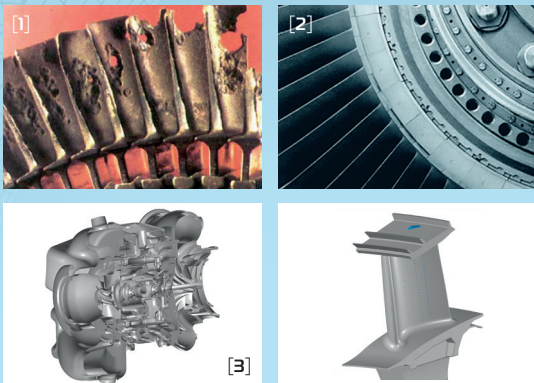# BOXERgeom supporting AI
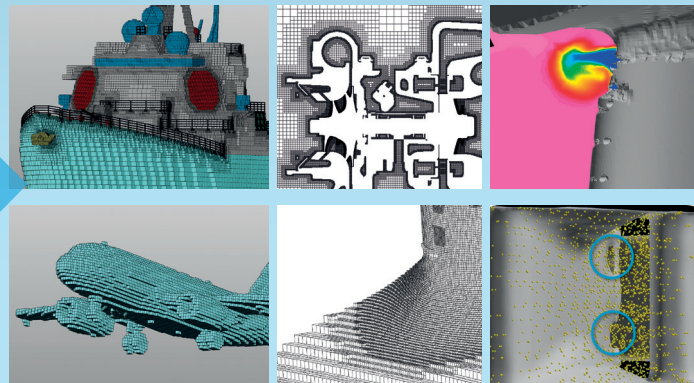
AI & Machine Learning efficiently consumes **geometry in voxelised** form – a 3D "image". The geometry is derived from design intent CAD and through-life PointCloud scans

## GEOMETRY



**Database of CAD Models or Scans**
For training or testing

## BOXERgeom



Create voxelated model from input geometry
Create physics-based degradation as training data
**Export 3D greyscale image**

[1] Wing RG & McGill IR "The protection of gas turbine blades" Platinum Metals Review, 25, (3), 94-105, 1981
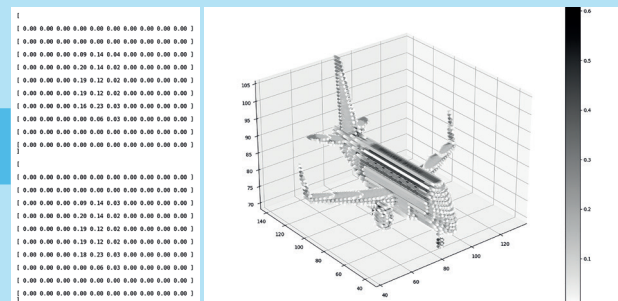
[2] Image from  https://www.mhi.com/products
[3] We are grateful to Cummins Turbo Technologies Ltd for permission to use this geometry

## TensorFlow
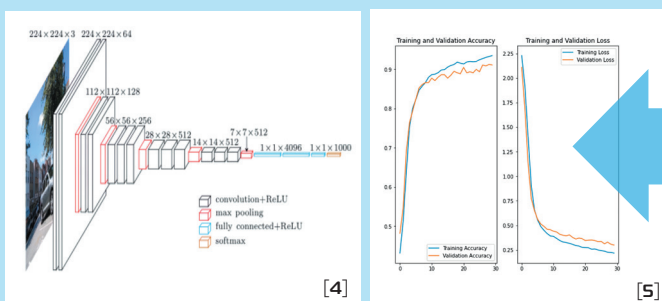


**Open source** library for numerical computation and large-scale machine learning
**www.tensorflow.org**
Create model with specific layers to convert 3D input into 1D

## Python



Read octree data format into a NumPy array
Visualize the incoming data for each geometry
**Create compressed data format**

[4] CNN image from https://www.cs.toronto.edu/~frossard/post/vgg16/
[5] Generated by CFS using http://modelnet.cs.princeton.edu/# ref:  Z. Wu, S. Song, A. Khosla, F. Yu, L. Zhang, X. Tang and J. Xiao 3D ShapeNets: A Deep Representation for Volumetric Shapes