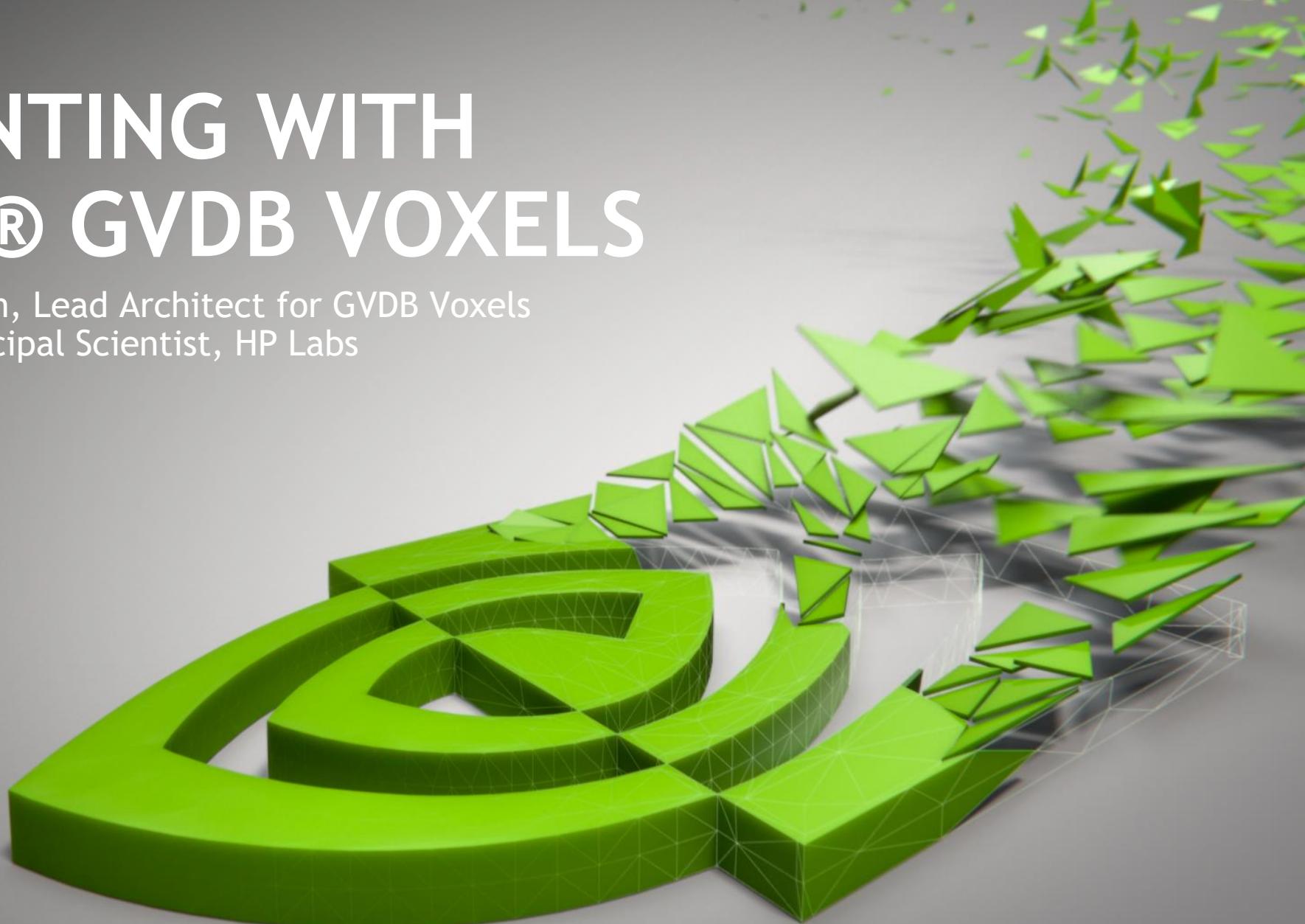


3D PRINTING WITH NVIDIA® GVDB VOXELS

Dr. Rama Hoetzlein, Lead Architect for GVDB Voxels

Dr. Jun Zeng, Principal Scientist, HP Labs



INTRODUCING

NVIDIA® GVDB VOXELS

A new, open source NVIDIA SDK
for compute, simulation and
rendering with sparse volumes



 **NVIDIA**.GVDB VOXELS

HP Jet Fusion 3D
4200/3200 Printer

HP Jet Fusion 3D Processing Station with Fast Cooling



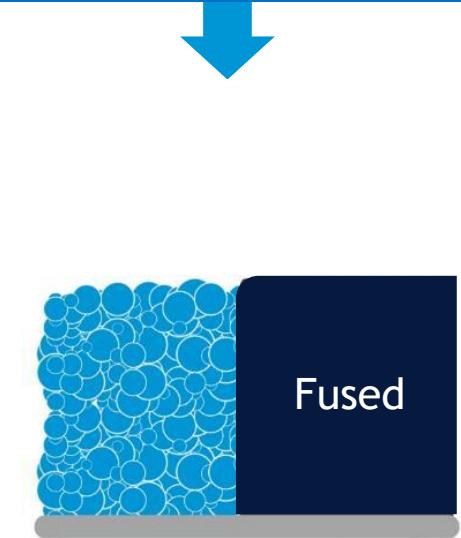
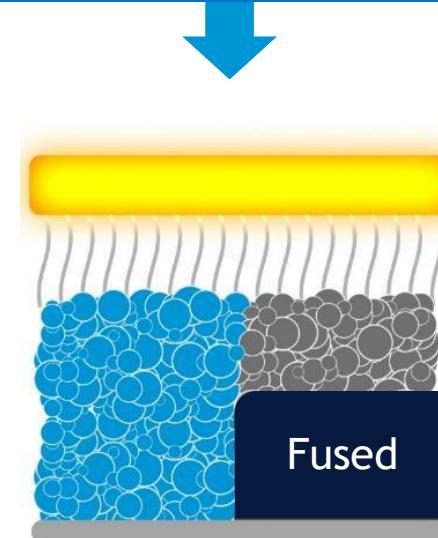
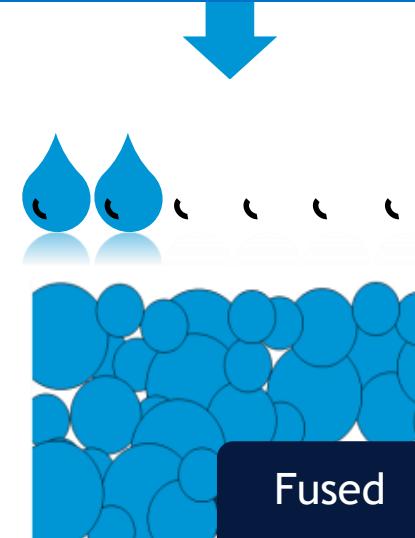
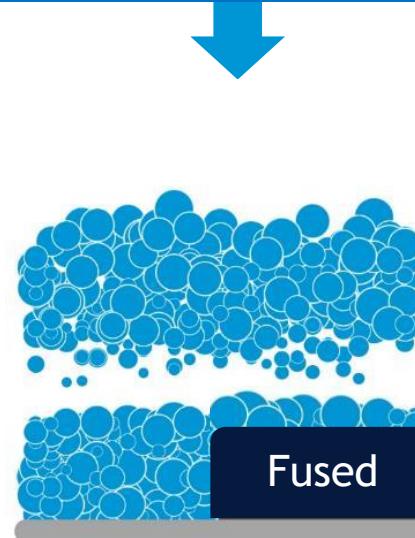
HP MULTI JET FUSION™ TECHNOLOGY

Basic elements of the process

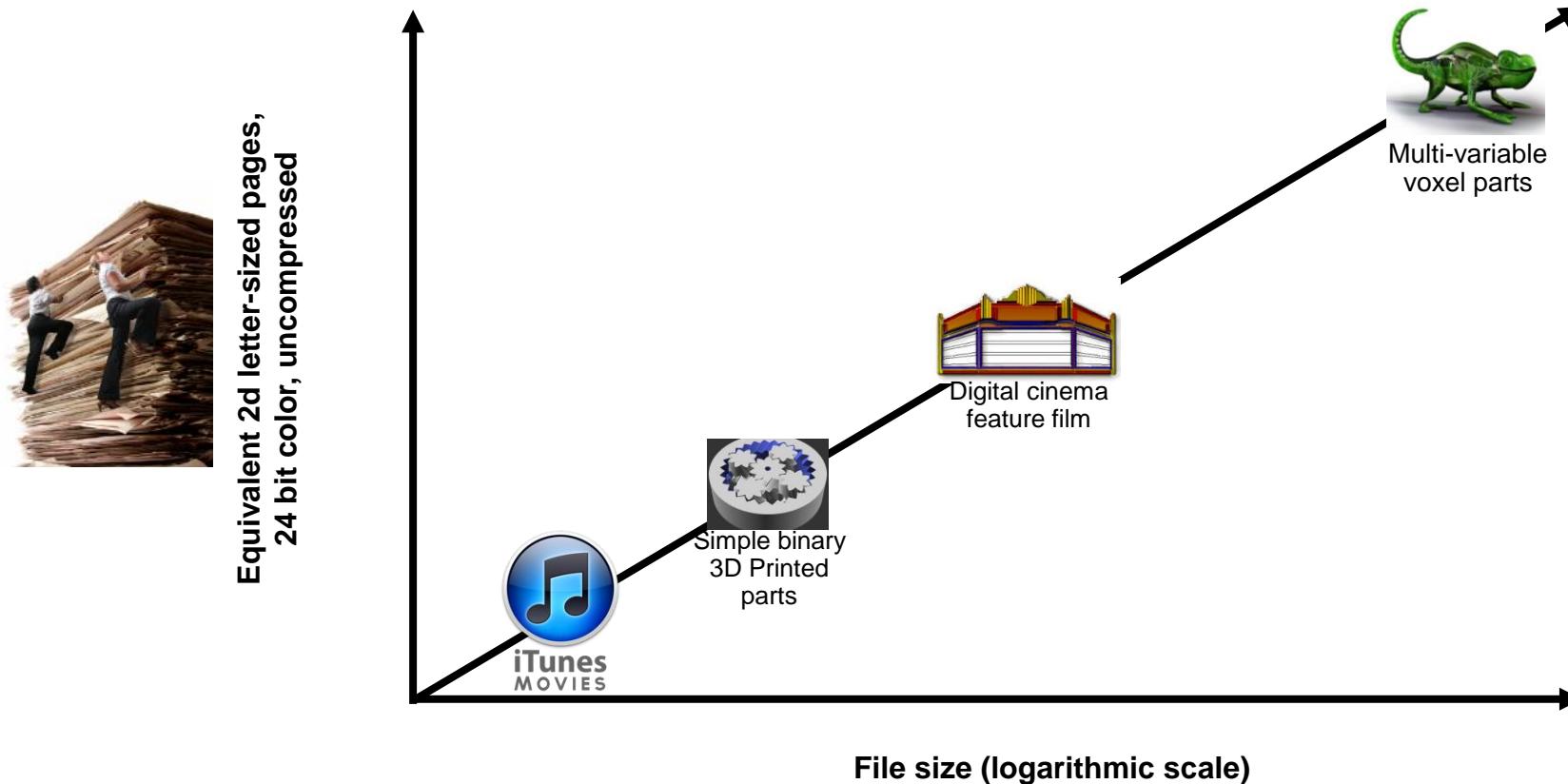
Material coating

Apply agents

Apply energy



Uncompressed voxel-based designs are very very large

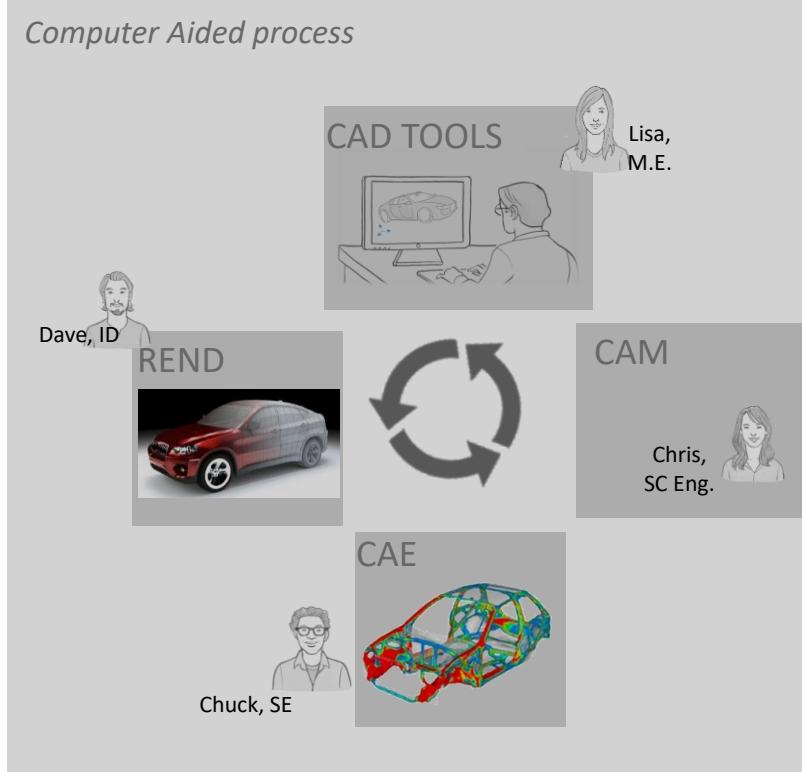


LONG TERM DATA PIPELINE FOR PART PRODUCTION

Digital on-ramp

PRODUCT ENGINEERING

Content Distribution



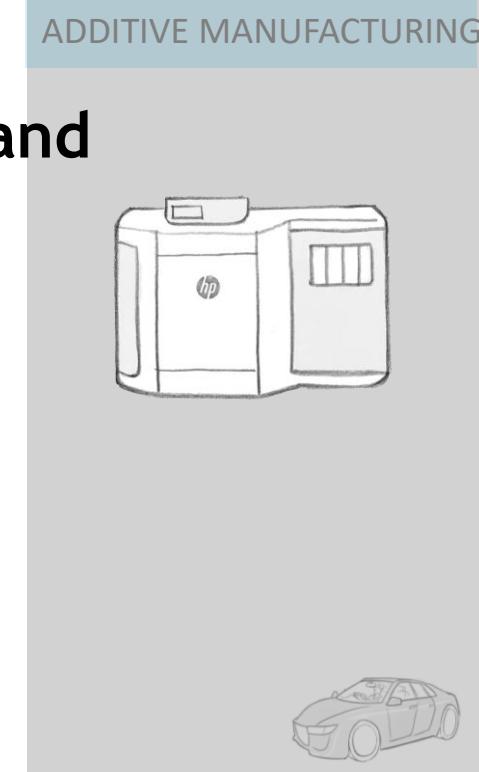
PRODUCT INTENT

Physical off-ramp

MJF PROCESS

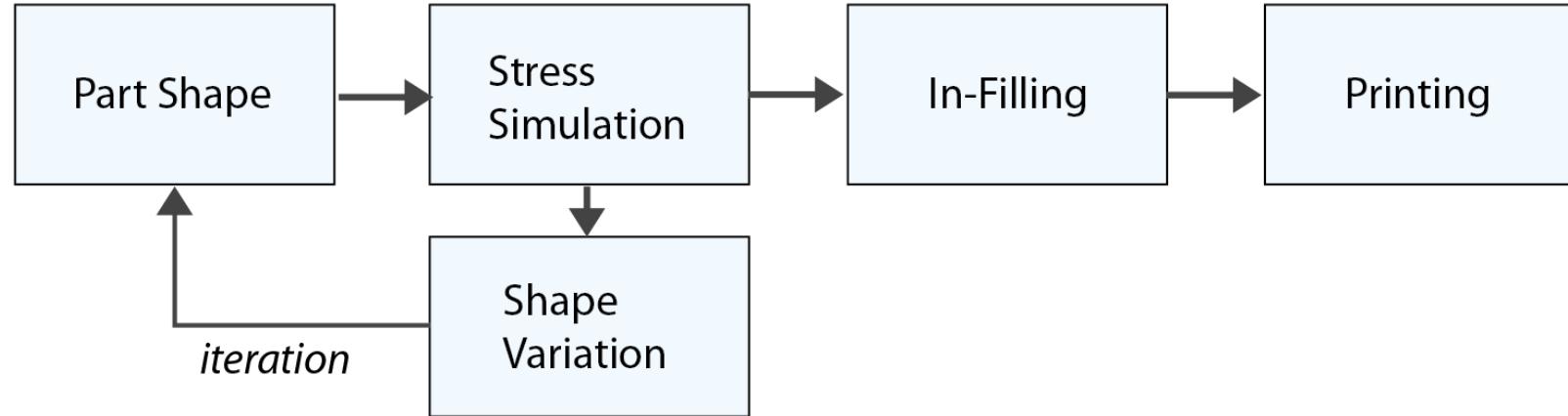
REAL PART

Process engineering and optimization

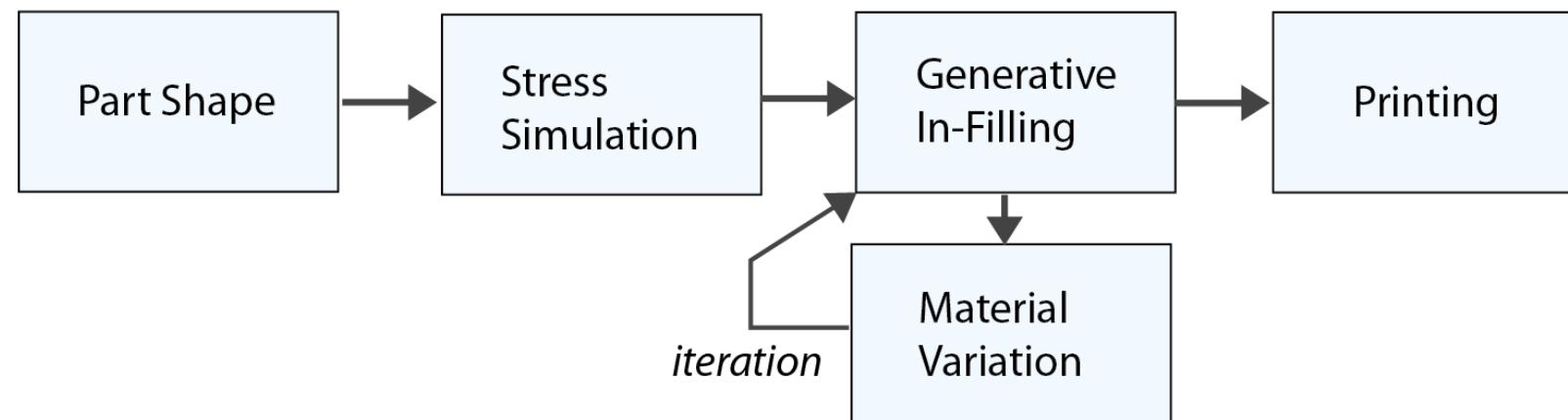


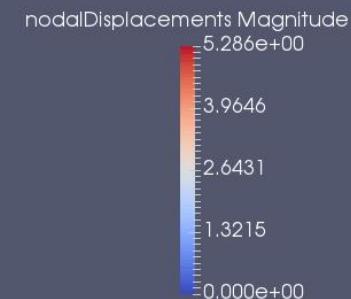
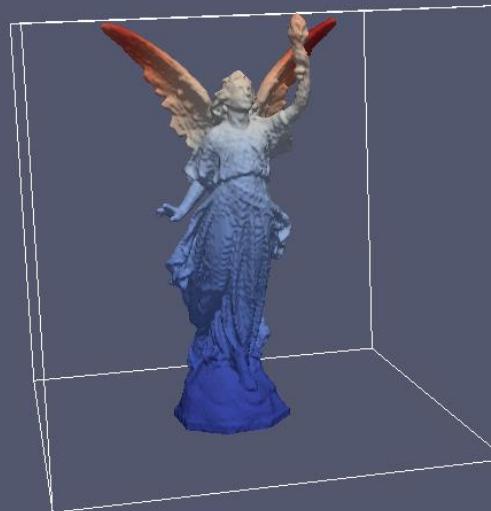
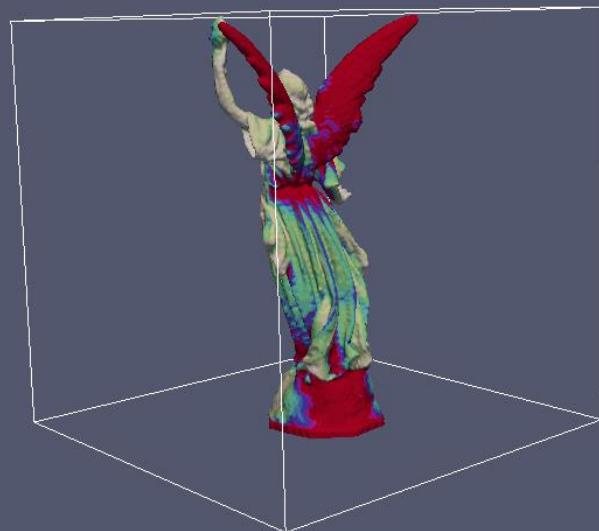
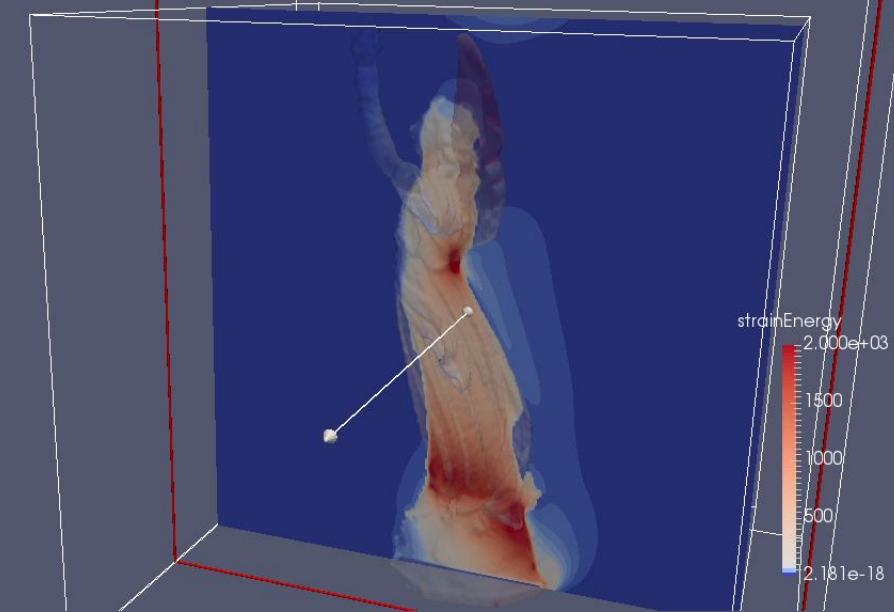
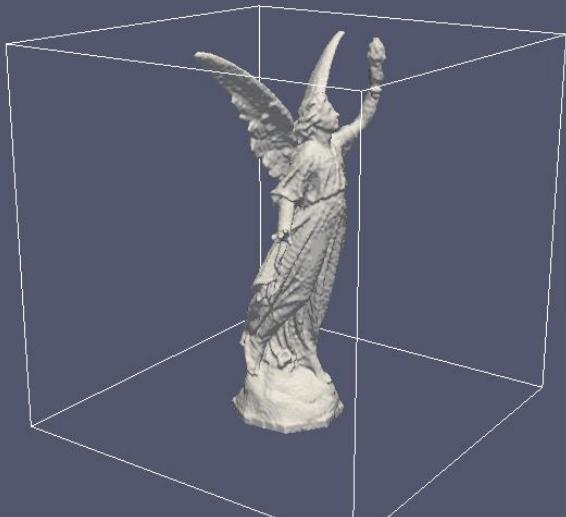
GENERATIVE DESIGN

MOTIVATION

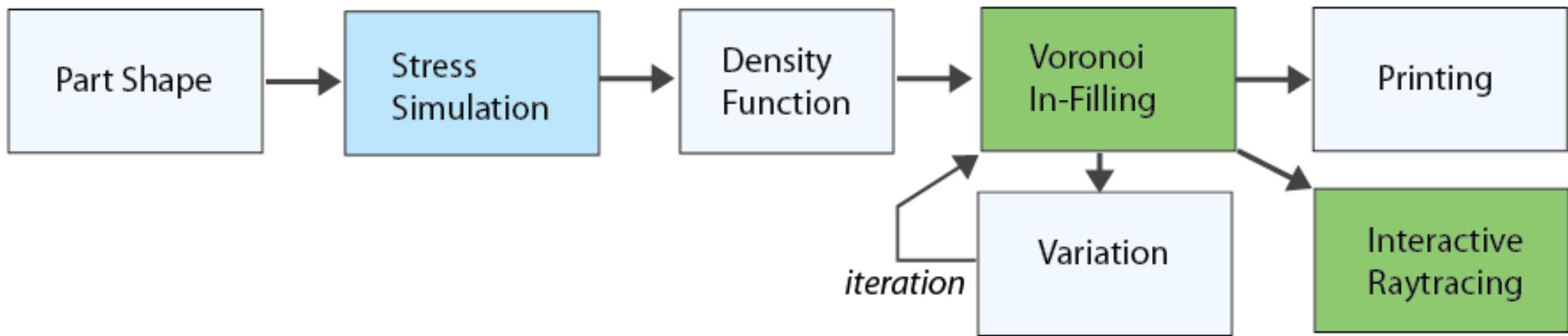


PROCESS ENGINEERING





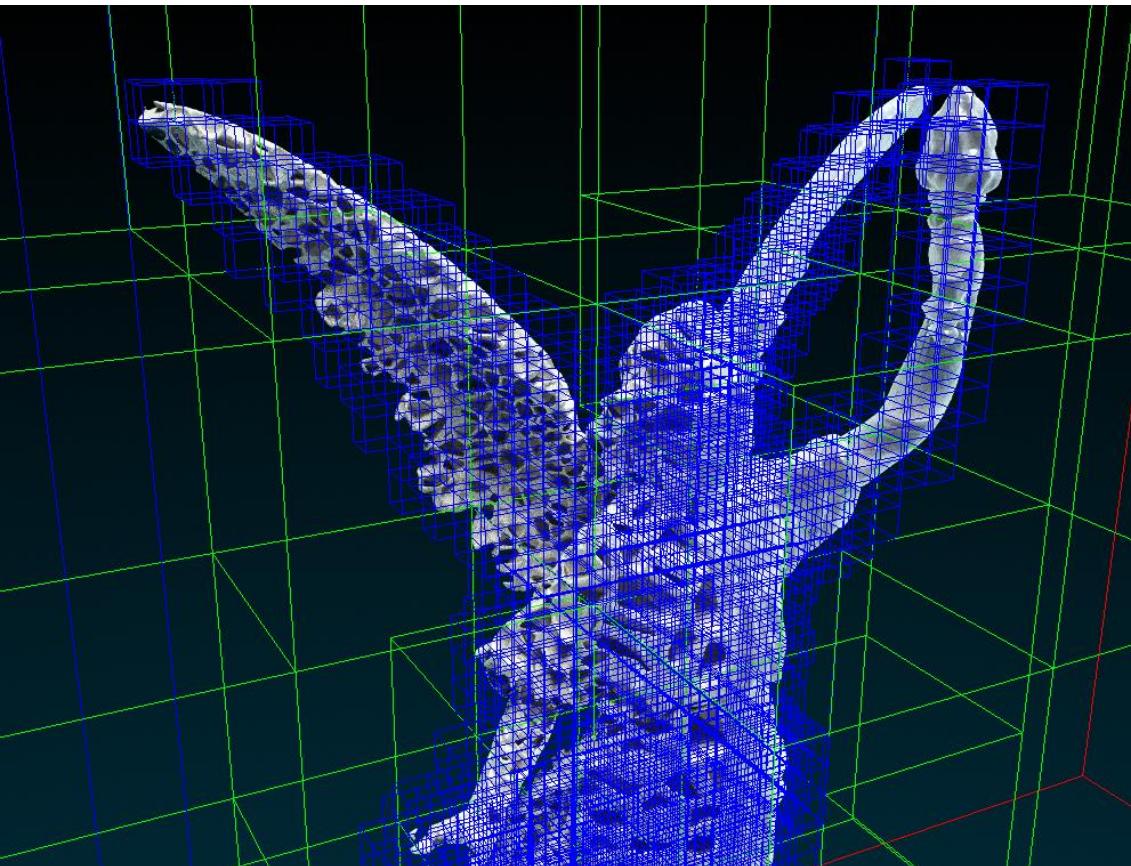
NVIDIA + HP COLLABORATION



Goal: Experiment with process engineering to generate interactive, simulation-driven, procedural in-fill structures with high quality rendering

NVIDIA® GVDB VOXELS

A new, open source NVIDIA SDK



Data stored on sparse hierarchy of grids

Designed for simple, efficient computation, simulation and rendering for sparse volumetric data.

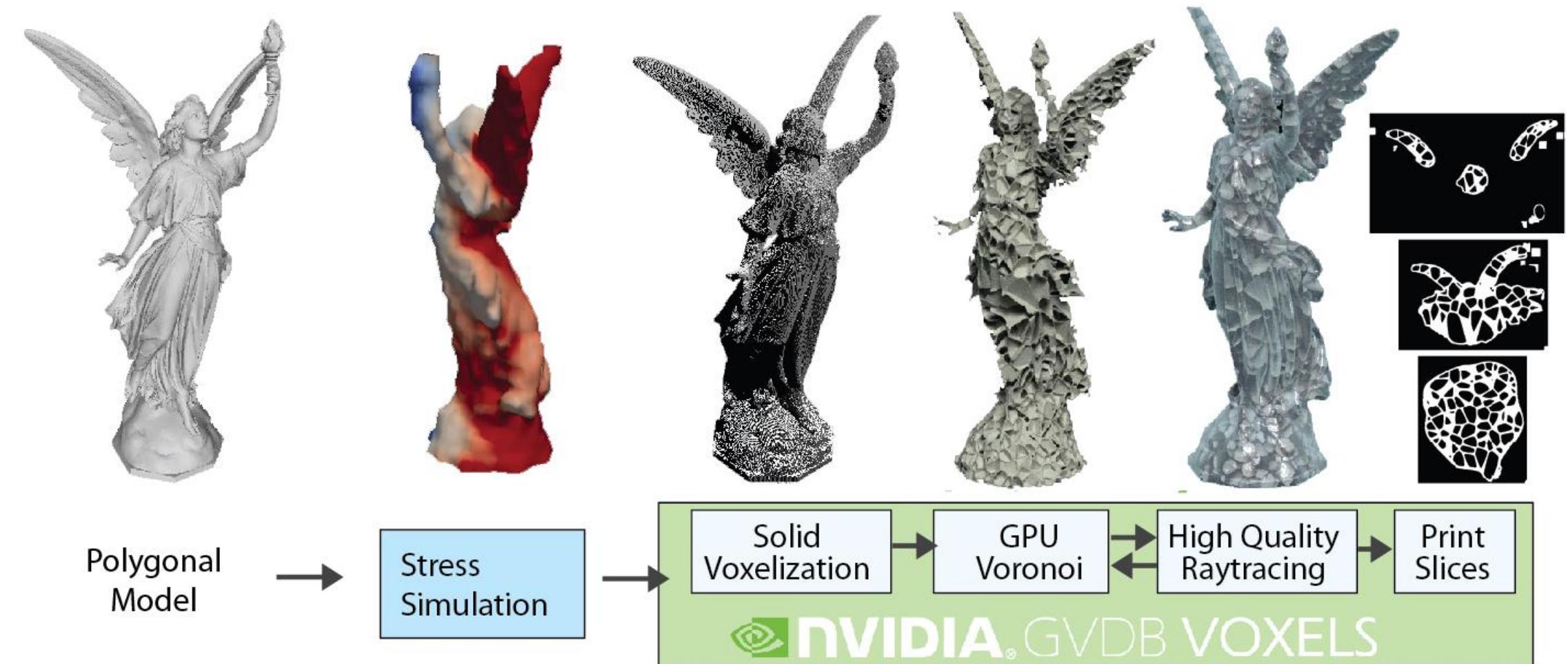
Compute API

- High resolution data
- Minimal memory footprint
- Fast kernels with NVIDIA® CUDA

Rendering API

- CUDA and OptiX Pathways
- Interactive, multiple scattering
- Custom rendering kernels

SOLUTION





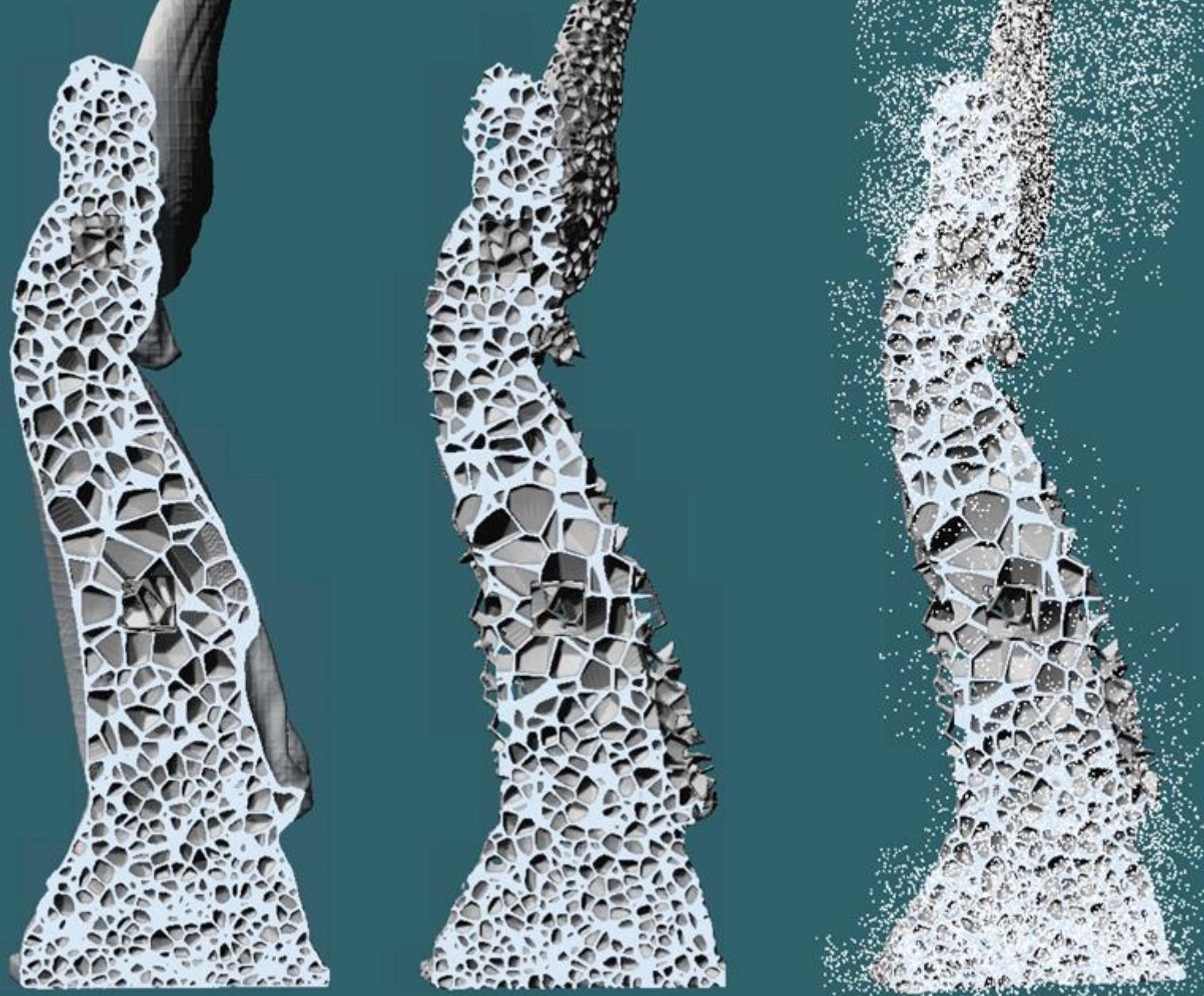
GTC 2017

NVIDIA®
GVDB VOXELS

INTERACTIVE
DEMO

RESULTS



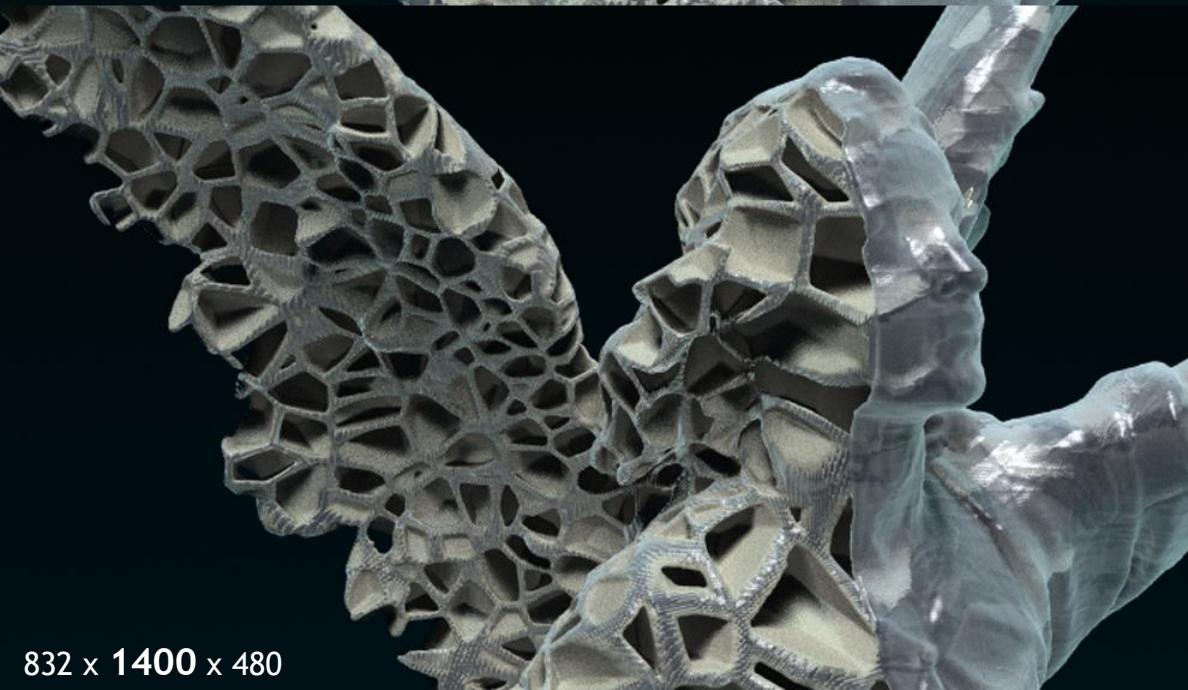




416 x 576 x 192



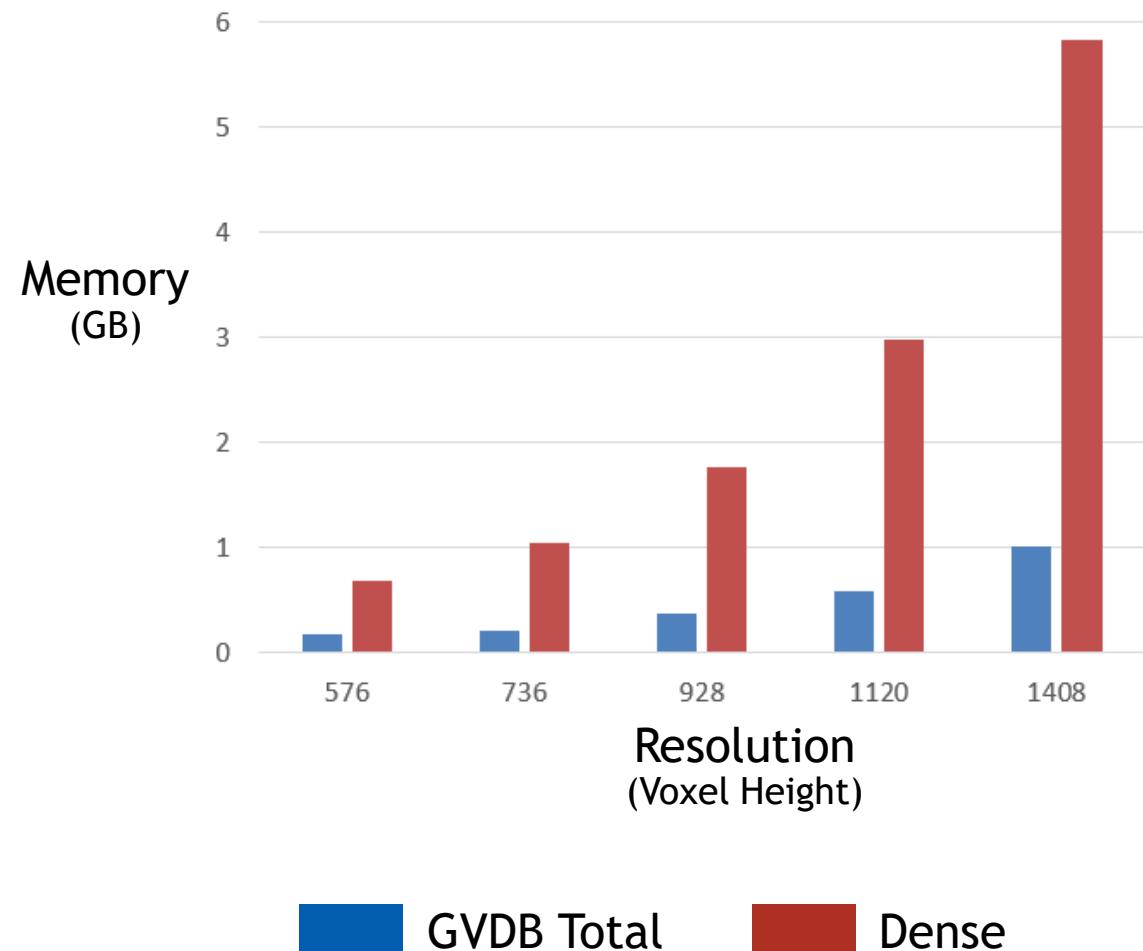
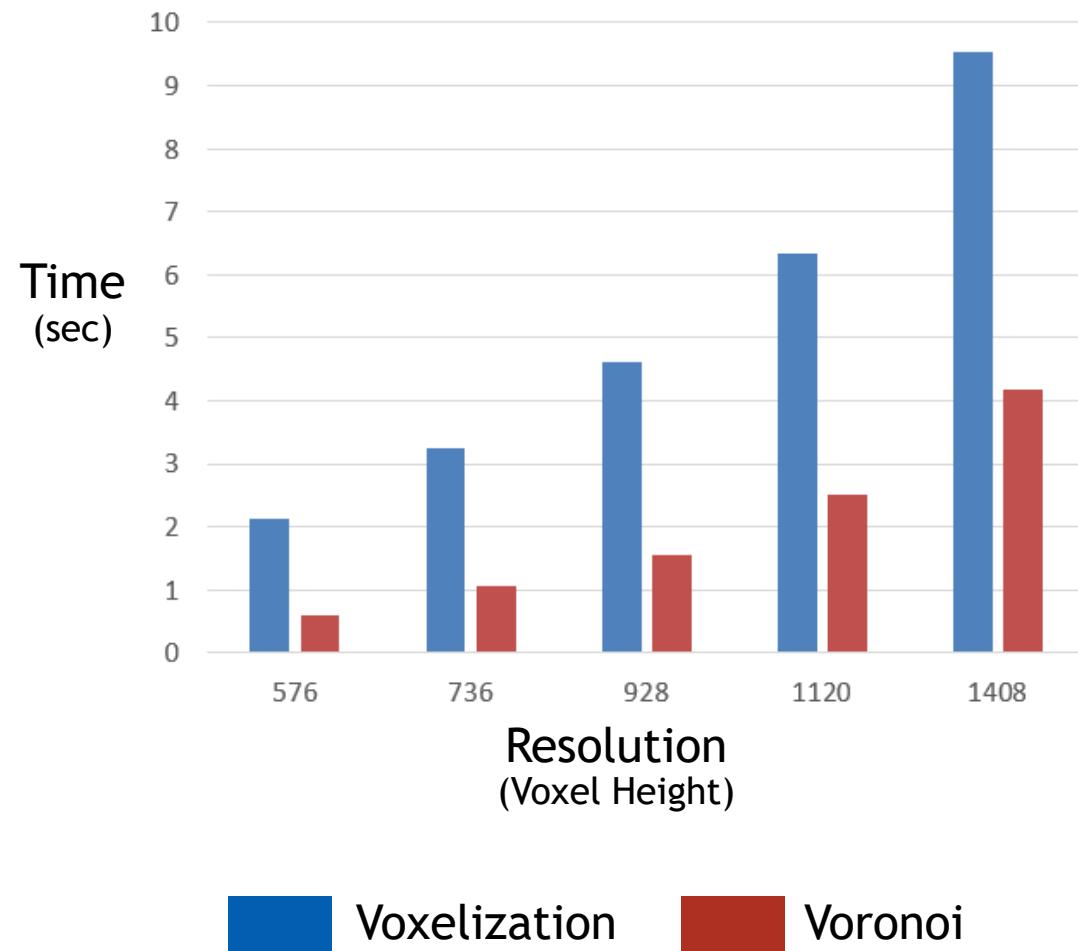
480 x 736 x 288



832 x 1400 x 480



RESULTS



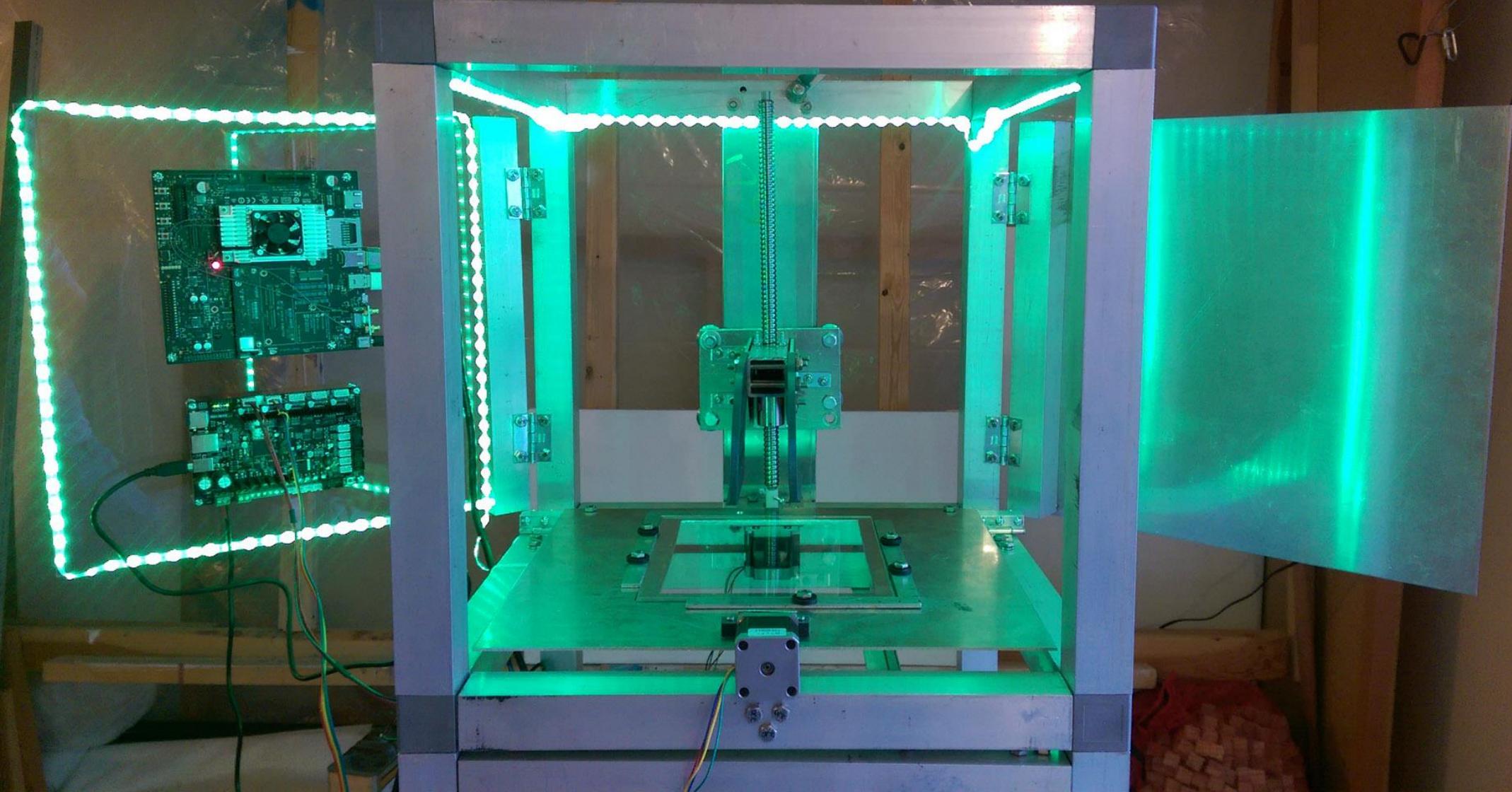


NVIDIA® GVDB VOXELS



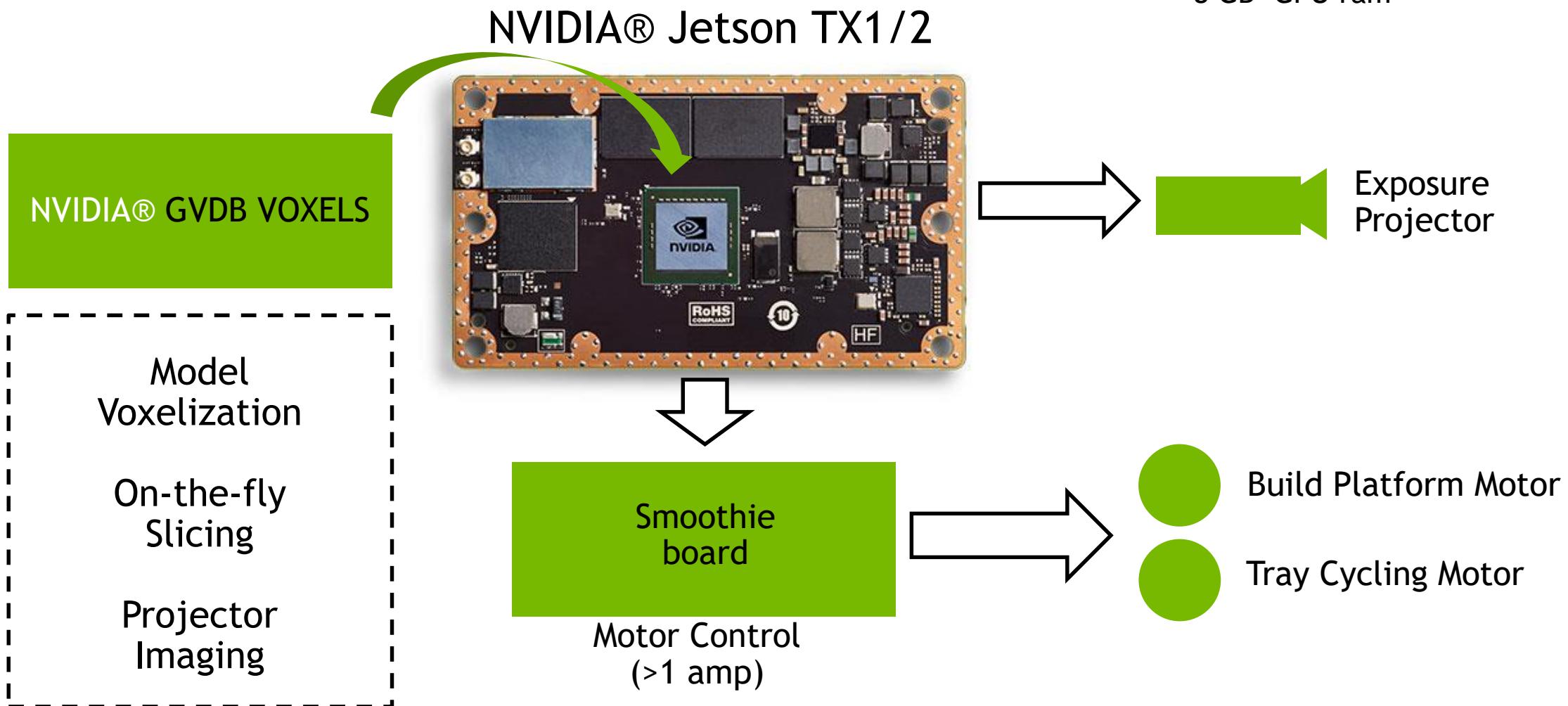
PRINTED PART

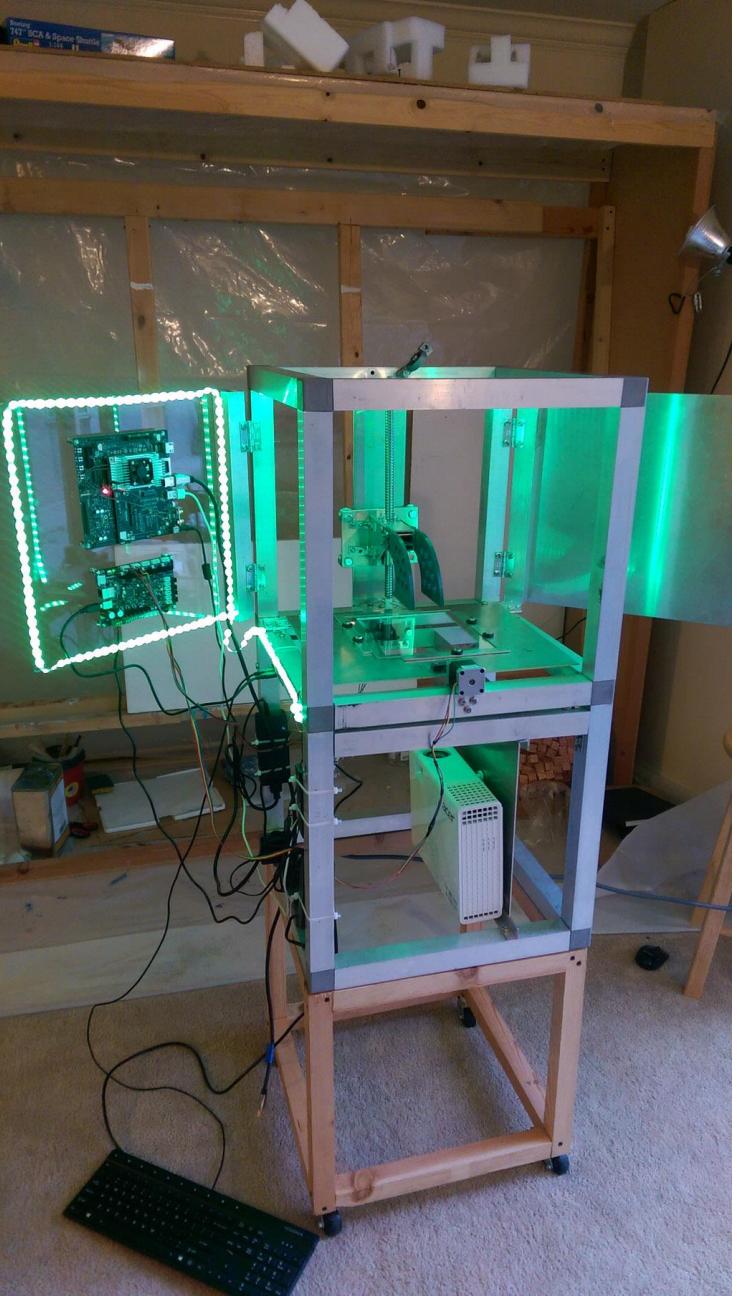
VOX3: DIY 3D PRINTER WITH THE JETSON TX1



VOX3: VOXEL-BASED DIY DLP/SLA 3D PRINTER

Jetson TX2
128x CUDA Cores
8.0 CUDA Toolkit ver
8 GB GPU ram





NVIDIA® GVDB VOXELS

Open Source: BSD3

Cross-Platform: Windows & Linux

Hardware: Kepler or later
 JetsonTX1/2 embedded
 Tegra/GRID VCA

[http://developer.nvidia.com / gvdb](http://developer.nvidia.com/gvdb)

Software Download, Programming Guide and
User Forums on the website

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rhoetzlein@nvidia.com

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