Variational and stochastic flows are now ubiquitous in machine learning and generative modeling. Indeed, many such models can be interpreted as flows from a latent distribution to the sample distribution and training corresponds to finding the right flow vector field. Optimal transport and diffeomorphic flows provide powerful frameworks to analyze such trajectories of distributions with elegant notions from differential geometry, such as geodesics, gradient and Hamiltonian flows. Recently, mean field control and mean field games offer a general optimal control variational problems on the learning problem. How do these tools lead us to a better understanding and further development of machine learning and generative models?

The Oberwolfach Seminar will address the topic from different points of view taking in particular recent developments in machine learning into account. The target audience is PhD students and post-doctoral researchers wishing to be quickly immersed in this modern, active research area. Priority will be given to young, motivated researchers.

Please see the website of the seminar for detailed information:

[www.mfo.de/occasion/2347b](http://www.mfo.de/occasion/2347b)

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 title, ID and date** of the intended seminar, together with **one pdf-file attached** containing

- 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

should be **sent by e-mail** via [seminars@mfo.de](mailto:seminars@mfo.de) until 1 September 2023 to:

Prof. Dr. Matthias Hieber  
Mathematisches Forschungsinstitut Oberwolfach  
Schwarzwaldstr. 9 – 11  
77709 Oberwolfach  
Germany

