

FHNW Institute Geomatics

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Education and Research

The FHNW Institute Geomatics (IGEO) offers two academic degree courses, a BSc in Geomatics (German, <https://www.fhnw.ch/geomatik-studieren>) and a MSc in Engineering, Profile Geomatics (English, <https://www.fhnw.ch/master-geomatics>) and is active in applied research and development projects and collaborations. Additionally, the IGEO offers further education courses, i.e., the in 2022 newly established CAS in Spatial Data Analytics (<https://www.fhnw.ch/spatial-data-analytics>) and the CAS in GeoBIM, as well as selected services.

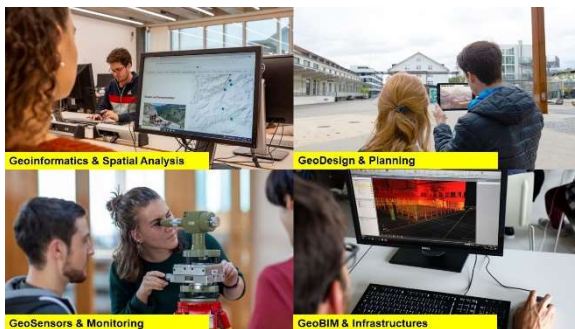


Figure 1: The four specializations of the redesigned BSc in Geomatics

The Bachelor of Science in Geomatics was redesigned and started in the autumn semester 2022 with four specializations – GeoDesign & Planning, GeoInformatics & Spatial Analysis, GeoBIM & Infrastructures, GeoSensors & Monitoring (Figure 1) - from which the students choose a major and a minor specialization area.

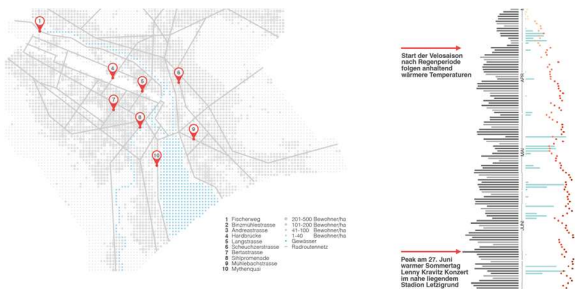


Figure 2: Part of a MSc InfVis student project result (Müller 2020)

The two main courses regarding cartography and geovisualization are the BSc module Geovisualization and the MSc module Information Visualization. In addition to theory, the students do practical visualization projects (e.g., Figure 2).

The following sections give insights in selected applied research projects of the past four years. More information on all projects can be found at <https://www.fhnw.ch/geomatik-forschung>.

ThermoPlaner3D

The ThermoPlaner3D project (Figure 3, <https://www.thermoplaner3d.ch/>) aims at extracting and visualizing detailed building energy information from large-area 3D thermography. The IGEO works together with the partners ZHAW, BSF Swissphoto and Considerate to design analysis processes and suitable visualizations to support energy companies and homeowners in making informed energy decisions.

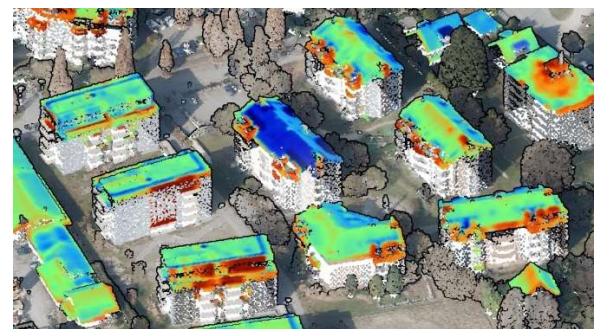


Figure 3: Visualization of raw thermal imagery data used to analyse building roof heat loss.

REDULO

A template-based App framework REDULO was developed to support location-based learning. In collaboration with the FHNW Institute of Architecture, a first application of REDULO offers archi-

tectural walks in Basel in the App “Baukultur Schweiz” (Figure 4, on GooglePlay / AppleStore).

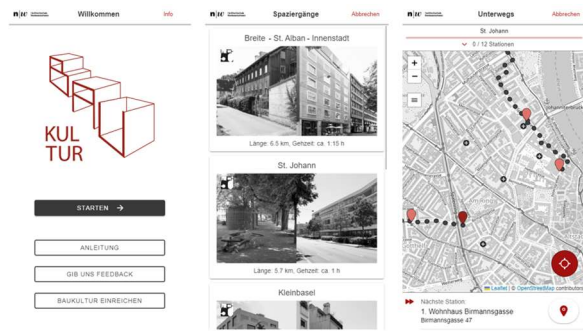


Figure 4: Three App “Baukultur Schweiz” screenshots using two different REDULO framework templates.

EVAC - Employing Video Analytics for Crisis Management

When extraordinary incidents take place, like a flooding after much rain, people record the event with smartphones. Such eyewitness videos may contain interesting information for incident management. This project developed processes to identifying relevant videos and visualizing extracted content for use by crisis managers (Figure 5, <https://www.nfp75.ch/en/ZJjLVBZ18ygSB9zw/project/project-bleisch>).



Figure 5: Examples of street centre line cues for linking multiple perspectives in spatial video analysis (Hollenstein & Bleisch 2022)

Building aggregation for shared heat pump energy generation

The project MicroHeat investigates the potential of thermal micro-grids for residential buildings with gas heating in the Canton of Basel-Stadt. A method was developed that estimates the potential of thermal micro-grids for small building groups considering factors such location,

neighbouring buildings, construction year, energy reference area, and building type to cluster buildings efficiently (Figure 6).



Heat load limit 100 kW, residential buildings with gas supply considered
Data source: Federal Statistical Office Switzerland, Geoportal Kanton Basel-Stadt, 2022

Figure 6: Visualising building topologies with potential thermal micro-grids (Bereuter & Hall 2023).

Digital Cities 4 Us

In the research project DigitalCities4Us, IGEO collaborates with Hexagon and the City of Basel to analyse and visualize dense city point clouds to support different stakeholder requirements.

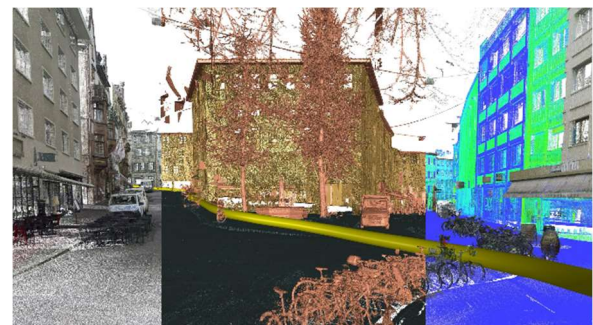


Figure 7: Analysis of dense city points clouds to evaluate accessibility (Cadotsch & Karabasoglu 2023).

References

Bereuter, P. & Hall, M. (2023). MICROHEAT Building Aggregation to estimate the potential for shared energy generation with heat pumps. ICC 2023, Cape Town.

Cadotsch, L. & Karabasoglu, E. (2023). Hocharaufgelöste 3D-Modelle für die Analyse der Accessibility. BTh Thesis FS23, BSc Geomatics FHNW.

Hollenstein, D., & Bleisch, S. (2022). Linking Multiple Perspectives with Object-Based Visual Cues for Spatial Video Analysis. ISPRS Archives, 43(B4-2022), 455–462.

Müller, G., (2020). Geoinformationsvisualisierung: Velofrequenzen in der Stadt Zürich. MSc in Engineering, Profile Geomatics, TSM InfVis Project HS20.