

## VU SAR Remote Sensing

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### Independent Research Project

The goal of the independent research project is to provide you with the opportunity to apply SAR remote sensing data and methods of your choice taught in the course.

The scope of the project is up to you, but I expect analysis of your chosen data for one or two specific topics along with relevant background material. You may use SNAP for your analysis, but you can also use other software you are familiar with (e.g. QGIS, Erdas Imagine) and use Python.

The following prerequisites must be met:

- You shall include two of the three main topics of this unit:
  - a. processing SAR data and change detection,
  - b. identification and quantifying surface displacements using InSAR,
  - c. classification using fully polarised SAR data.
- You shall include data from at least two different sensors.
- The topics shall be related to each other (e.g. change assessment and classification of a city or the Amazon forest; surface displacement and impact of an earth quake).

Notes:

- You may use open-source Copernicus data (e.g. Sentinel-1, ERS-1/2) for topics a & b, but you can also use other available data you may find and you are interested in (e.g. freely accessible TerraSAR-X or ALOS PALSAR sample data).
- Changes can either be shown using an RGB composite including different periods or also by comparing two SAR images using map algebra. Using the same data and orbit will facilitate showing/identification of the changes.
- The availability of freely available fully polarised / quad pol data is limited, but suitable sample data is available. You may search for data by your own, or e.g. use ALOS 2 - PALSAR-2 data from San Francisco. I have access to the ESA TPM RADARSAT-2 archive (<https://tpm-ds.eo.esa.int/oads/access/collection/Radarsat-2>). You may have a look what is available there. Furthermore, I will provide a list of data I have found by the end of this week i.e. latest 31<sup>st</sup> Jan.

You should work in a group of two students, but you can also work individually.

#### Part 1 – Confirm Research Topic

You will need to confirm your topic and with me by uploading the topic pre-approval form on the TeachCenter.

#### Part 2 – Written Report

Length: about 2500 words of text (not including figures, tables or references) with a leeway of about 10%.

Your report should document your research in a journal-style manuscript and include a figure showing the study region, at least one table presenting the data used (incl. scene ids

and dates of acquisition), and figures showing the processed data and your results. You should include at least 5 scientific references (e.g. journal papers) covering both methodological aspects and aspects related to the chosen topic. It should be written at a high-level and the approach reproducible. A documentation of the processing steps of the utilised software etc. should be provided in an appendix. Upload one copy (in pdf format) electronically via the TeachCenter.

**The submission must include:**

1. a standard cover page, with your student ids, a sentence certifying that this is your own work and a statement about the individual contributions.
2. the report (written and formatted according to the above description).

**Submission deadlines:**

**Preapproval: Mon, 10<sup>th</sup> Feb., 12:00 (noon).**

**Full Report: Mon, 10<sup>th</sup> Mar, 12:00 (noon)**

Overall Grade consists of

1. The topic pre-approval (worth 10%)
2. The written report (90%)