UNIVERSITY OF CAMBRIDGE

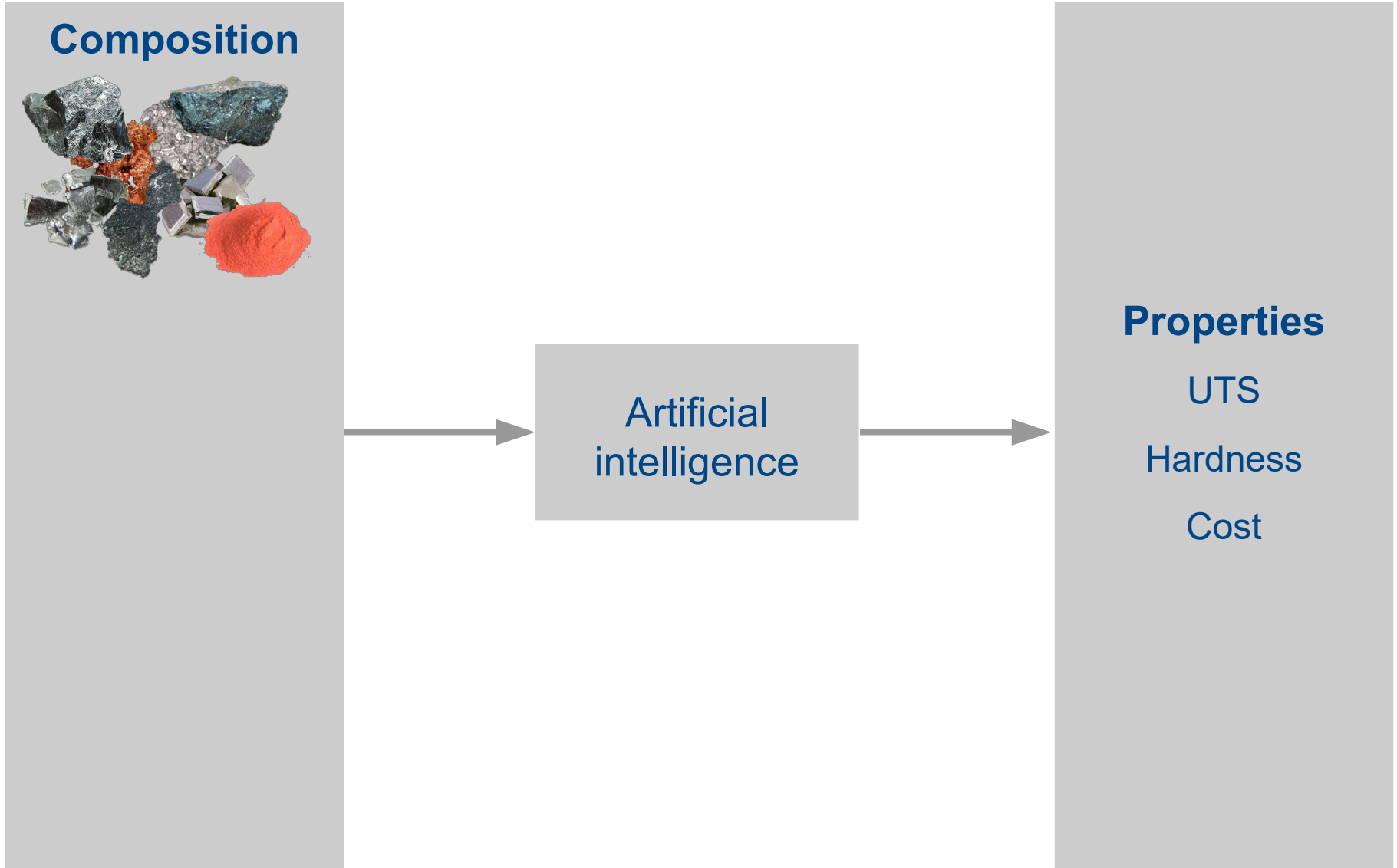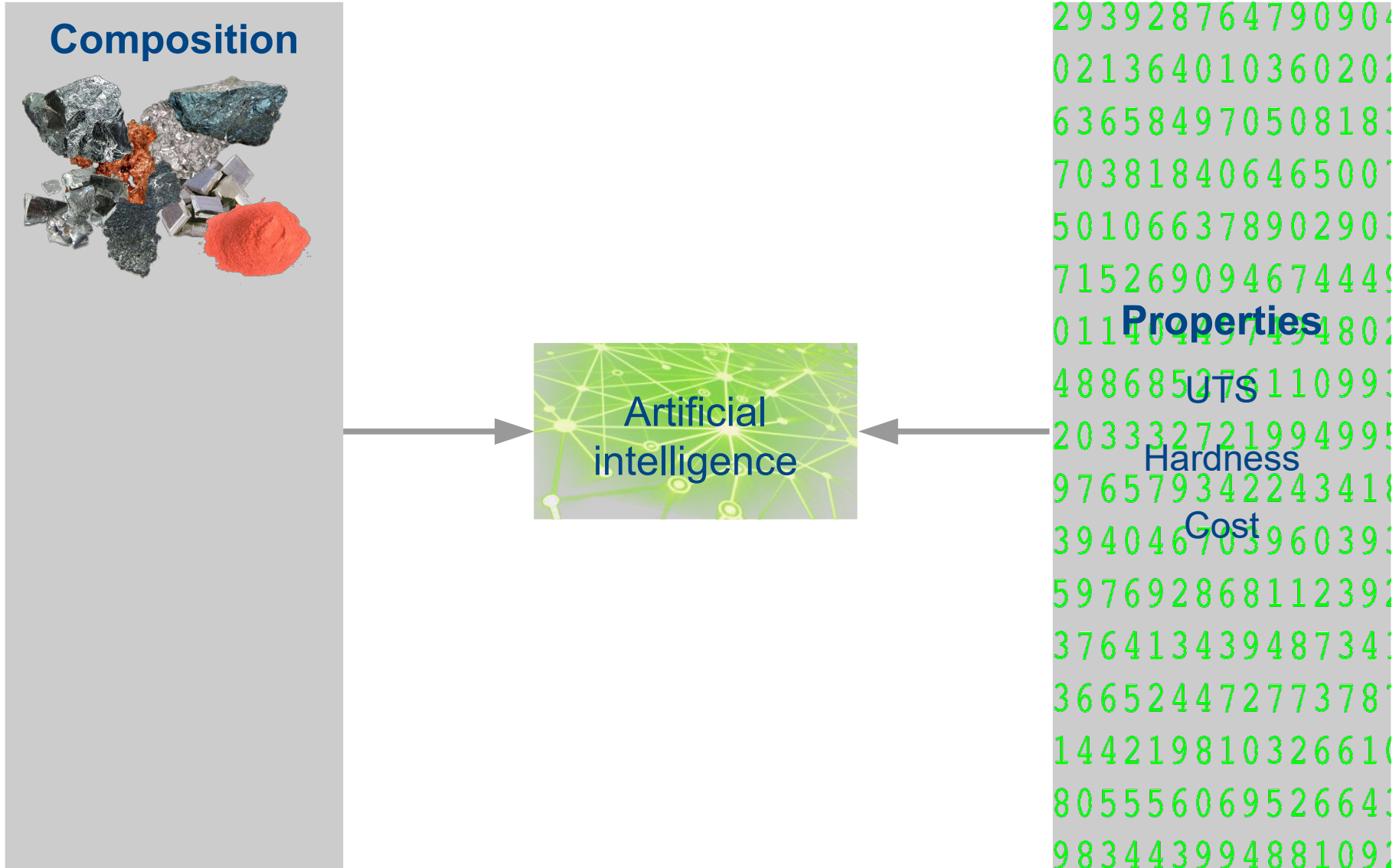# Future applications of artificial intelligence

Gareth Conduit

TCM Group, Department of Physics

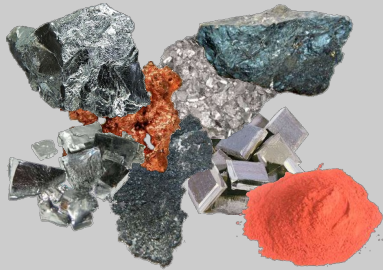# Neural networks for materials design

Composition

Artificial intelligence

Properties

UTS

Hardness

Cost

Neural networks for materials design

Composition

Properties

UTS

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Artificial intelligence

Neural networks for materials design

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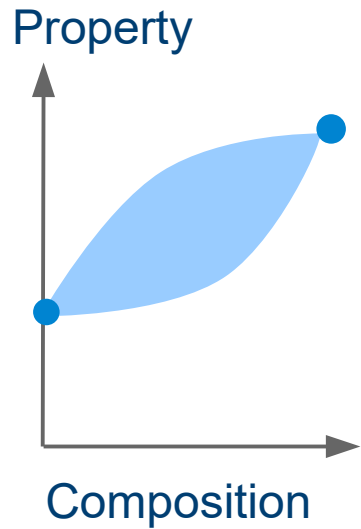# Neural networks for materials design

Composition

Properties

UTS

Hardness

Cost

Simulations

Density Functional

Molecular dynamics

Finite element

Artificial intelligence

Composition

Properties

UTS

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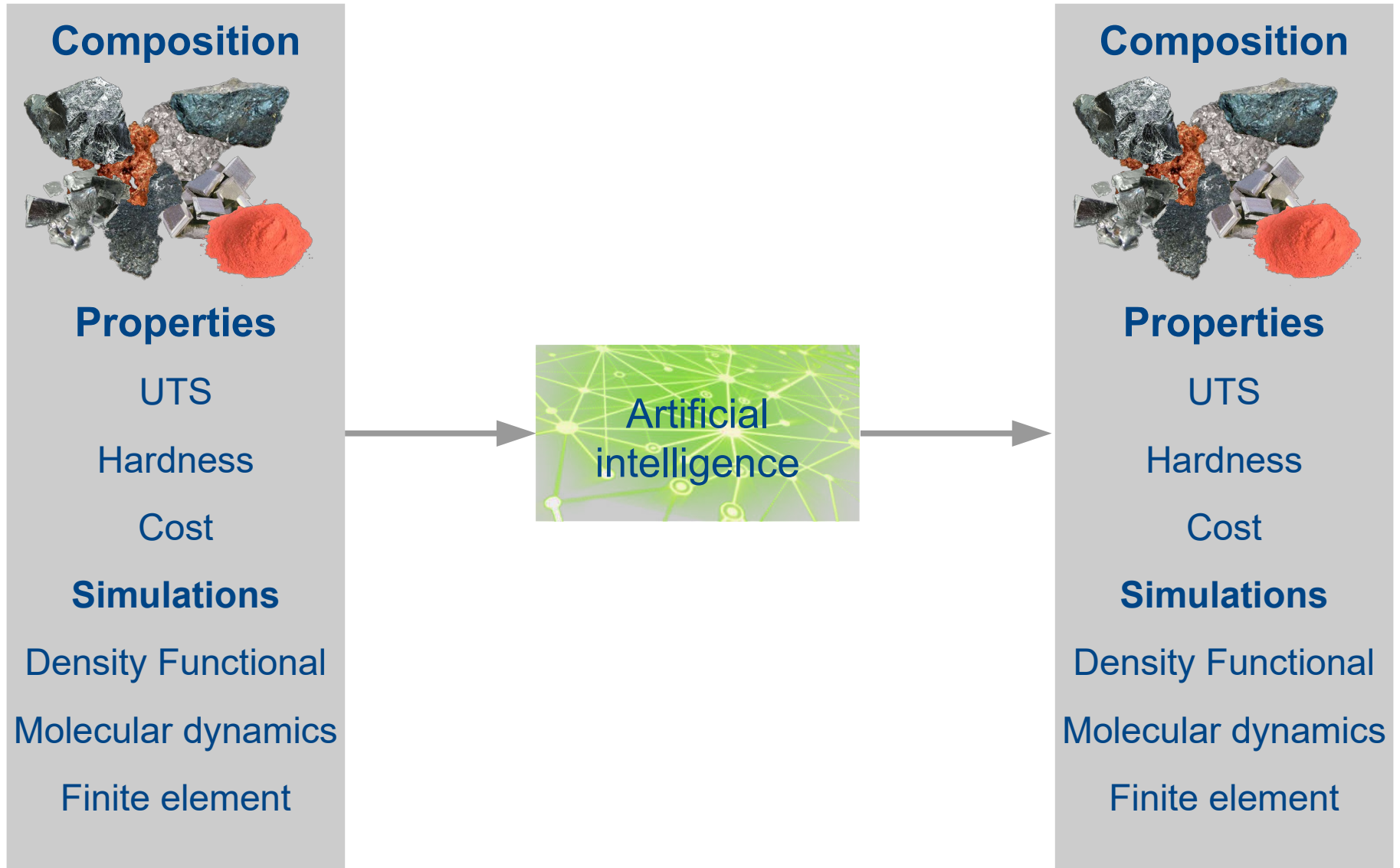
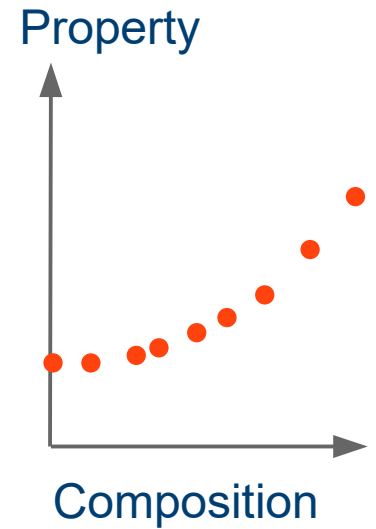# Combine databases with neural networks

Experiment

Property

Composition

Combine databases with neural networks

Combine databases with neural networks
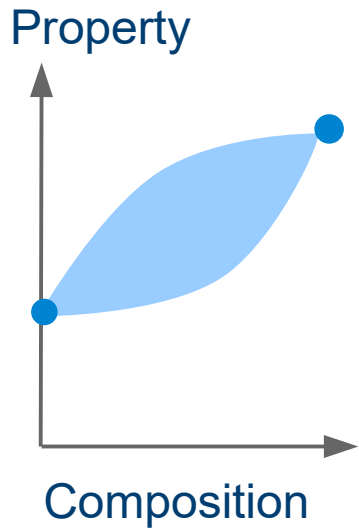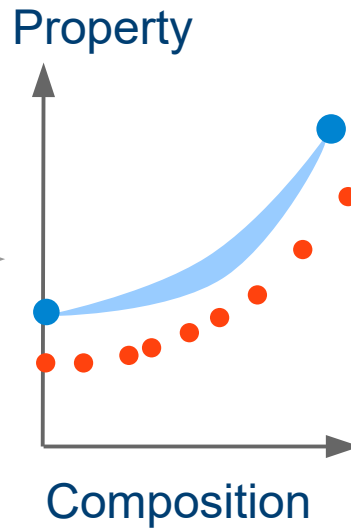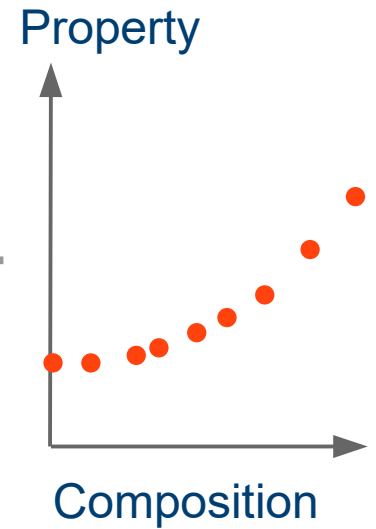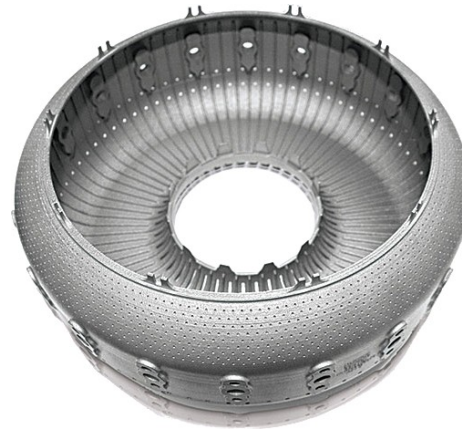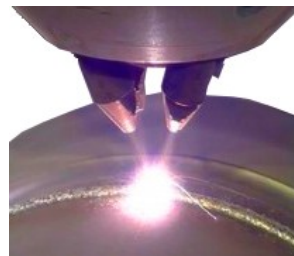
Additive manufacture

3D printed alloy
for combustors
Designed from
7 data points

Additive manufacturing
from molecular dynamics
and experimental data

Merging experiment and simulations

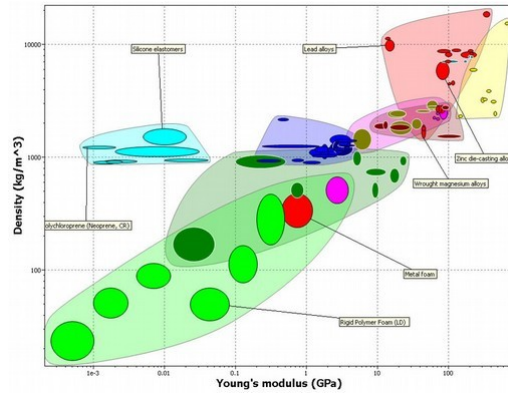Battery design
with DFT and
experimental data

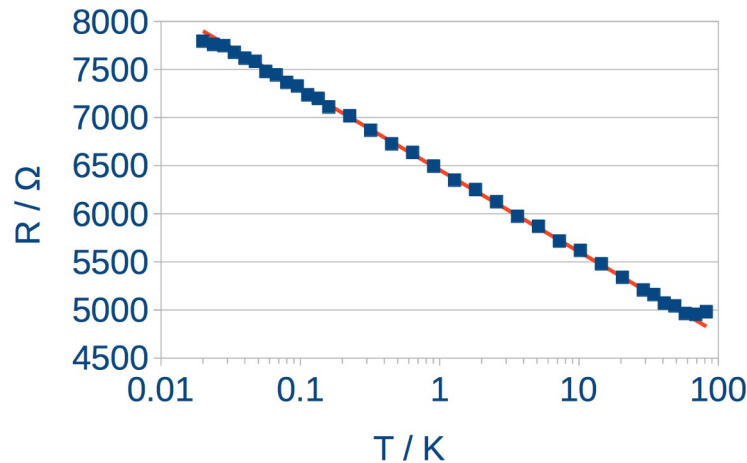Designing lubricants
with DFT and
experimental data

Database analysis

Materials databases
Found 792 errors

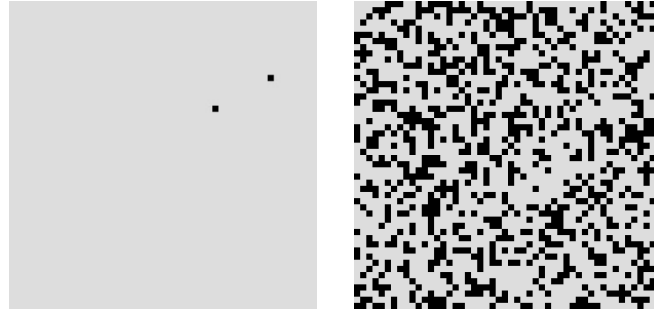**Low temperature**
thermometer

Going beyond materials

Increased drug data available 200-times

Exploited data from different fidelities of simulations to design new blade shapes

Summary

Used artificial intelligence to discover materials and drugs

Unique ability to study sparse, high value, big data

Merge experiments and simulations into holistic design tool

Looking for further applications of artificial intelligence