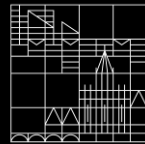




Satellite-Assisted Archaeological Survey in the Silvretta Alps: the Very First Steps

Universität
Konstanz



Karsten Lambers



Universität Zürich

Thomas Reitmaier



Silvretta study region: Switzerland / Austria - 500 km² - 1500 to 3312 masl

Silvretta Historica Project

- Sub-projects:
 - Archaeology
 - History
 - Cultural tourism
- Satellite-assisted archaeological survey
 - High-resolution images
- 2010 to 2013



Excavation, Fimba Valley, Sept. 3, 2010



Silvretta study region: Switzerland / Austria - 500 km² - 1500 to 3312 masl



Fimba / Fenga Valley near Heidelbergger Hütte, looking north

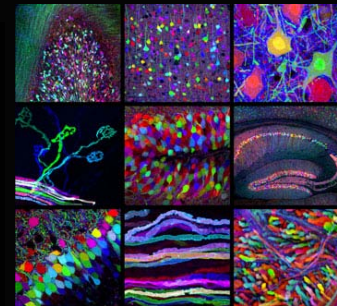
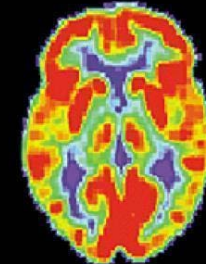
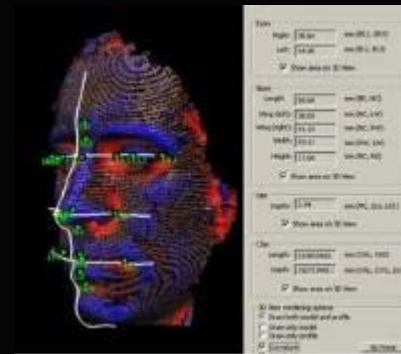
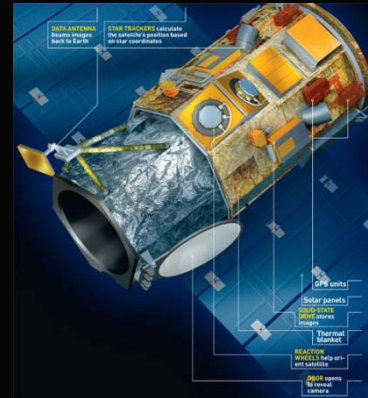
Alpwirtschaft: Alpine Pasture Economy

- Origins: Bronze age or earlier?
- *Alpwirtschaft* infrastructure:
 - Cattle enclosures
 - Shelters, fire places
 - Huts, cabins
 - Installations for dairy farming
 - Roads, trails
 - Boundary markers



Why Satellite Images?

- New sensors and data
- Advances in image analysis
 - Earth observation
 - Medical imaging
 - Surveillance
- Automated extraction of „uncooperative“ features



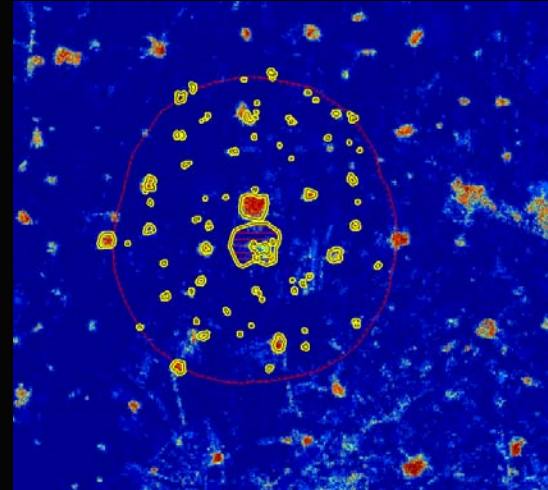
PHILADELPHIA

Buttern Sie Ihr Brot mit Philadelphia



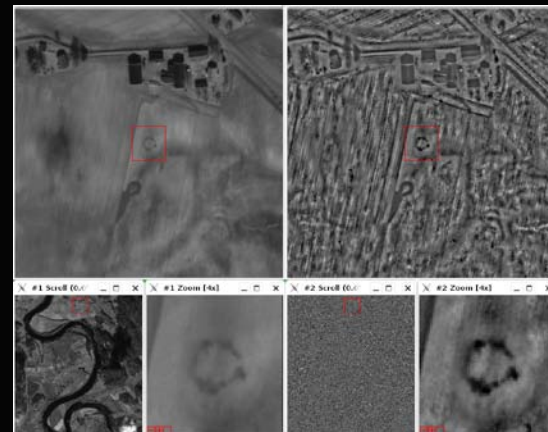
Automated Feature Extraction

- Model building: from physical properties of archaeological features to search algorithms



Menze et al. 2007: Spectral signatures

- Silvretta:
 - Typical features with recurring properties
 - Neither covered by trees nor built over



Trier et al. 2009: Shape, size



Iron Age cattle enclosure, Plan d'Aigl, Tasna Valley, ground view



Iron Age cattle enclosure, Plan d'Aigl, Tasna Valley, aerial view



Iron Age cattle enclosure, Plan d'Aigl, Tasna Valley, artist's rendering

Huts, Cabins, Cheese Cellars



Iron Age hut, Fimba Valley



Early Modern Age huts, Fimba Valley

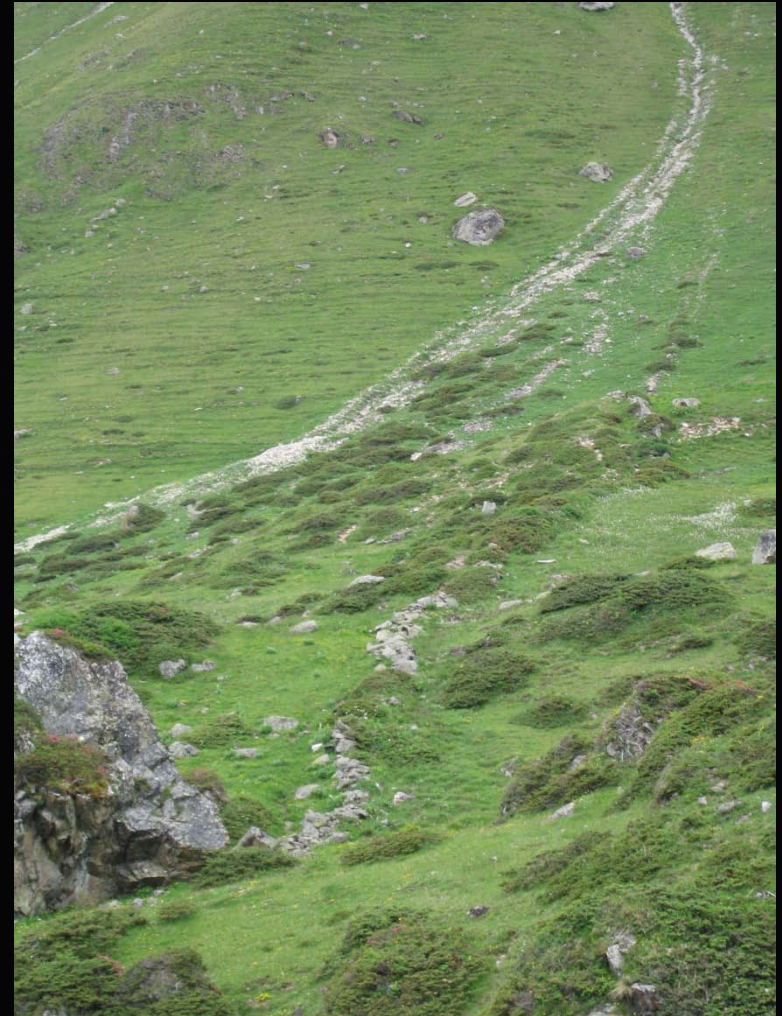


Three generations of huts, Marangun d'Urexas, Tasna Valley

Roads, Trails, Boundary Markers



Ancient road, Fimba Valley



Boundary marker, Tasna Valley

Terraces



Plan d'Aigl, Tasma Valley



Rosshoden, Jam Valley

Rock Shelters



Fire places below rock shelters, Plan da Mattun, Tasna Valley



Fire places beneath rock shelters, Plan da Mattun, Tasna Valley



Abri Frey and other potential rock shelters, Tuoi Valley

Very First Steps

- Model building
- GPS measurements of ground control points
- GIS database
- PhD candidate from January, 2011
- Image acquisition in July / August, 2011



Satellite Images in the Silvretta Alps

- Focus on methodology
- Automated feature extraction
- Spectral and geometric properties
- 2D / 3D analysis

