3D MODELING
UTAH VALLEY UNIVERSITY
GIS & REMOTE SENSING

GEOMATICS PROGRAM
UTAH VALLEY UNIVERSITY

Sowmya Selvarajan, PhD
Assistant Professor of Geomatics
Utah Valley University

ABSTRACT

THE NEED

WHAT?!

- Reconstructing UVU's 3D virtual model
  - Initial results
- Future Research Directions

WHY?!

- Demand for 3D geospatial data
- Initiated by the Geomatics program (Summer 2013)
  - To develop 3D virtual photorealistic model of the campus of UVU

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40⁰ 16’ 37” N

4606 ft

111⁰ 42’ 46” W

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Public University

Strong core values on **Teaching and Engagement**

Largest public University in Utah

Founded in 1941

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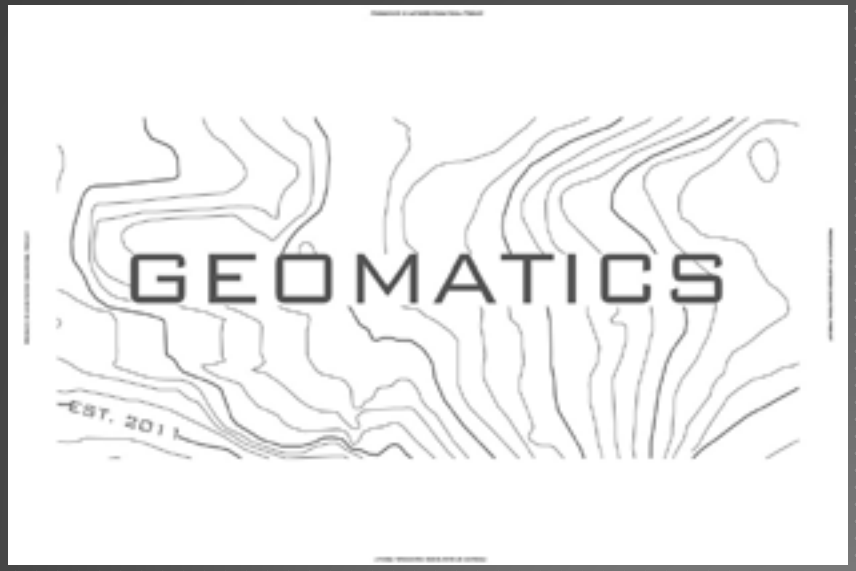
UVU - GEOMATICS PROGRAM



- Program started in 2011
- Currently 35+ declared majors in Geomatics
- Builds students in all aspects of geospatial technology : surveying, geodesy, legal and law, remote sensing, AND **GIS**

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SOMETHING NEW AT UVU

GIS and Geospatial technology is a new concept

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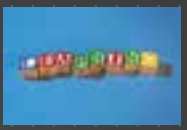
GRANTS FOR ENGAGED LEARNING



- Funded in 2012-13
  - Acquire very high resolution aerial imagery and high dense LiDAR data

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AERIAL IMAGERY

- Spatial resolution – 10cm
- Spectral resolution – 4 bands (B, G, R and IR)
- Large format Ultra CamX camera
- After winter, before spring (April 24th, 2013)

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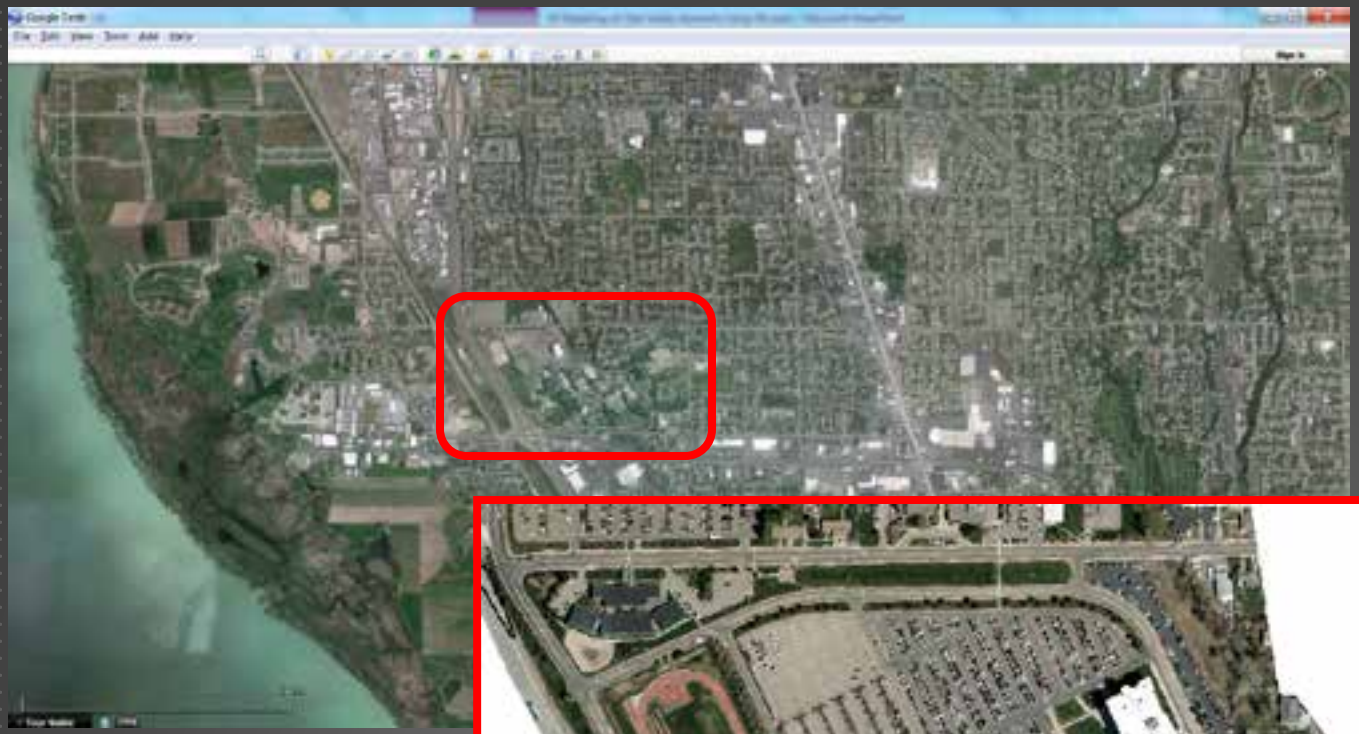

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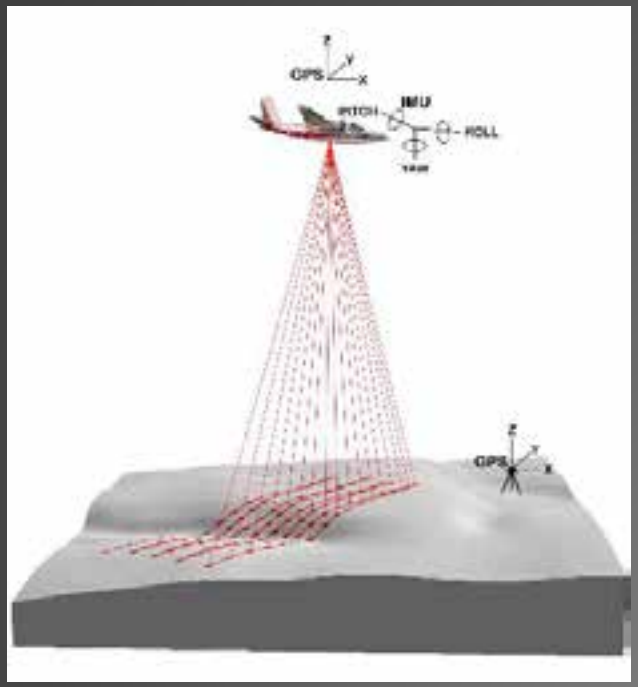
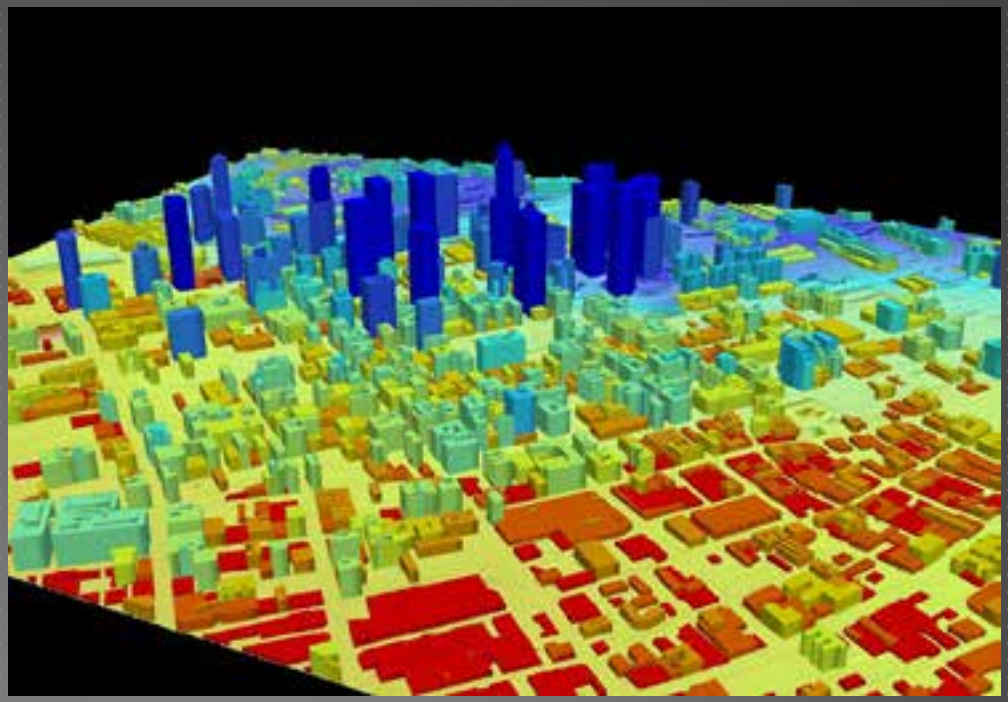
LIDAR – LIGHT DETECTION AND RANGING DATA



Courtesy:
http://forsys.cfr.washington.edu/JFSP06/lidar_technology.htm



Courtesy:
http://www.leidos.com/geospatial/modeling/lidar-urban-modeling

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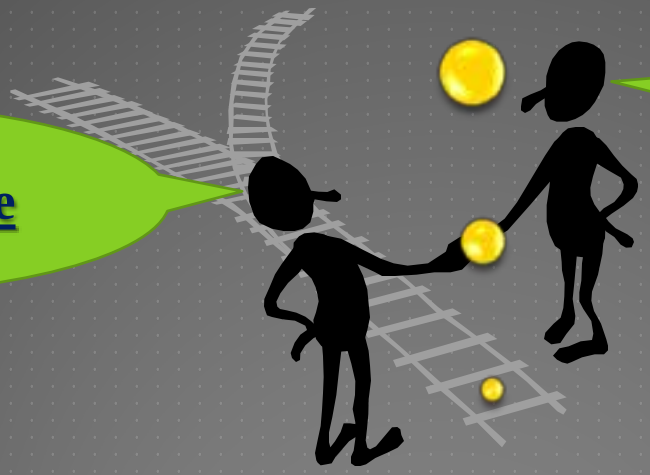
Remote Sensing & GIS !!!



Yo, I'm sam **Image**

Hey, I'm john **LiDAR** ..

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DATA FOR 3D MODELS

- Integrating aerial and LiDAR data
- To reconstruct
  - terrain surface with various topographic features
  - Building geometry

INTEGRATION OF MULTI SENSORS – WHY?!

- Accuracy enhancement
- Limitations related to occlusions, shadows and disadvantageous viewing angles

DERIVED-DATA FROM LIDAR

- Multi points to earth model
- Hill shade
- Contour
- Building elevations and geometry

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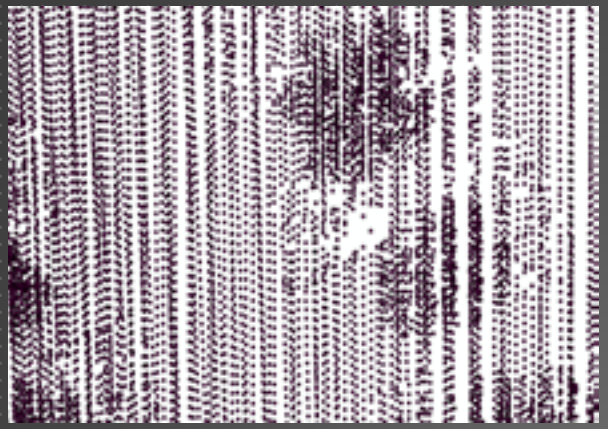
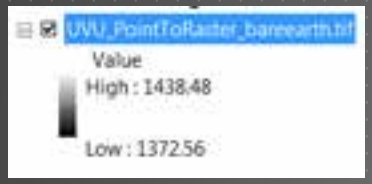
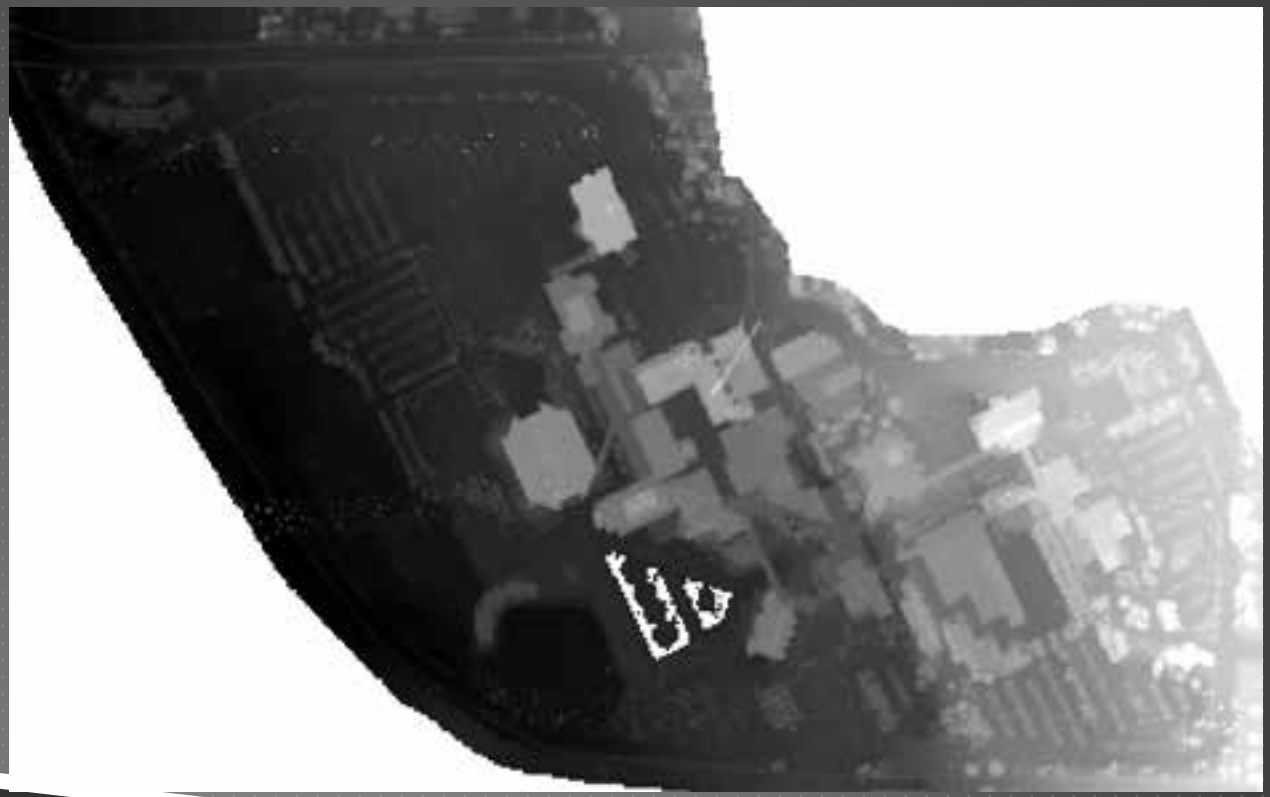
LIDAR - MULTI POINT (LAS) TO RASTER







LIDAR - HILL SHADE OF UVU

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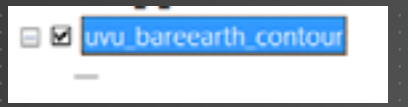
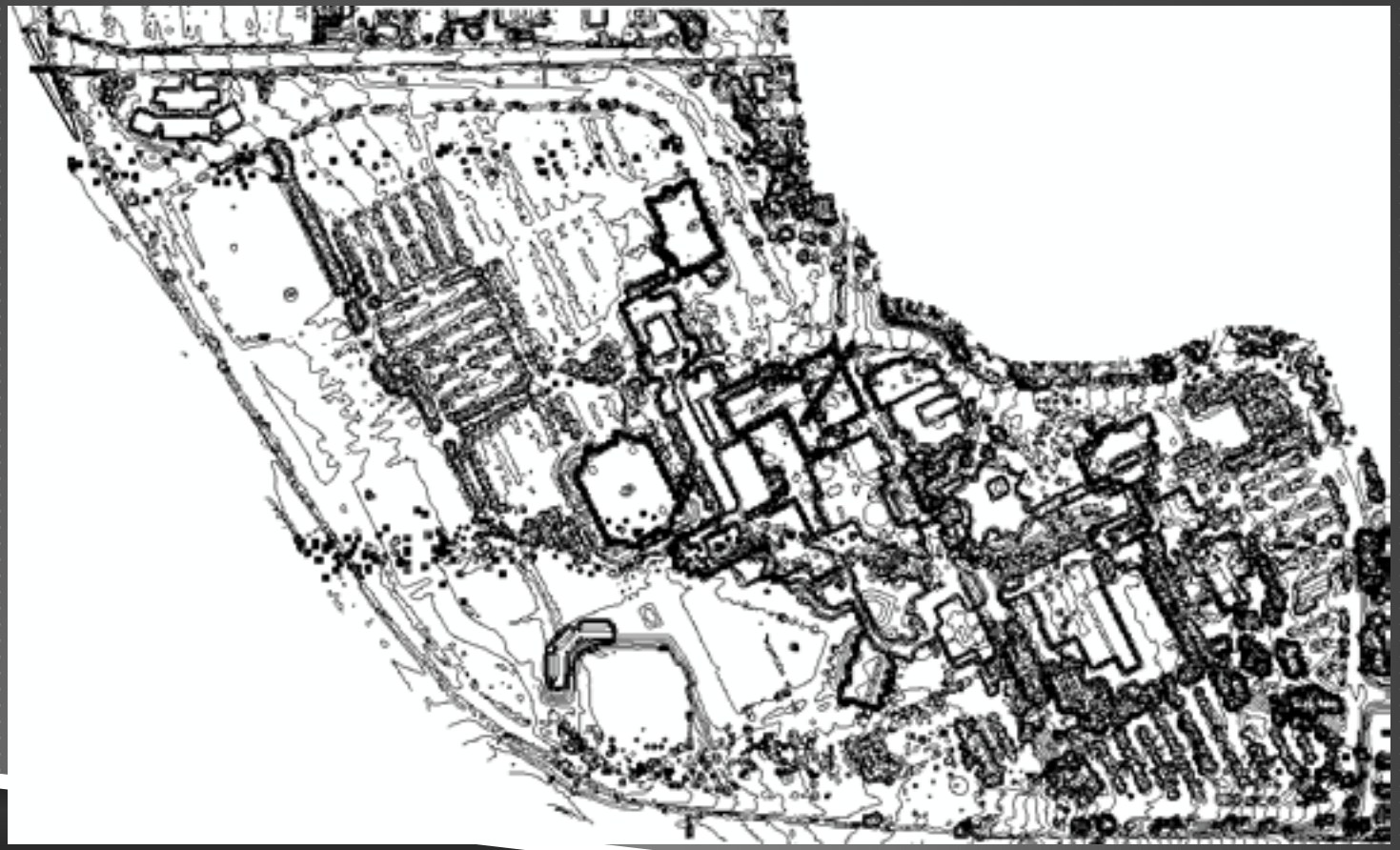
LIDAR - CONTOURS OF UVU





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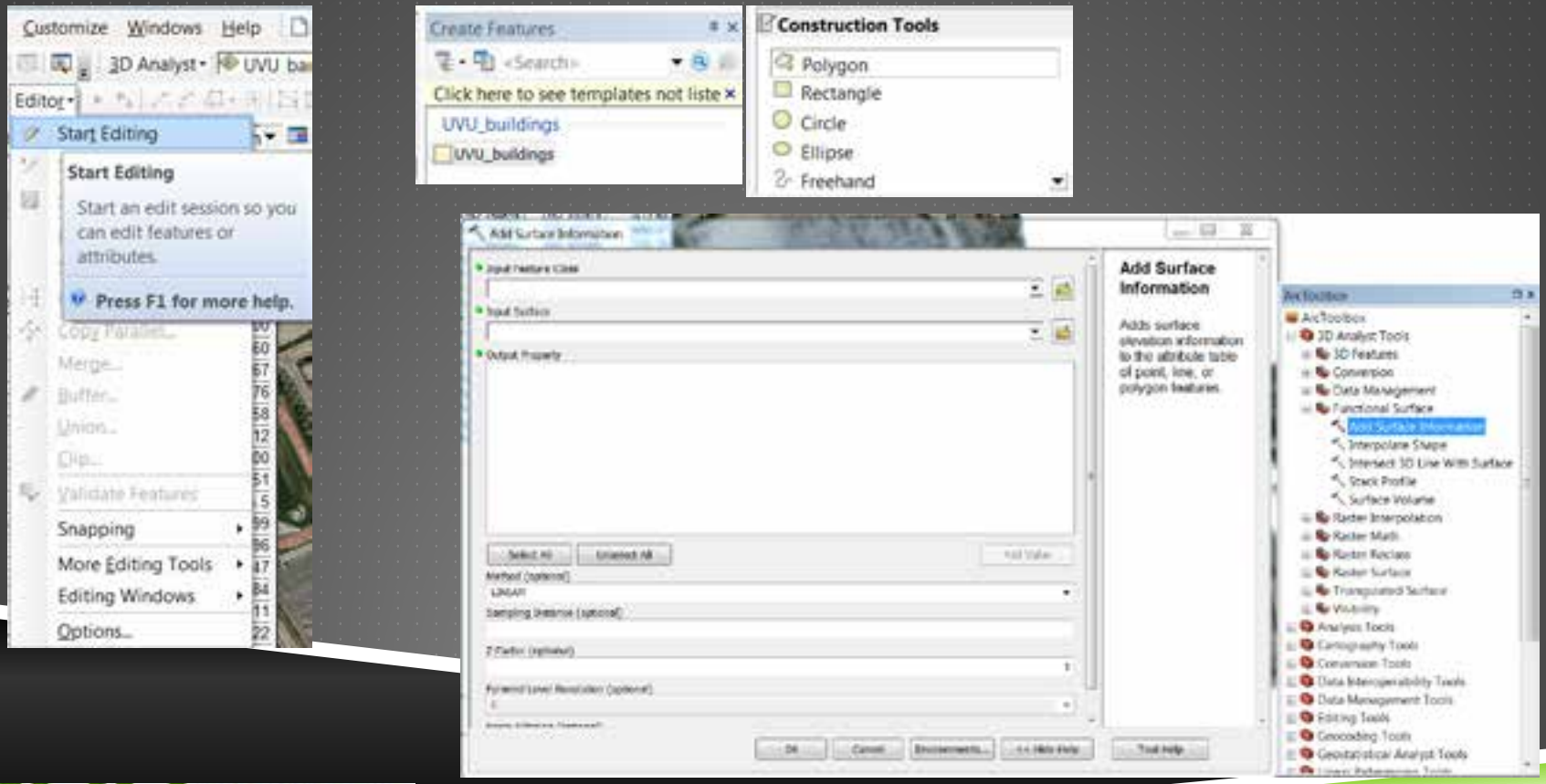
DERIVED DATA FROM AERIAL IMAGERY

- Polygon - Building footprints with surface info
- Polygon - Sports & Stadium
- Polygons – Parking lots
- Lines – Roads

BUILDING FOOTPRINTS

A functional surface was created with the building footprints



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BUILDING FOOTPRINTS

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3D MODELING IN ARCSCENE

Animation
in ArcScene

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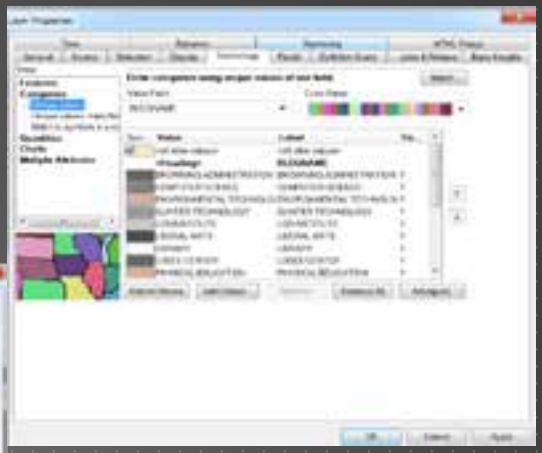
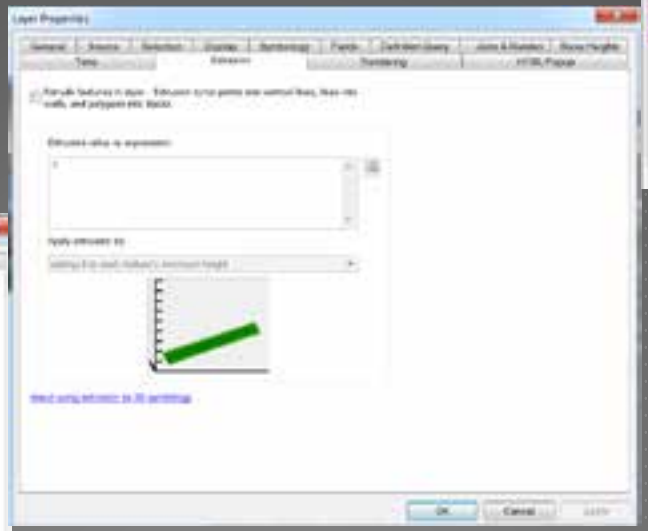
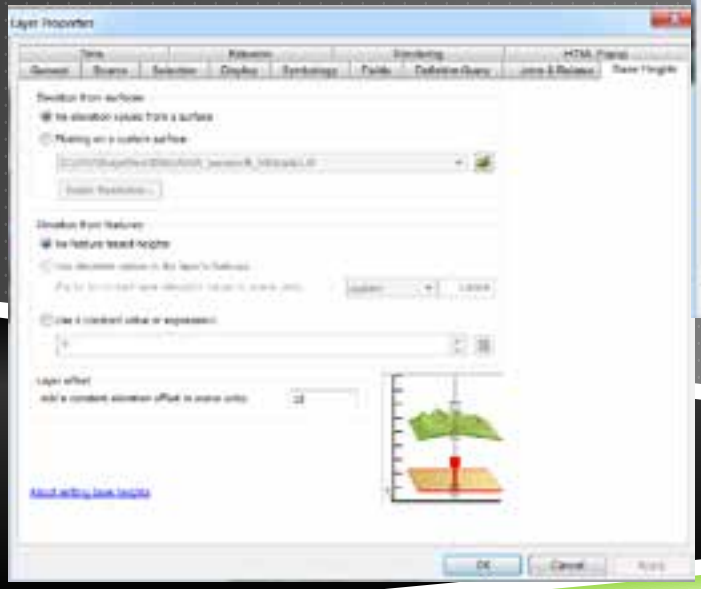
LAYER PROPERTIES IN ARCSCENE







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TEXTURING PARKING LOTS WITH PICTURE FILL

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SPORTS' & STADIUM AT UVU

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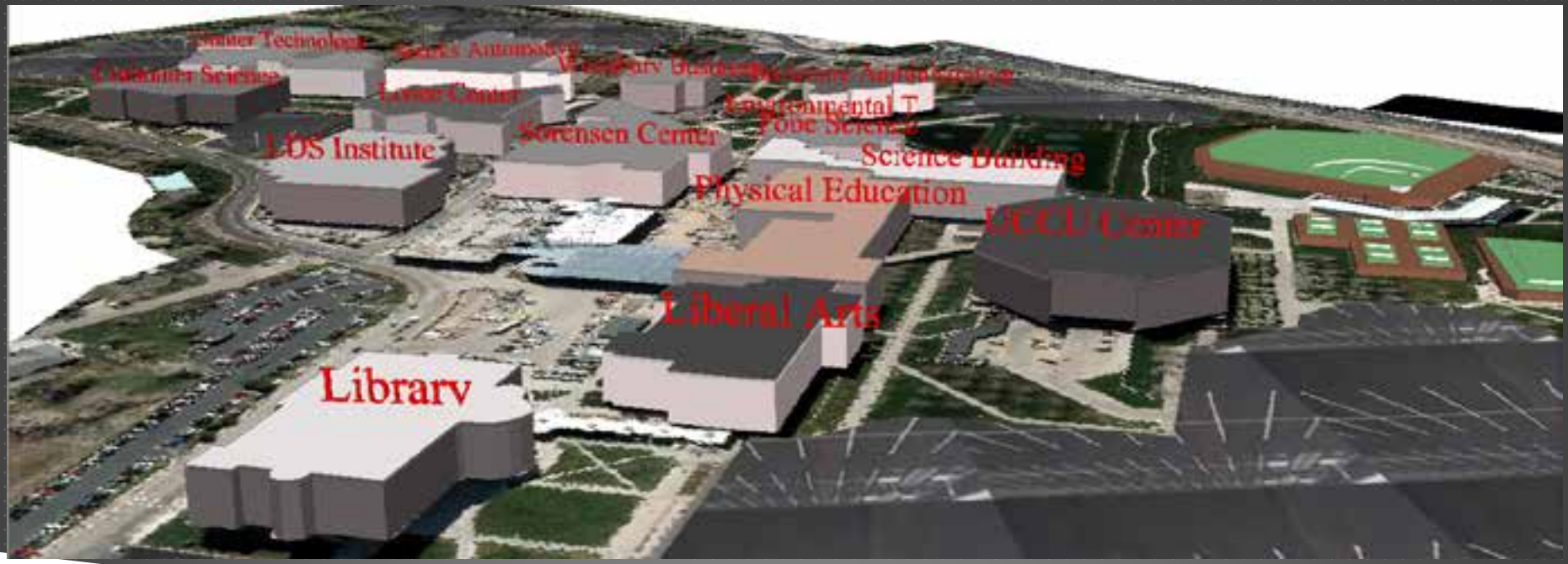
GRAPHICS TEXT



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3D UVU MODEL

3D UVU MODEL

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FUTURE WORK

- Building photo realistic texturing using SketchUp fusion
- Roads rendering
- Accurate parking lot features
- Customized graphics and texts

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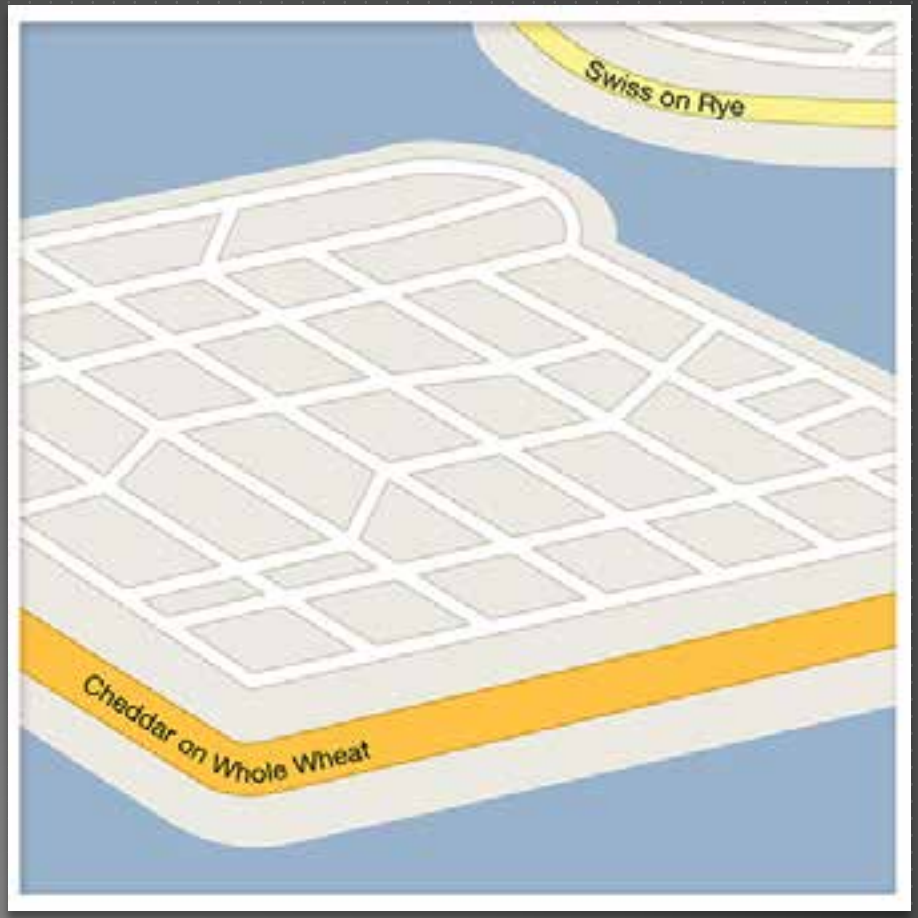
THANK YOU !

www.uvu.edu/geomatics



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