mad³

material data driven design

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SAND1471105

Revolutionizing the manufacturing process by eliminating the need to perform expensive, timely, and resource heavy mechanical materials test **by utilizing the power of machine learning.**
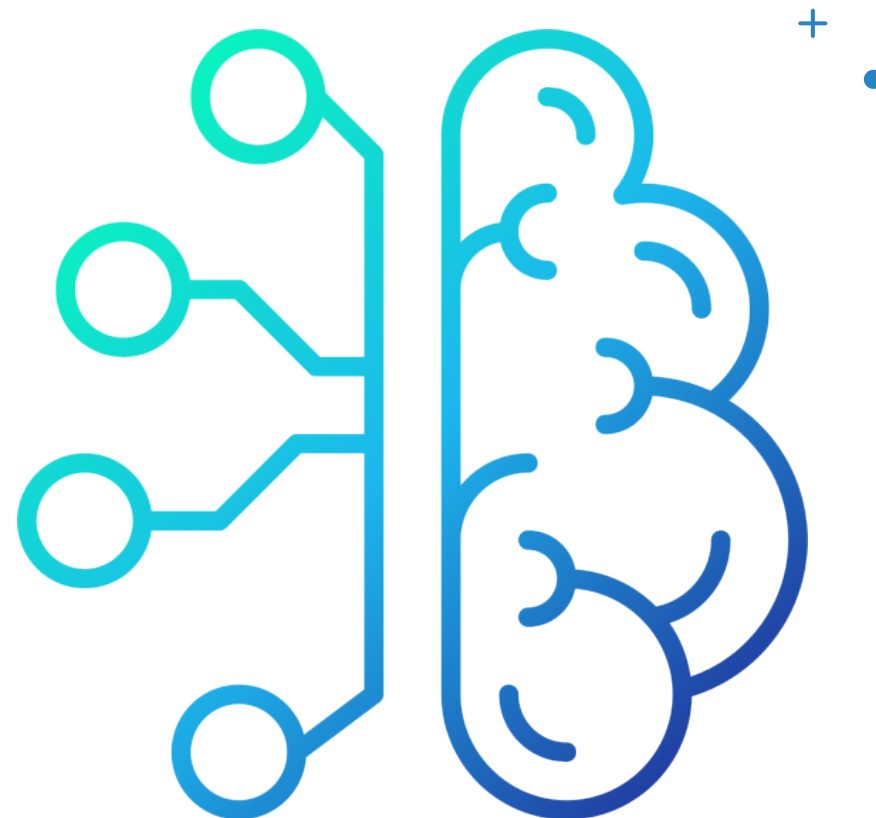
SANDIA TEAM

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Computational Materials and Data Science

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Computational Materials and Data Science

PROBLEM

The current manufacturing industry does not have a readily available solution to predict and characterize how metal alloys and other materials will respond to manufacturing environments at scale.

Industry Lag Time

Up to 6 months and specialized equipment to test materials, not readily available in industry.

Poor Resource Allocation

Current efforts to predict a material's anisotropy from initial microstructure can cost $2M-$5M and can take years.

Operational Shortcomings

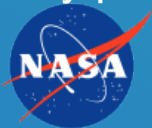The industry currently tests for material deficiencies in opposed to forecasting.

PROBLEM

R&D Data

Research and development data is difficult to understand, implement into industry, and expensive.
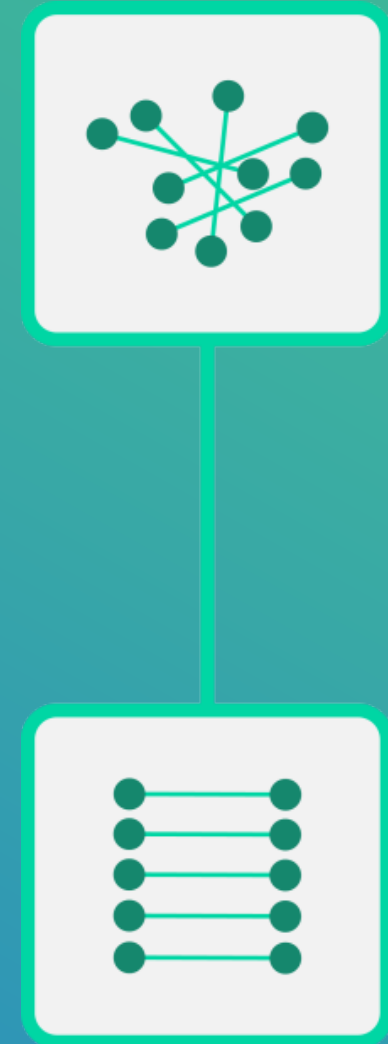
Staffing Issues

"Unfortunately, you can't have a PhD build each and every part of a spaceship."

Carbon Footprint

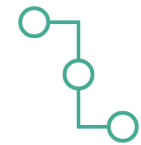Mechanical test requires wasting tons of materials, transporting materials, and disposing of wasted materials.

SOLUTION

A machine learning-based **software** that instantly predicts material's physical properties and allows for manufactures to:

Save Money
- Potential for millions in savings
- Less test performed
- Staffing cost
- Reduced material cost

Reduce Carbon Footprint
Eliminates the need to waste material on test, transport material, and dispose of tested materials.

Save Time
Tests return data **1000x faster** than current mechanical test which can lag up to six months.

Transform Operations
Bridging the gap between complex R&D data and industry simplifies the overall testing process.
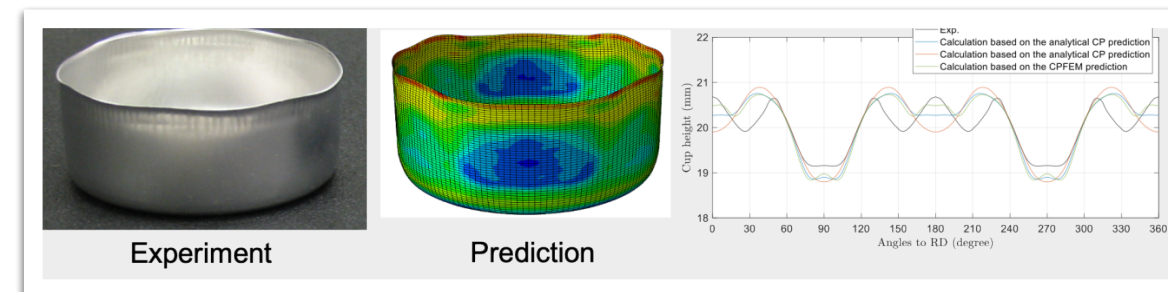
TECHNICAL SLIDE

Actual GUI shown.

Theory: Machine Learning based anisotropy prediction
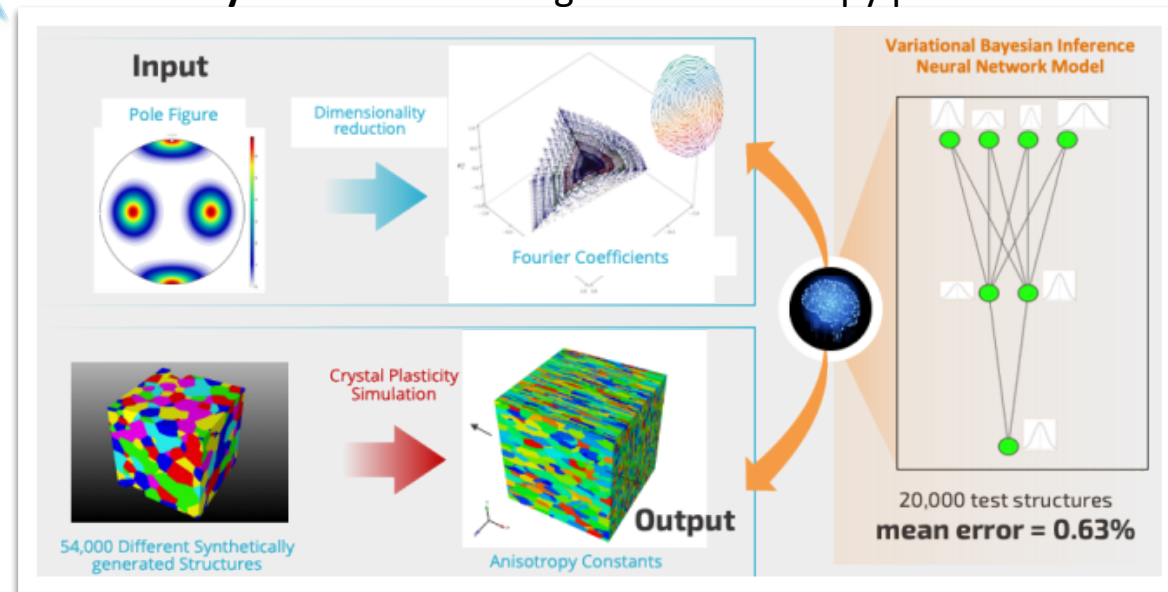
Montes de Oca Zapiain et al., *Mater. Sci. Eng. A* (2022)

Application (e.g., metal forming analysis)

CUSTOMER TESTIMONY

"How can I get this technology?"

Dr. Andrey Ilinich, Ford Research

"I would love the ability to obtain anisotropic constants from texture immediately"
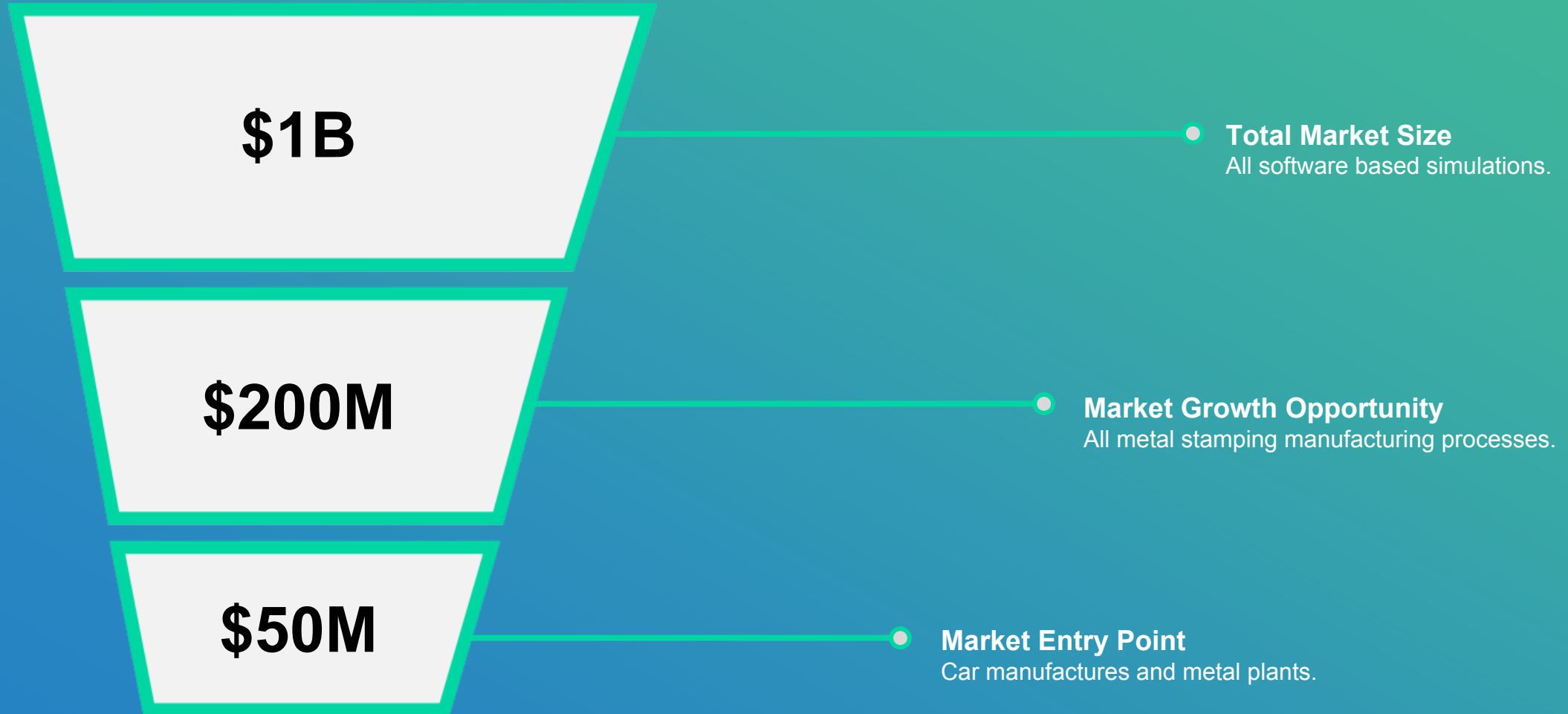
Dr. Sebastijan Jurendic, Novelis

75 Interviews

125 Interviewees

43 Institutions

8 Countries

MARKET

$1B

Total Market Size
All software based simulations.

$200M

Market Growth Opportunity
All metal stamping manufacturing processes.

$50M

Market Entry Point
Car manufactures and metal plants.

COMPETITIVE ANALYSIS

Speed (Fastest)

Commercially Available Simulations
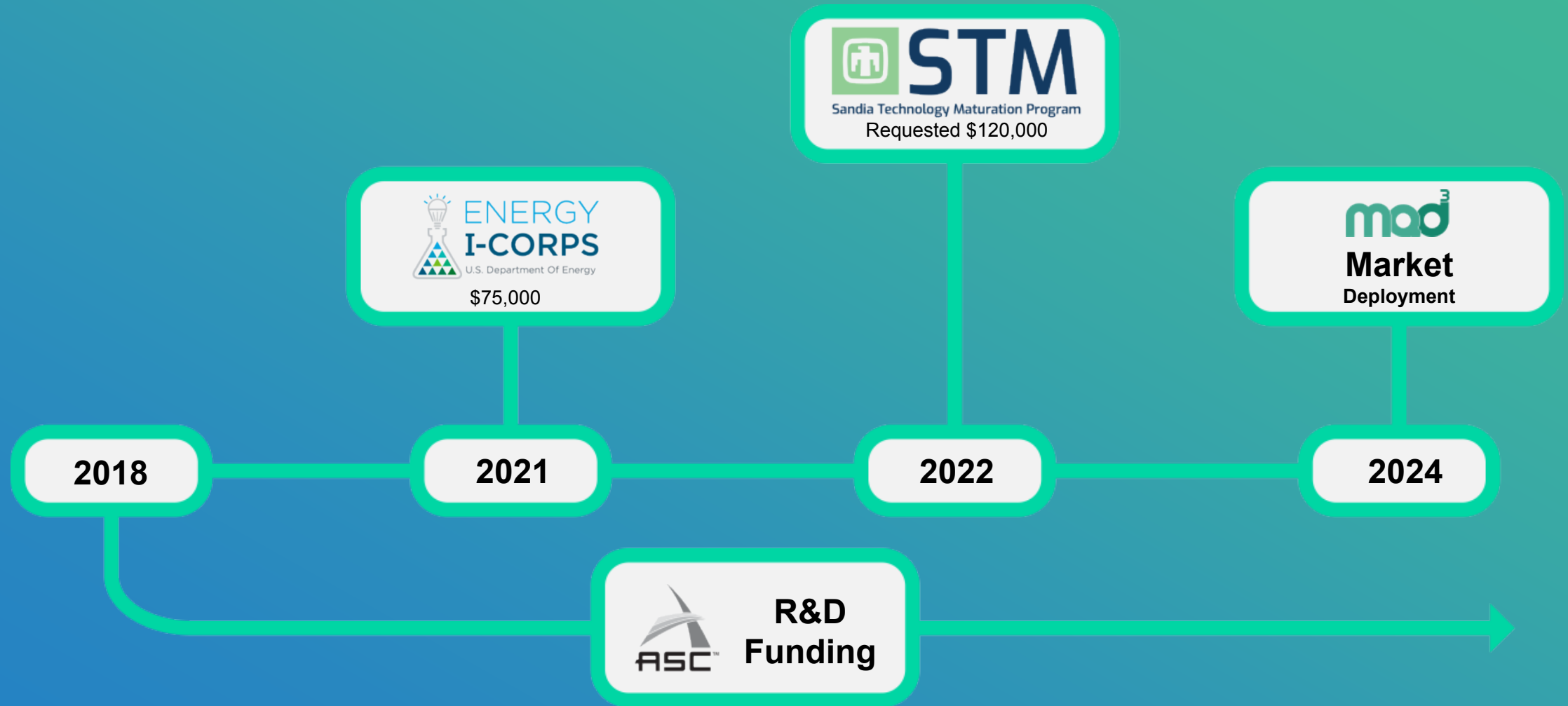
High-Fidelity Simulations

Physical Experiments

Accuracy (Best)

ROADMAP

QUESTIONS?

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