

Advanced Methods MSc/MA

# Remote Sensing: Spectroscopy and Analysis of Spectral Data (MV-PG)

Hannes Feilhauer

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Masterseminar, 2 SWS, ECTS-Studium

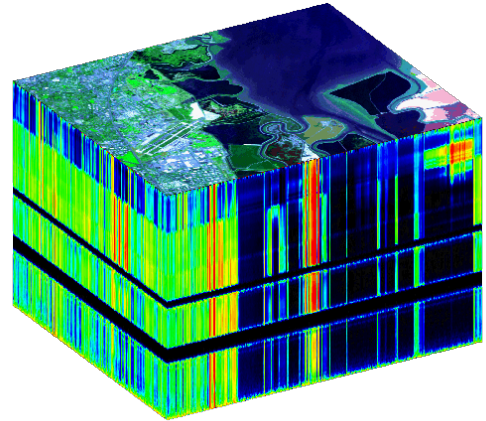
ECTS-Credits: 5

Teaching language: English

Monday, Feb 18<sup>th</sup> to Wednesday, Feb 20<sup>th</sup> 2019, 8h30 - 16h00

Room 00.133 (CIP 1)

Participants: max. 20



Common multispectral air- and spaceborne imagery depicts the Earth's surface in three to ten spectral bands. Hyperspectral remote sensing (also known as imaging spectroscopy) is based on the same physical principles. The reflected radiation is, however, quantified in hundreds of narrow spectral bands. The high information content of these data allows to exploit small spectral differences, enabling the discrimination of similar materials. This potential is frequently used for analyses of minerals in the top soil, biochemical constituents of the vegetation, or urban materials to generate very detailed land cover maps.

This class will provide you with an introduction to the principles, potentials, pitfalls, and applications of hyperspectral remote sensing. You will learn a broad range of techniques for the analysis of hyperspectral data. We will test advanced classification and regression methods (Spectral Unmixing and Partial Least Squares regression), machine learning approaches (Random Forests and Support Vector Machines), as well as mechanistic radiative transfer models (ProSAIL) in practical applications using the R language. Subsequently, we will read and jointly discuss current scientific papers using the tested methods. After completion you will be familiar with state-of-the-art approaches in an emerging field of remote sensing technology.

Administrative details will be shared by Email prior to the first session.

**Basic knowledge of the principles of remote sensing is essential for a successful completion. Familiarity with the R programming language is not required but may be helpful. Candidates without R skills are requested to contact Hannes Feilhauer (hannes.feilhauer@fau.de) by Oct 17th.**

