

Potential MSc topics

Hugo Ledoux

<https://3d.bk.tudelft.nl/hledoux>

2016-09-23

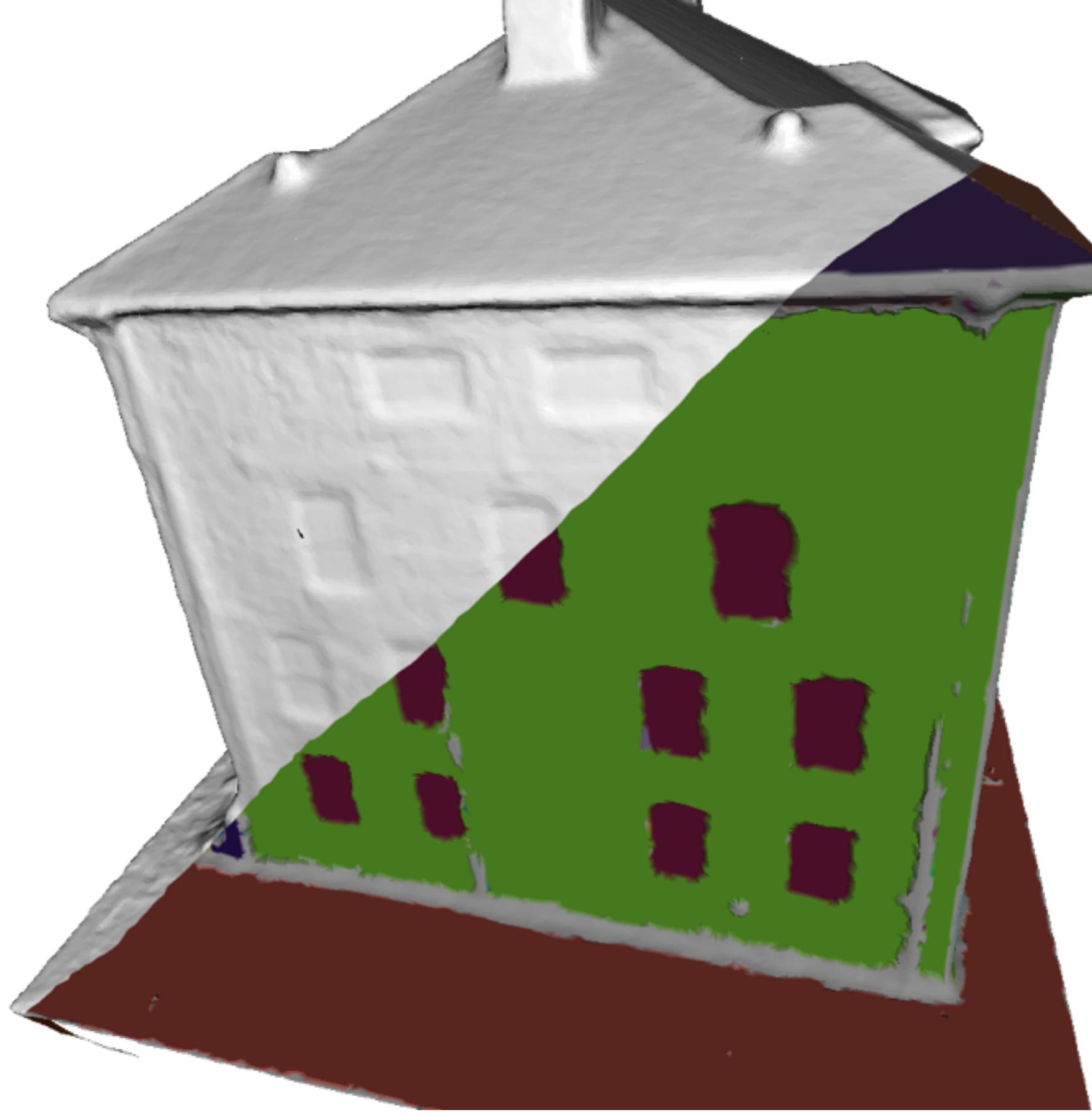


“Straightening” and improvements of
meshes of 3D city models obtained
from image matching

3D Amsterdam constructed by Cyclomedia







- Supervised by me and Abdoulaye Diakité
- We have a large area of Amsterdam already (in COLLADA format: textured triangles), so the project can start right away!
- Notice that it's possible to do this project with a mix of software (FME, CloudCompare) and Python.

more than one student possible

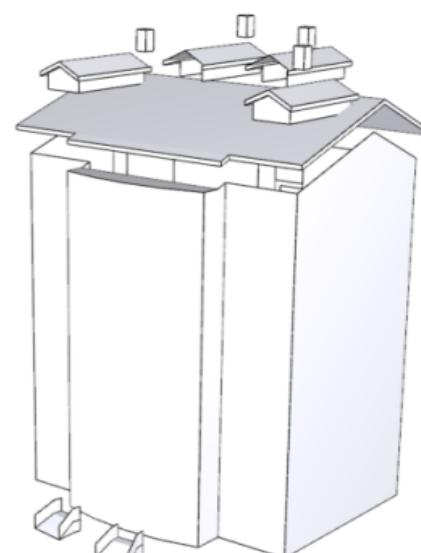
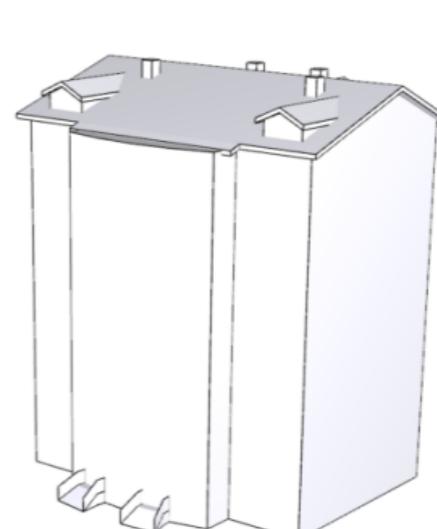
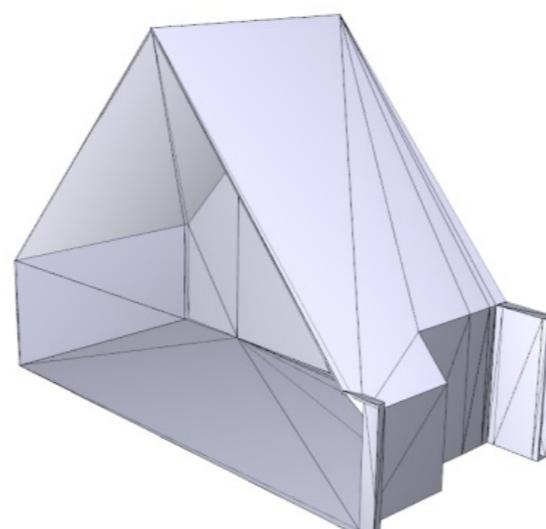
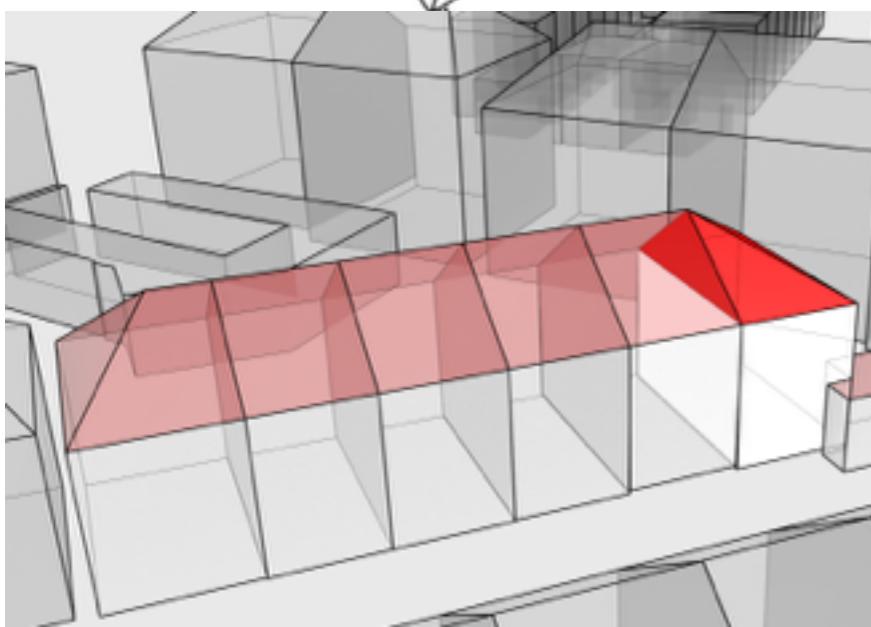
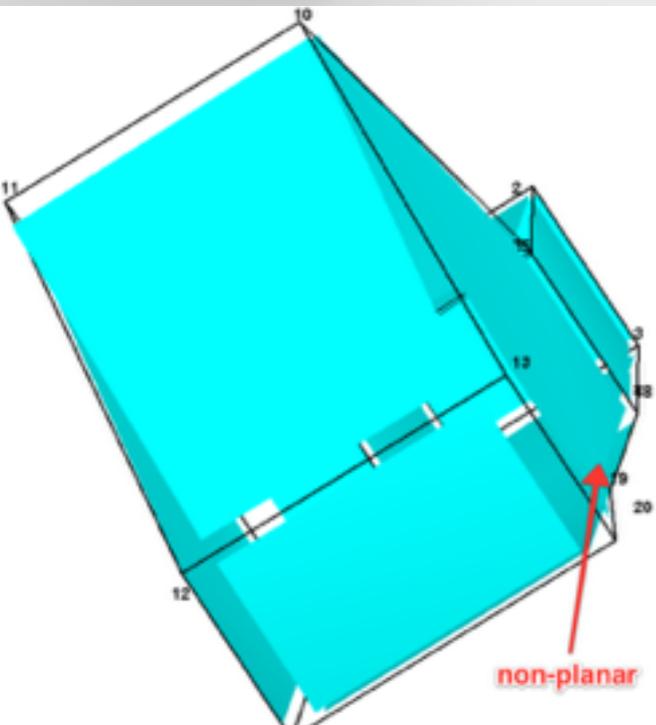
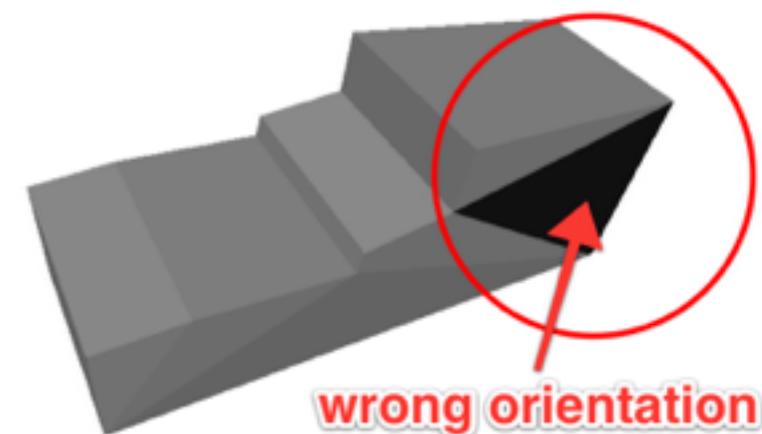
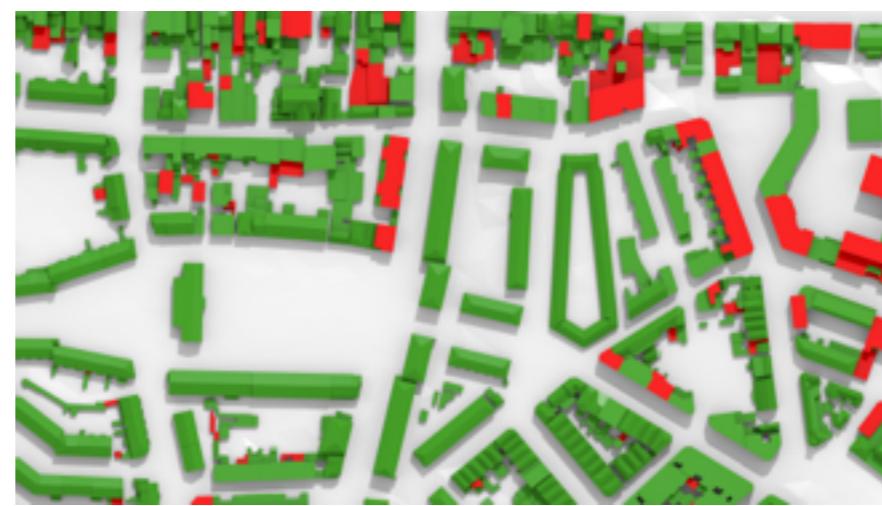
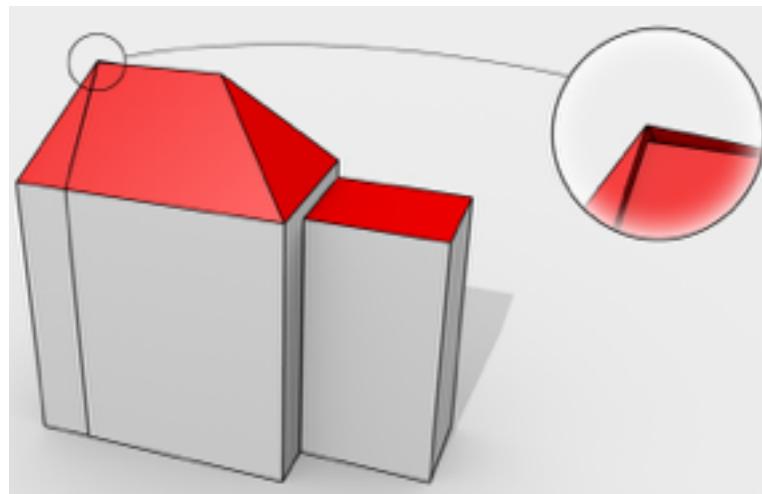


- Swedish startup
- use drones

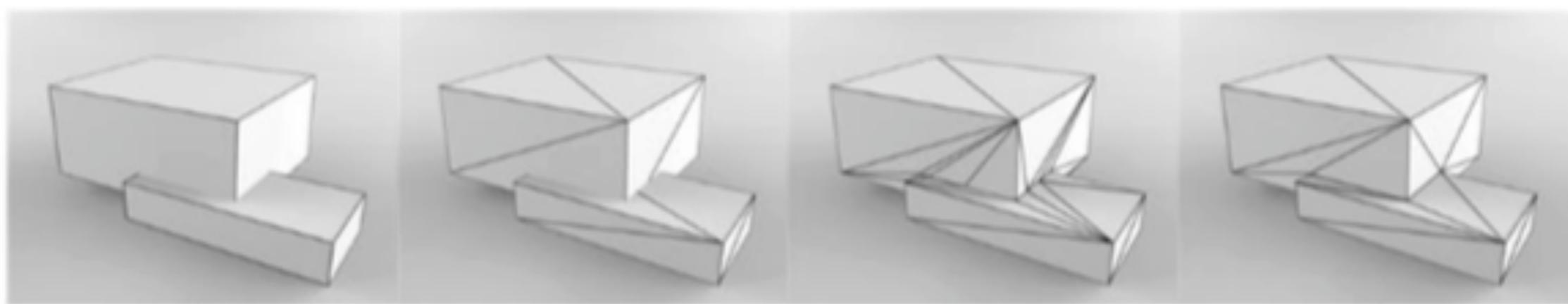
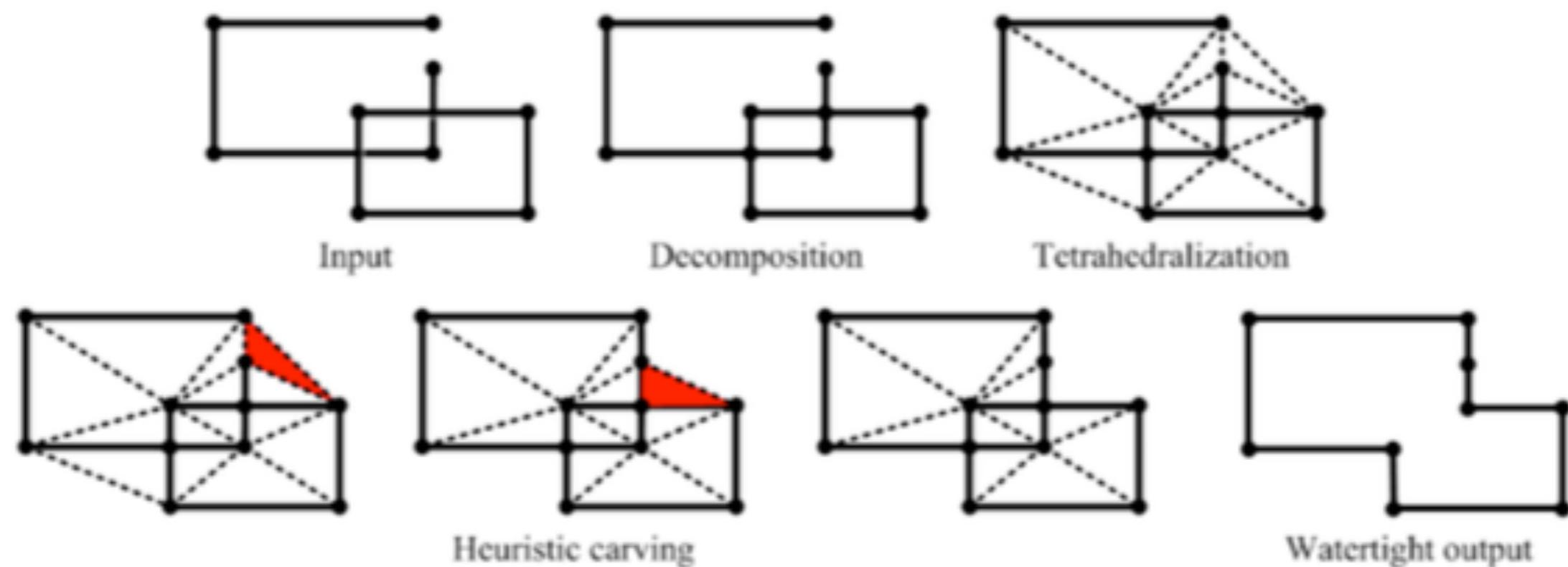


Automatic repair of 3D buildings

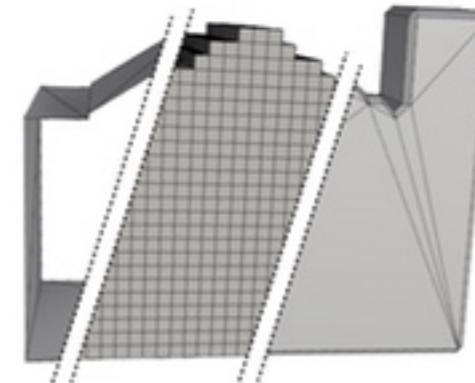
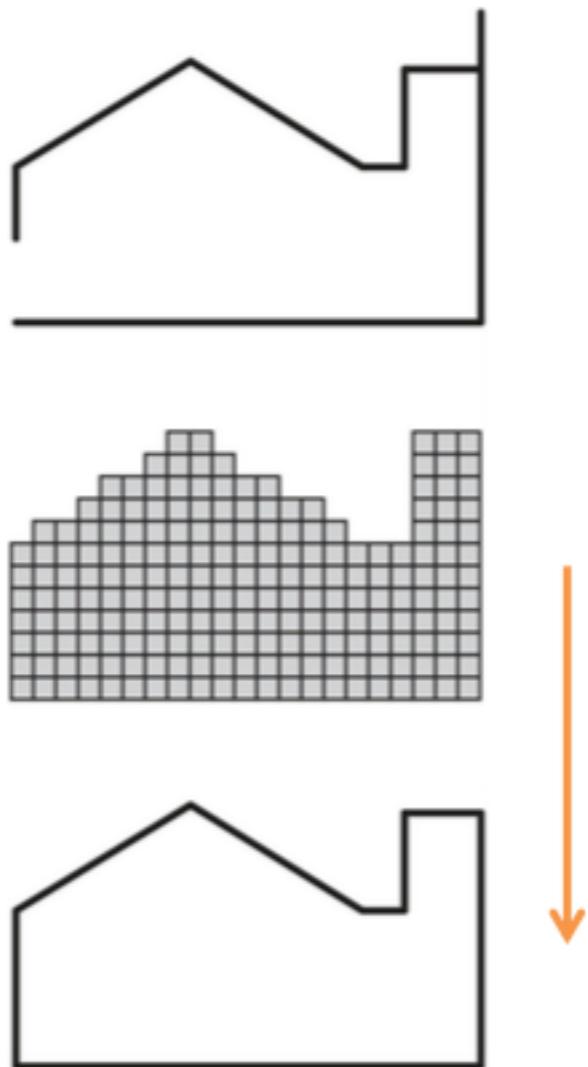
errors = very common in 3D buildings



Some work on automatic repair: tetrahedralisation



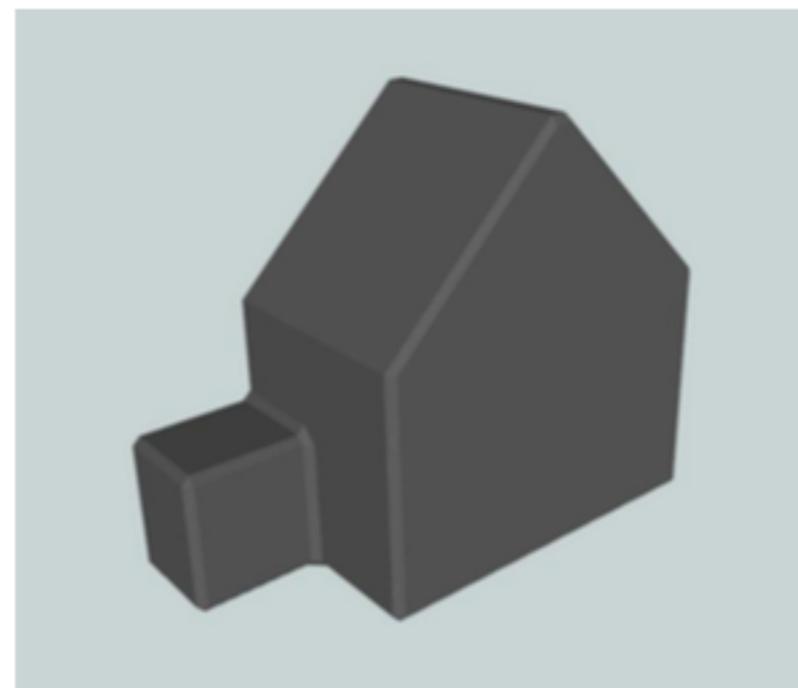
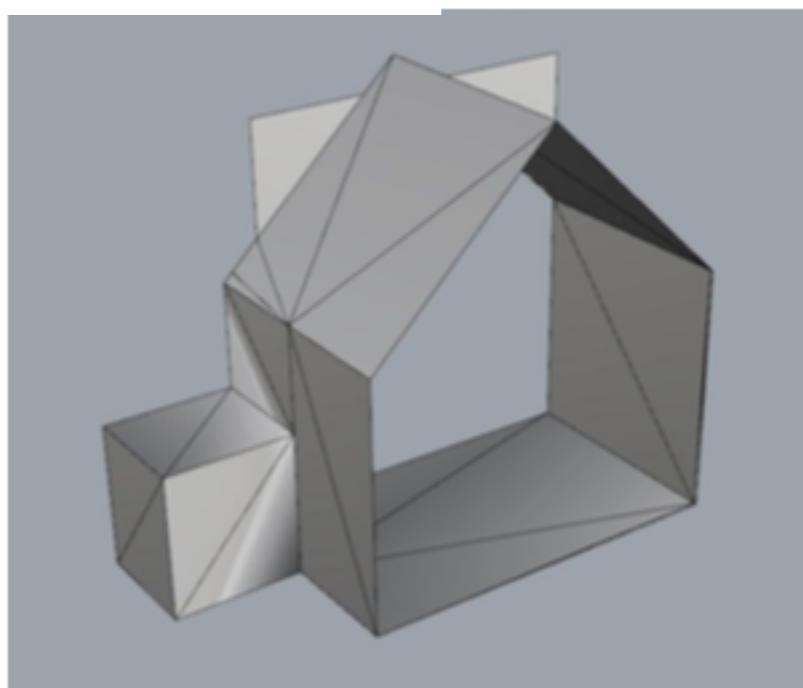
Some work on automatic repair: voxels



Damien Mulder

(2015)

Automatic repair of 3D city building models using a voxel-based repair method



good to know

- aim = try new repair function in CGAL for smooth surfaces and modify them so that they are useful for buildings (where surfaces are usually perpendicular)
- C++ required, but I am patient...

IFC to CityGML LOD4

Automatic generation of CityGML LoD3 building models from IFC models

MSc thesis in Geomatics
by Sjors Donkers



December 2013

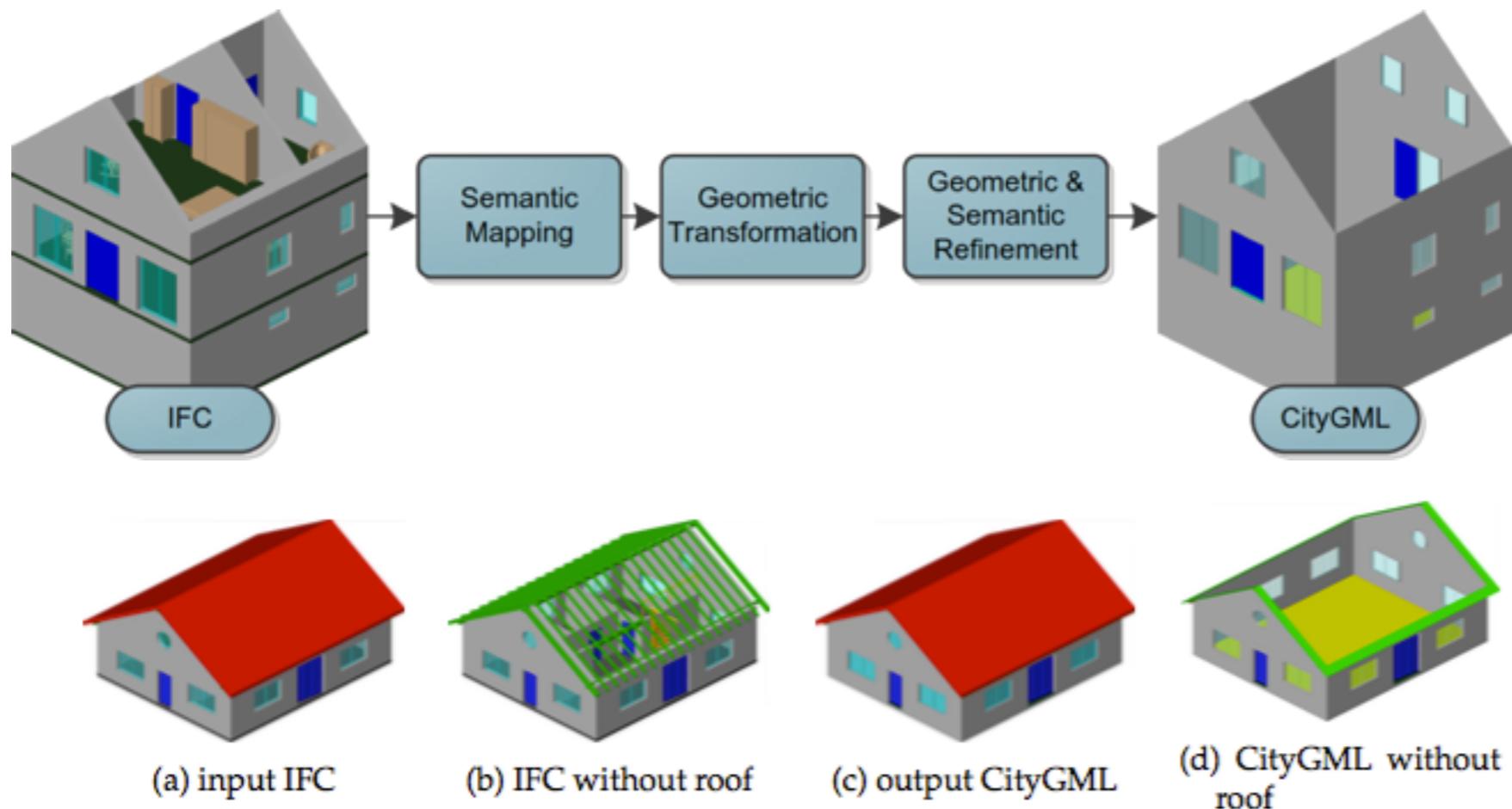


Figure 17: **FZK-House** dataset, available at www.iai.fzk.de/www-extern/index.php?id=1174&L=0

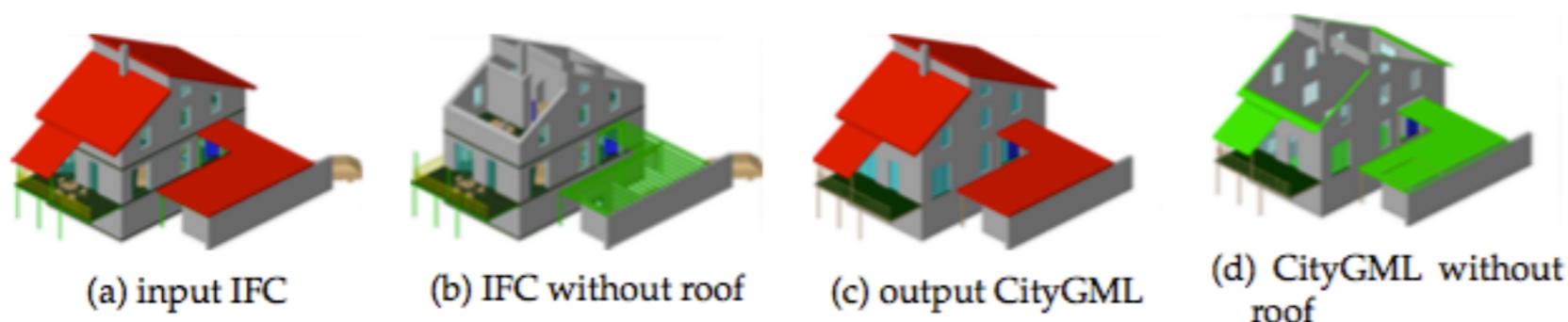
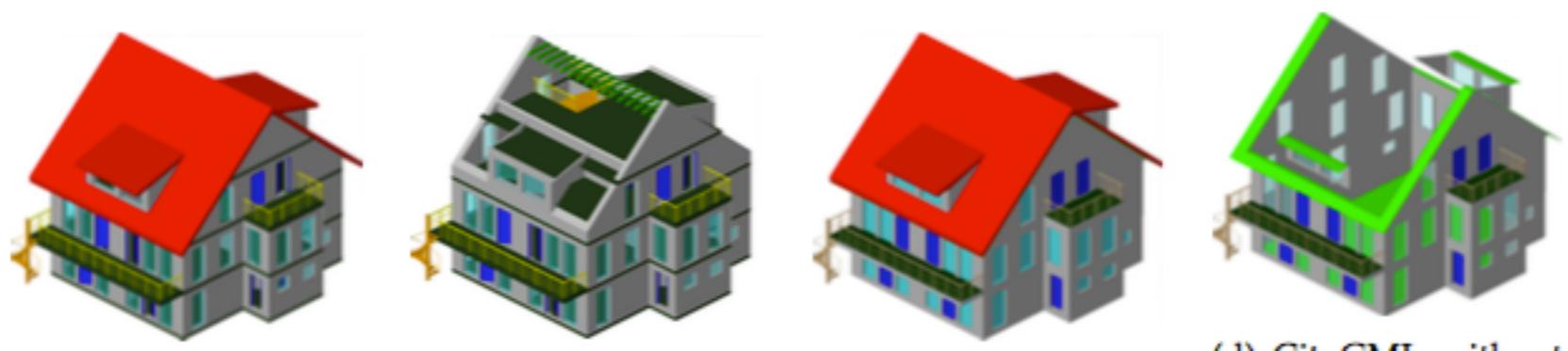


Figure 18: **FJK-House** dataset, available at www.iai.fzk.de/www-extern/index.php?id=1167&L=0

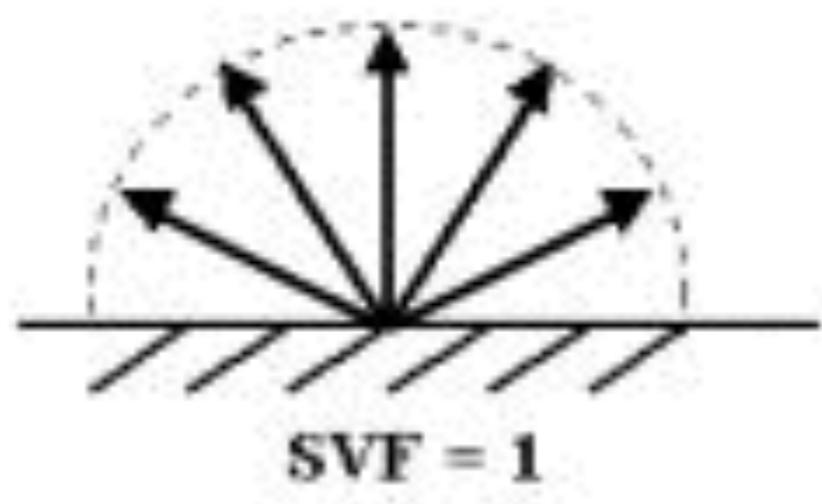


todo



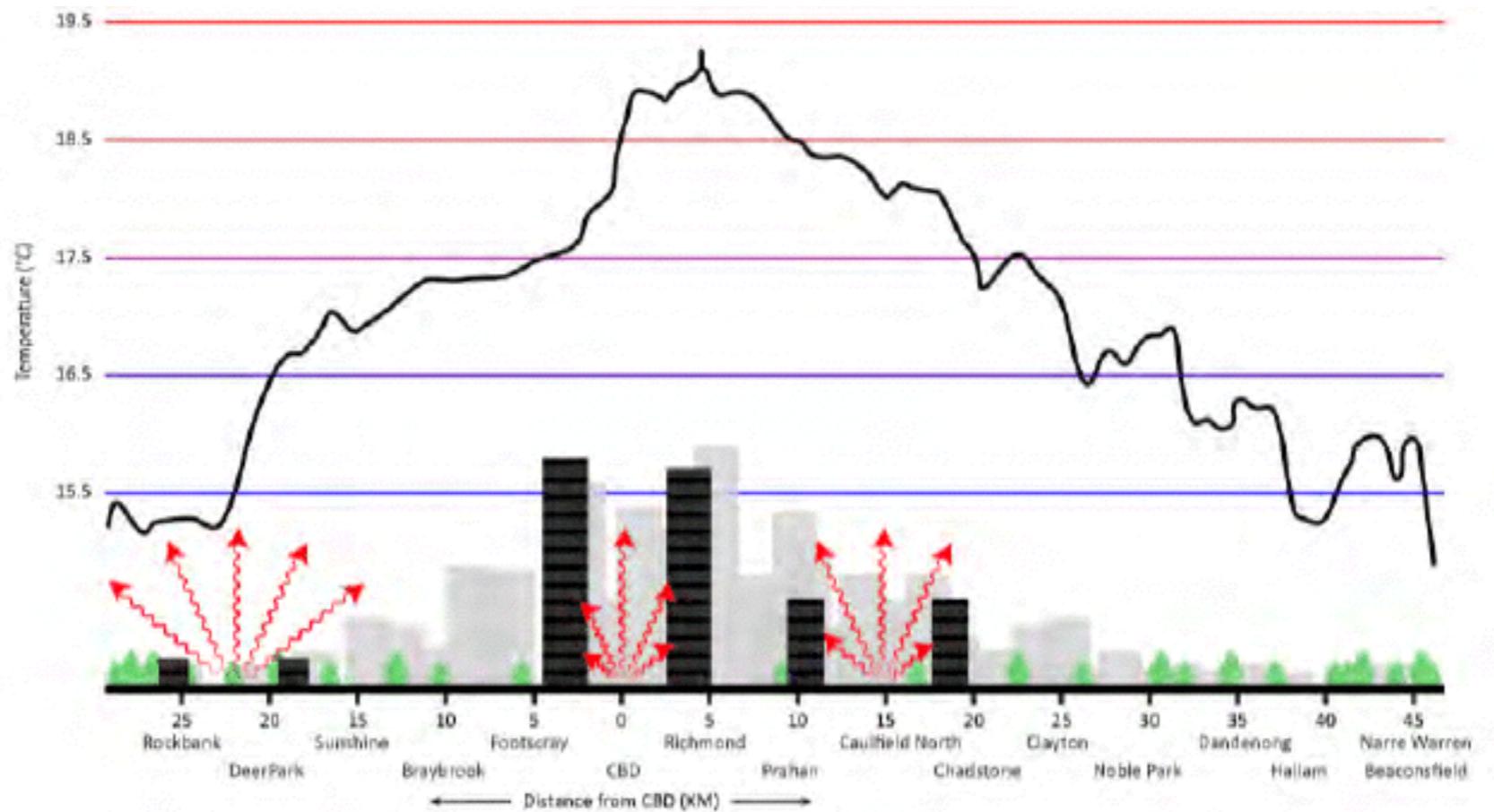
- improve methodology (LOD4, new LODs in CityGML v3)
- code is C++

Computing the sky view factor (SVF) from point clouds



SVF: the proportion of visible sky in the hemisphere of a given point

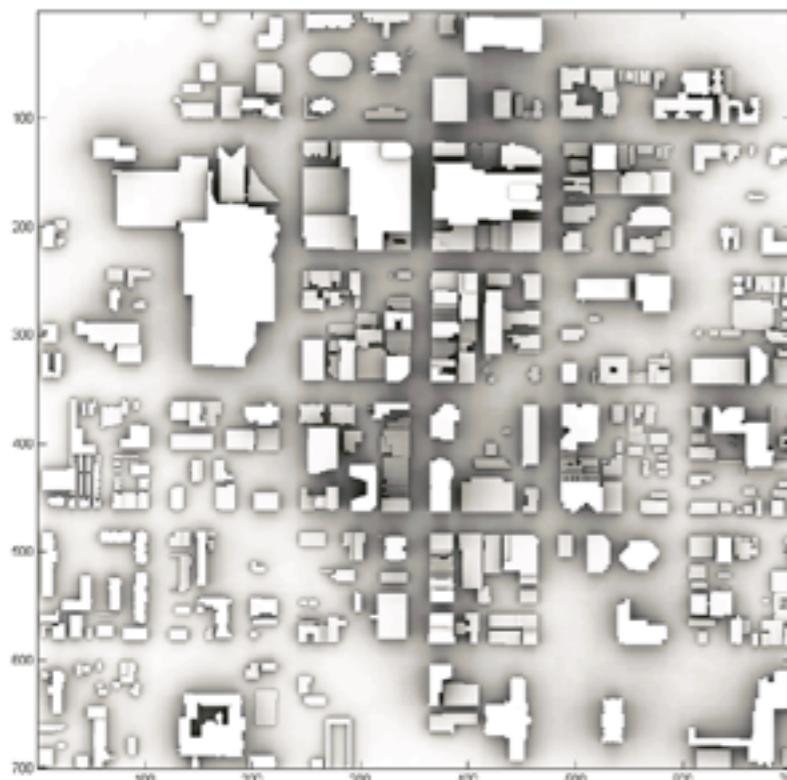
Computing sky view factor (SVF) from point clouds

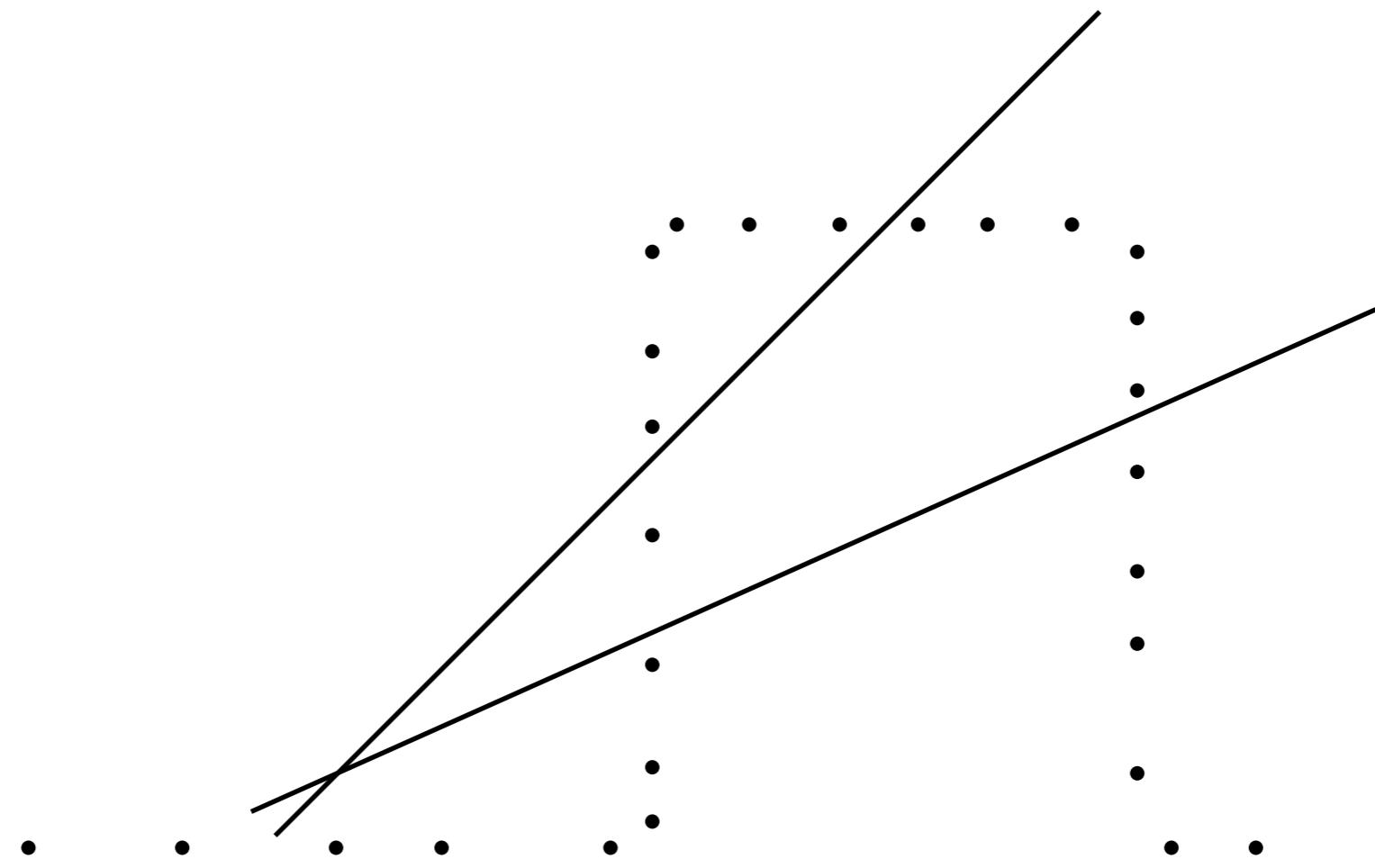


Used in research on urban canyon effects

Computing sky view factor (SVF) from point clouds

- Can the SVF be estimated directly from a point cloud?
- Skip time consuming generation of building models
- Include all scanned objects including vegetation.

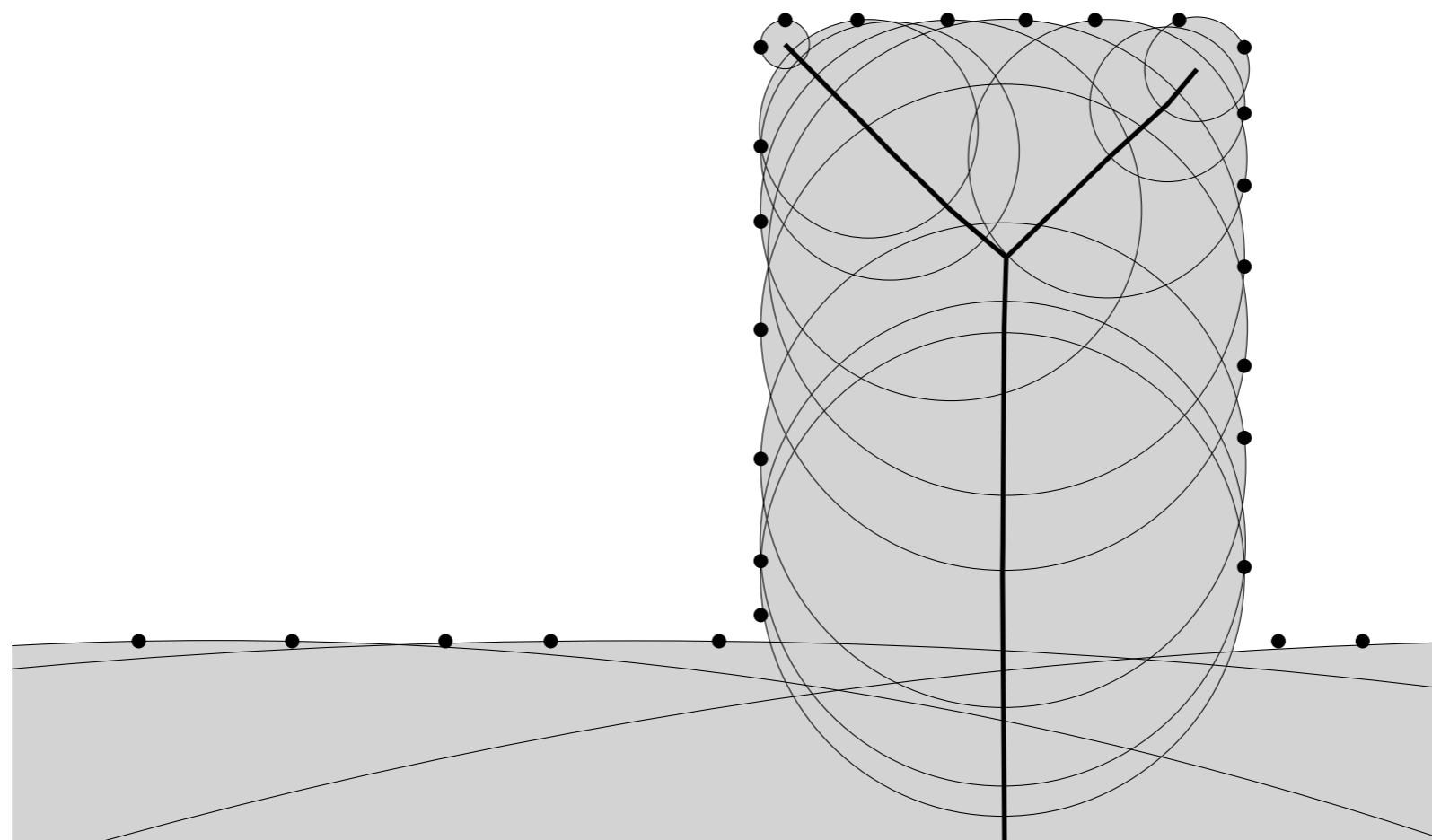




Medial Axis Transform

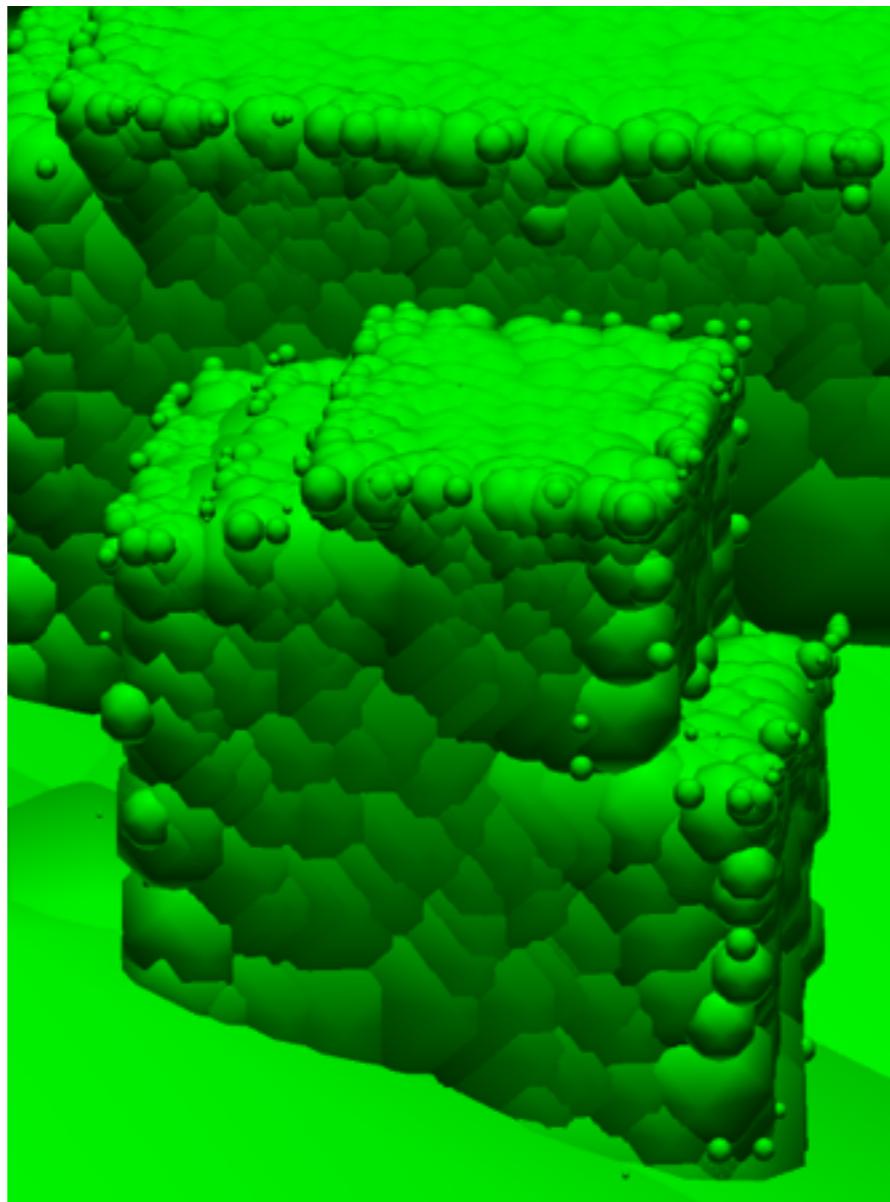
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skeleton

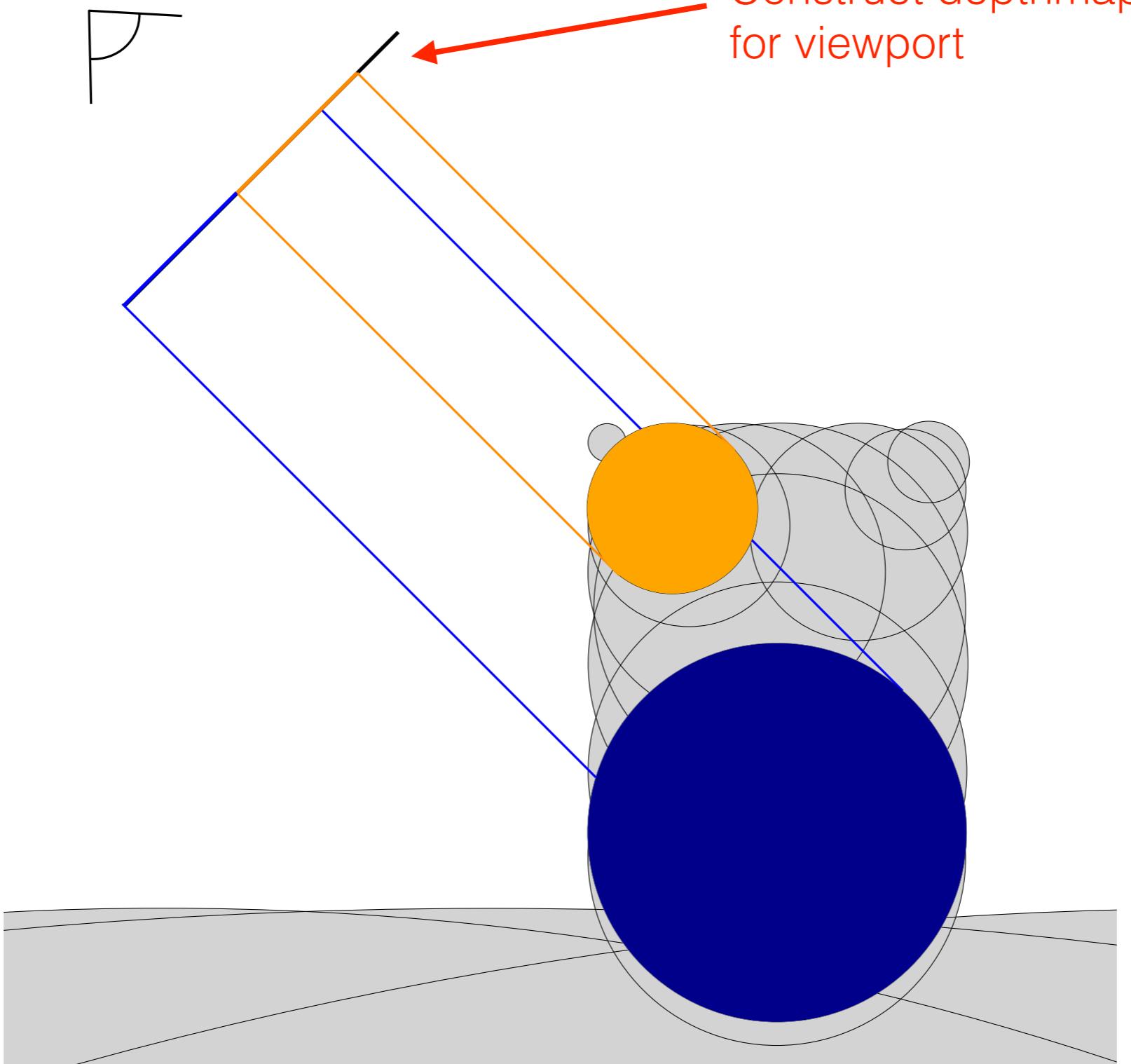


Building volume

By union of medial balls



Workflow



Computing sky view factor (SVF) from point clouds

- Candidate must be fluent in Python and eager to extend and improve coding skills
- Contacts: Ravi Peters, Hugo Ledoux

Automatic generalisation of
depth contours



Smoothing



53

44

Aggregation

53

soCymS

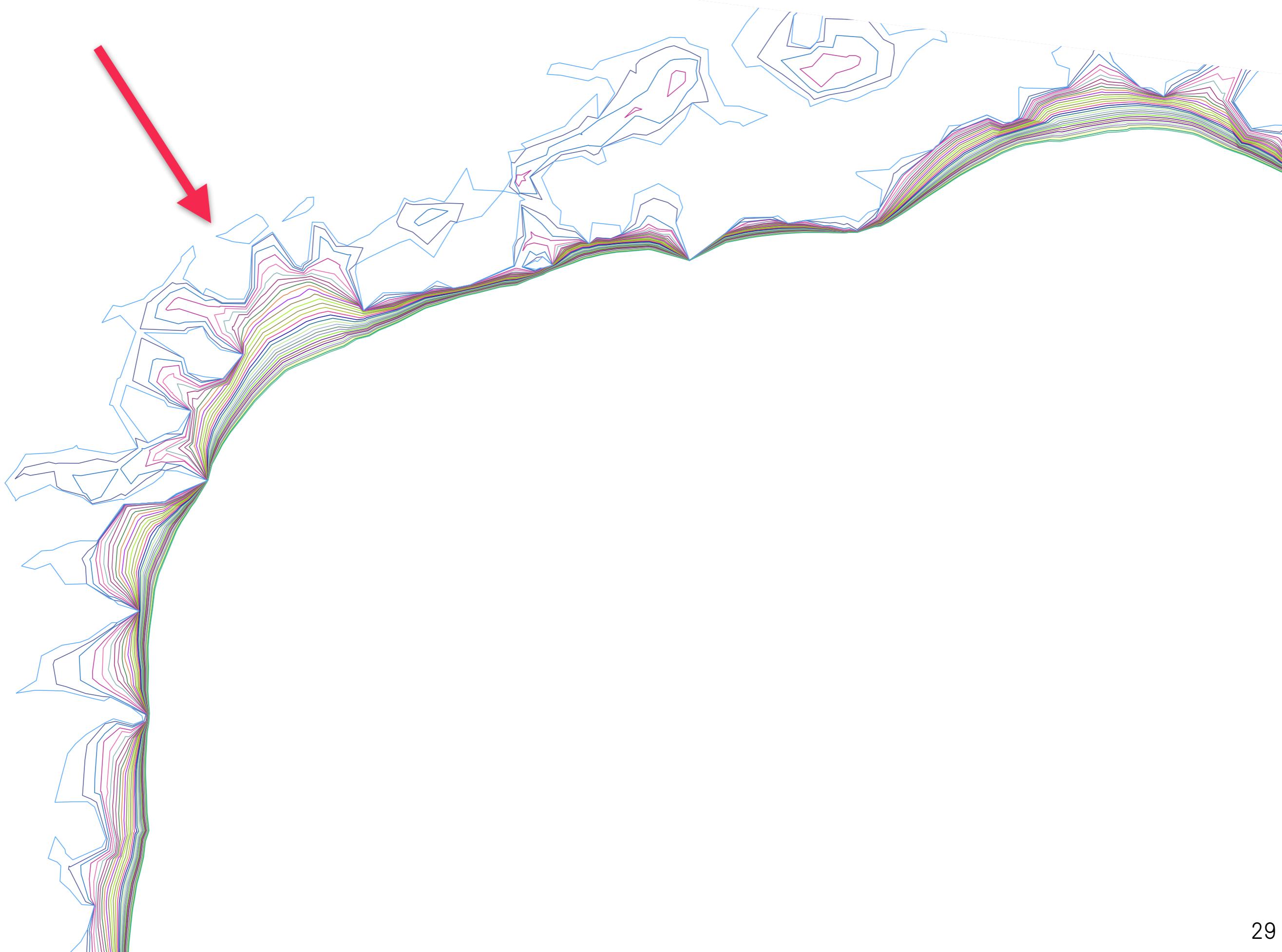
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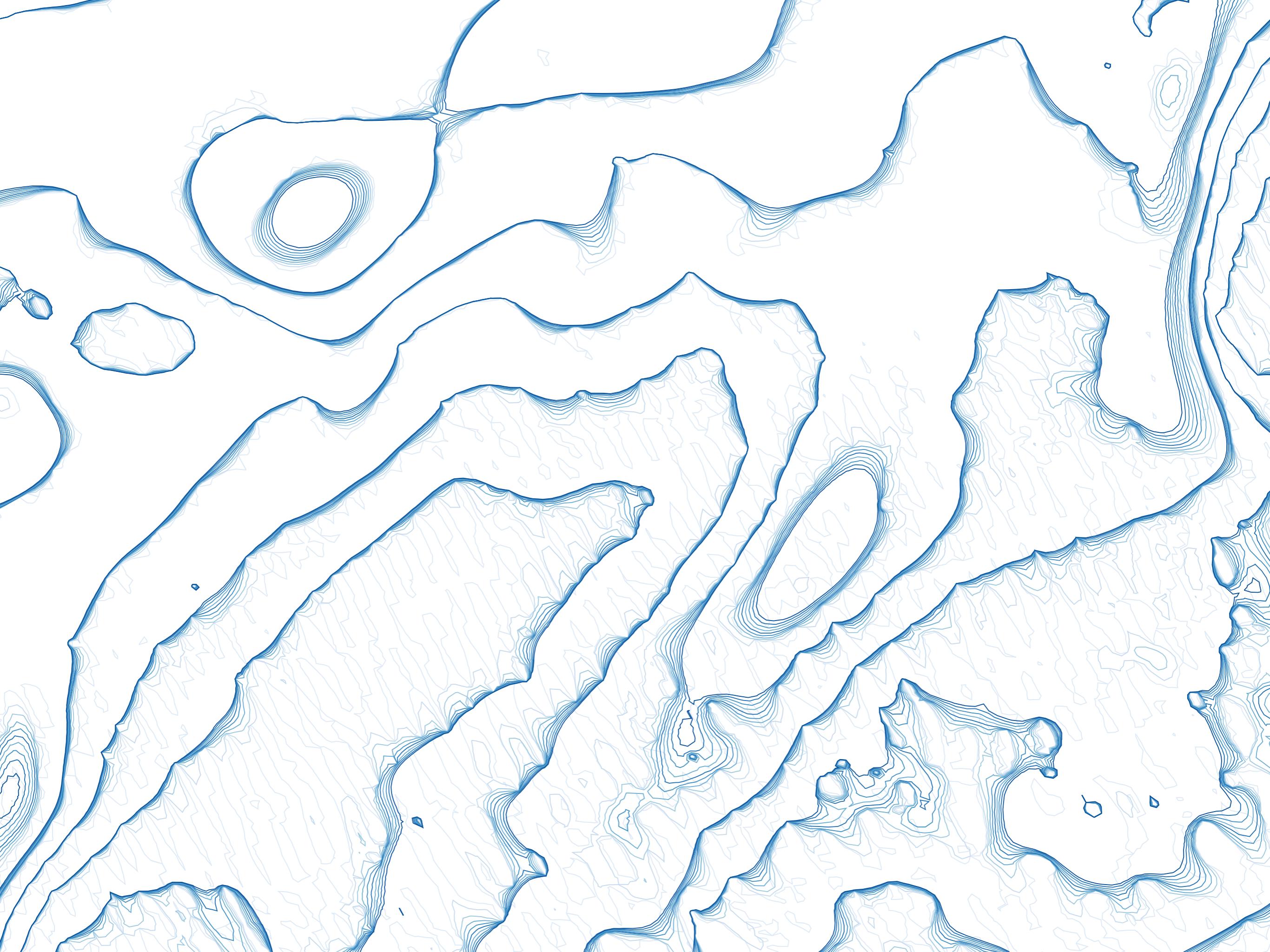
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47

54

28





good to know



- supervised by Ravi Peters and myself
- focus on automatically applying the algorithms + where to generalise
- starting with working code
 - <https://github.com/Ylann1/Surfonoi>
- code is C++, but probably possible to make do with Python