

Advanced material processes and die design DSL 732

Topic 8 3D Scanning

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3D scanning

- Opposite of 3D printing
- Cyber-physical systems
- [Applications](#) – Reverse Engineering, Elevation mapping, Internal body structures, [AR](#)
[Sushant AR](#), [VR](#), [Motion Capture](#) [DIY MoCap](#)

3D Scanning technologies

- Photogrammetry
- Fluid scanning
- LIDAR
- CT (Computed Tomography) scan
- AFM (Atomic Force Microscopy)

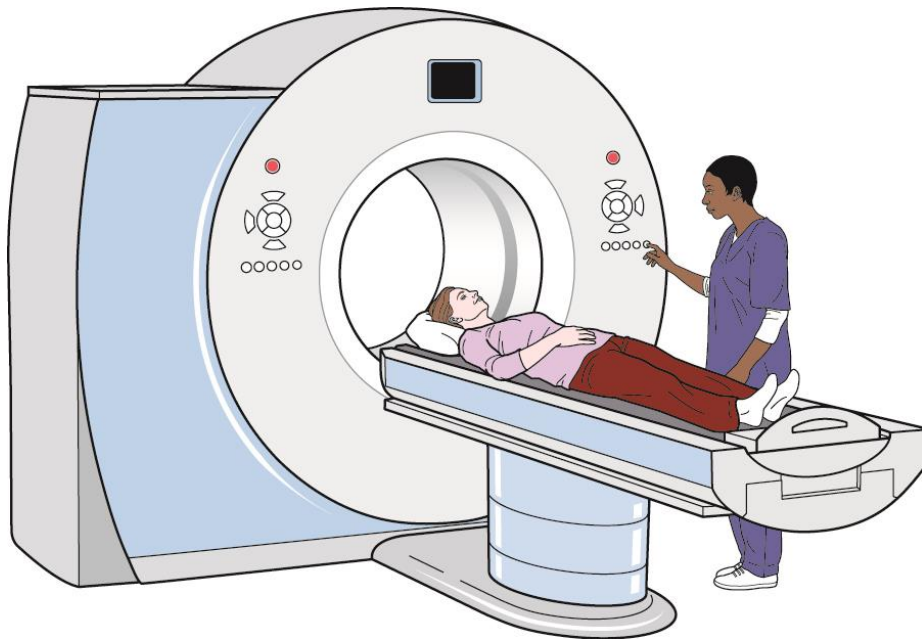
Fluid scanning

- [Milk Scanner Video](#)



CT scan

- How does CT scan work?
- Internal body structures



CT Scan machine



Head CT

LIDAR

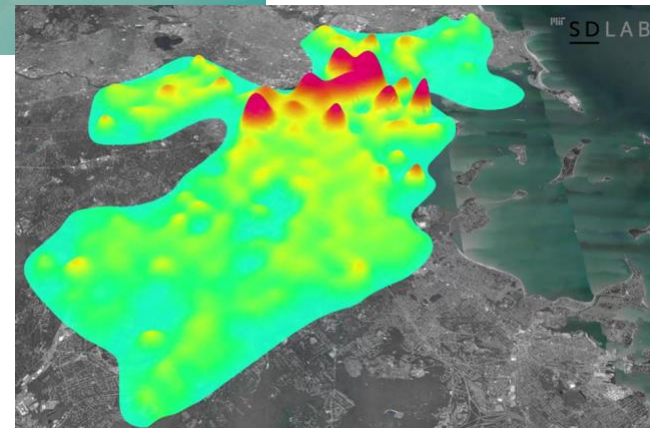


[3D buildings with aerial LIDAR](#)

[How does LIDAR work?](#)

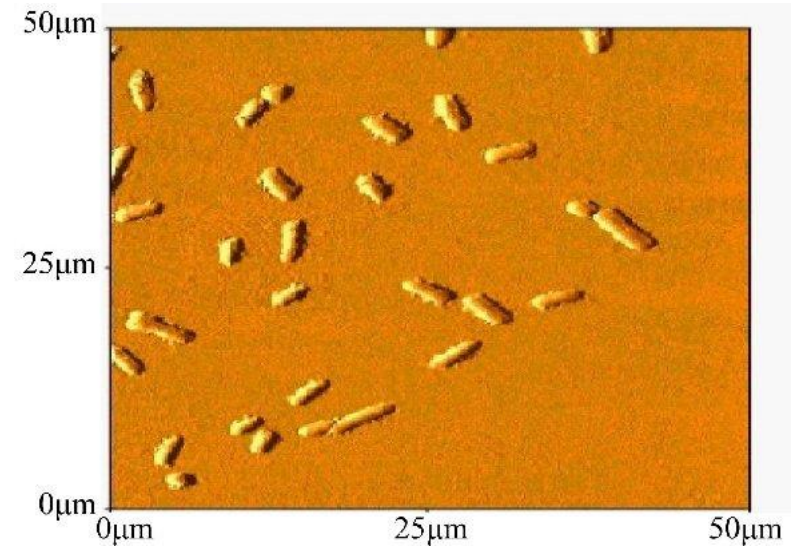
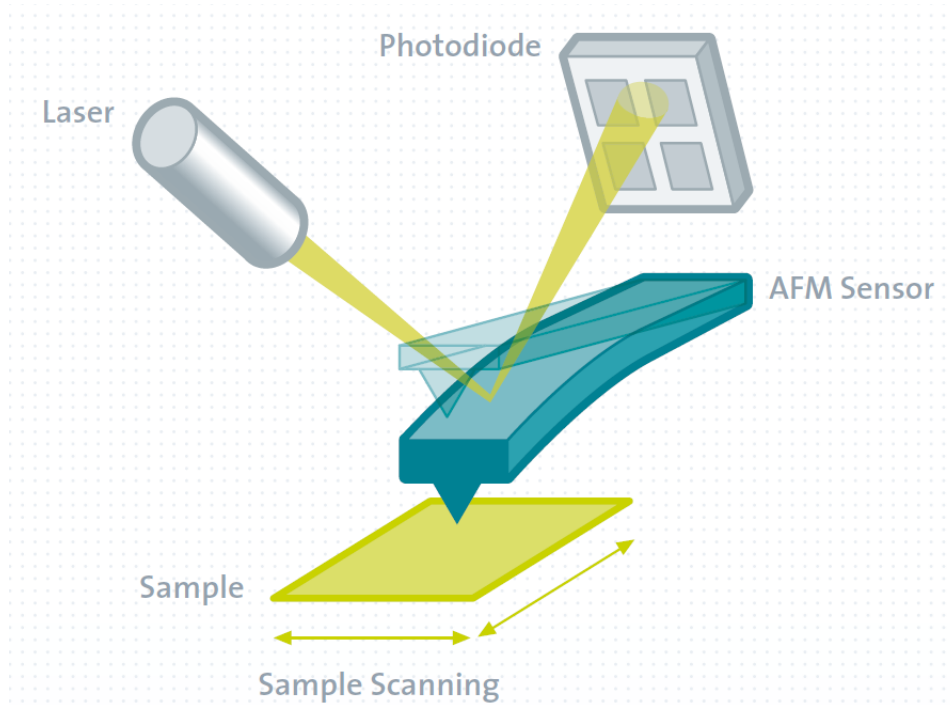
[LIDAR Applications](#)

[MIT SDL Boston
energy model](#)



AFM

Micro-nano scale



[E. Coli](#)

[Source](#)

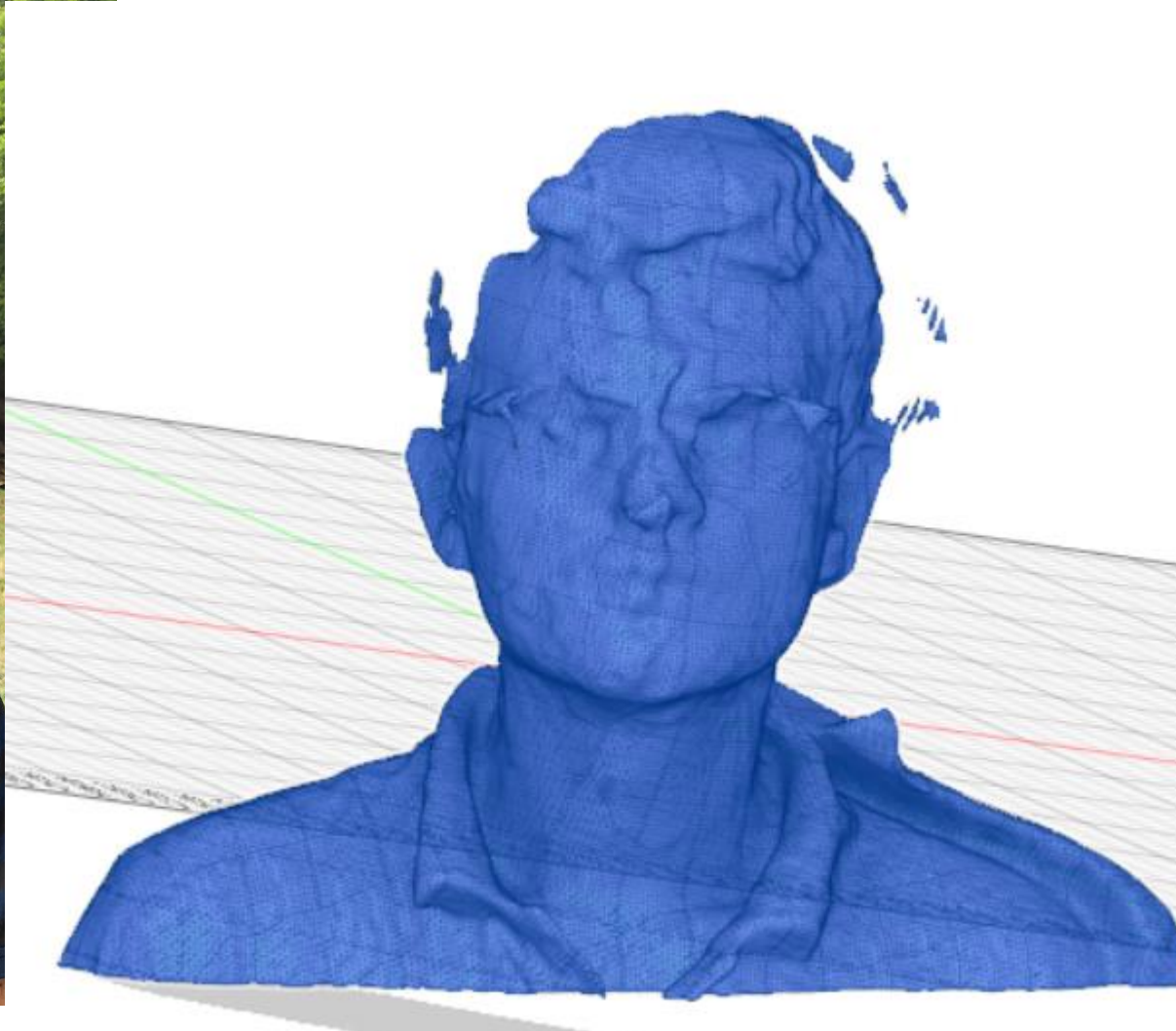
[AFM animation](#)

Photogrammetry



- Using images to construct a 3d model
- Image quality tips: Textures surfaces work better, diffused light conditions.
- Avoid Uniform surfaces (Blank Walls), Transparent Objects, Reflective surfaces
- [Best smart phone apps for 3D scanning](#)
- SCANN3D Android App, export not free
- Qlone Android/iOS App
- 3D Creator Android App
- [Sense 3D Scanner](#)
- [Kinect](#)
- 3DF Zephyr Desktop software [Tutorial 1](#) [Tutorial 2](#)

3DF Zephyr scan



3DF Zephyr workflow

- Get photos for a 360° view
- In 3DF Zephyr, make a 3D model and mesh
- Clean up the model with Tools. Bounding Box.
- Export the obj file to Fusion 360 to clean up the model further. Make a closed mesh and export stl file. (optional step)
- Open obj/stl file in Ideamaker. Repair if needed. 3D print if you would like.

3D scanning resources

- [Fab Academy Video](#) (56:00 – 1:11:00)

Groups, Meeting place

- 3D printing: Near makerspace 3d printer
- 3D Scanner: WS-213 Orange Studio
- Laser cutting: Near makerspace laser cutter

Dates	Group	Machine training
16, 17 Sept	1	3D printing
19 Sept	1	3D scanning
23, 24 Sept	1	Laser cutting
16, 17 Sept	2	3D scanning
19 Sept	2	Laser cutting
23, 24 Sept	2	3D printing
16, 17 Sept	3	Laser cutting
19 Sept	3	3D printing
23, 24 Sept	3	3D scanning

Project reimbursements

- [Team mentors](#) **approve your purchases**
- Low cost projects without compromising quality
- Any purchase beyond 5000 ₹ can't be through cash.
- Online purchase fine with GST and credit card/debit card statement for a purchase > 5000 ₹.
- Local purchase = GST bill mentioning IITD GSTIN = 07AAATI0393L1ZI
- Team mentor + team meet me for a purchase > 1500 ₹
- Save the bills. Reimbursement procedure – later.

Announcements

- Share a anonymous feedback google form
- Uploading assignments on website – prototyping portfolio, searchable digital repository for junior batches and others interested in making.
- Can use www.wordhtml.com, main points + pdf in assignments also acceptable.
- Request Final Project documentation fully in html.
- CAD Assignment deadline 20th Sept.
- Assignments on 3D printing, 3D Scanning, Laser cutting deadline 12th October.