Powering Innovation That Drives Human Advancement

AI-Powered Advancements in Ansys offering

Felipe Mercado – Lead Application Engineer

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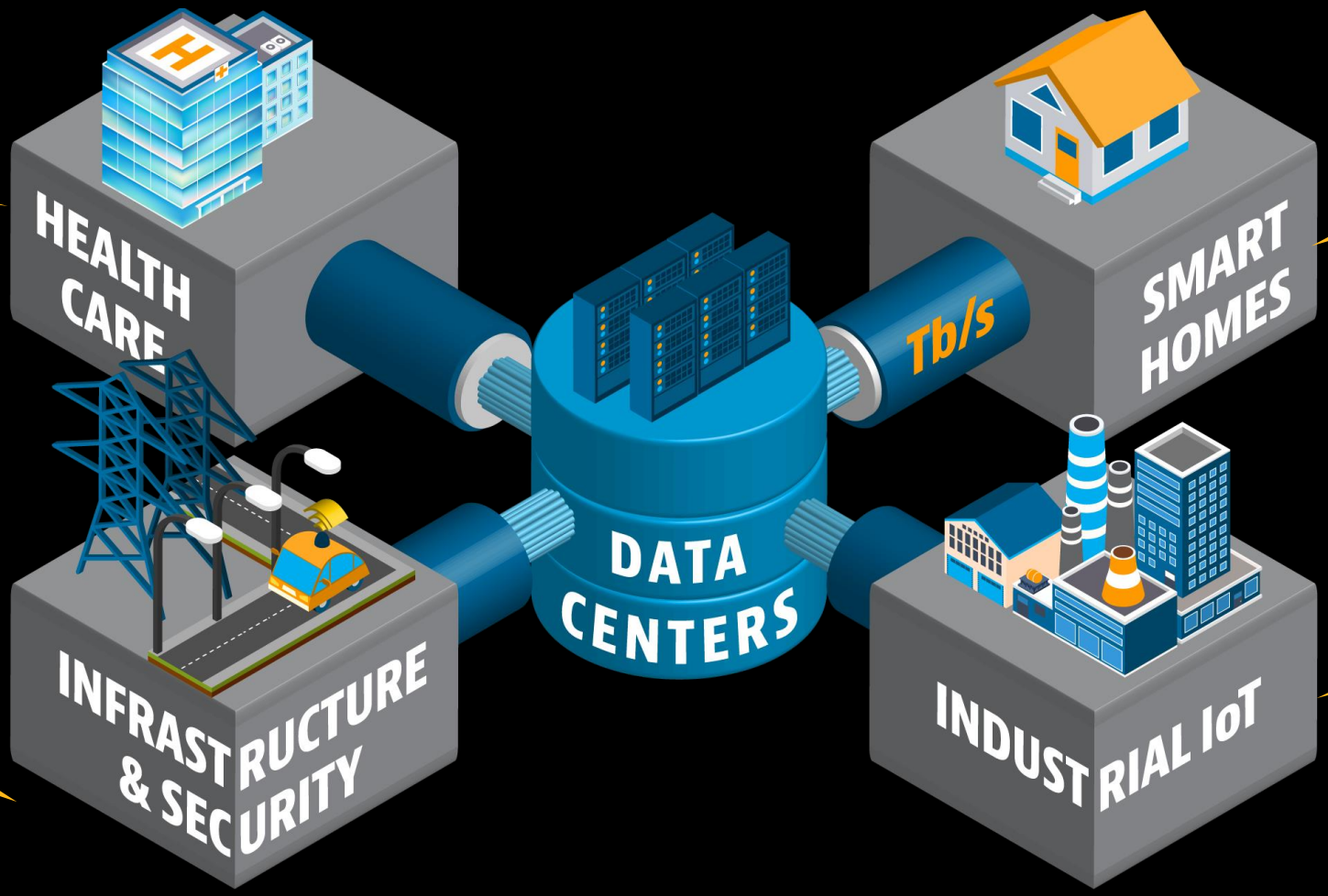
Photonics for AI

Medical imaging, sensing and diagnostics, lab on a chip, …

5G/6G, Optical communications, analog & RF systems, structural & environmental sensors, autonomous vehicle navigation (LIDAR), …



Consumer electronics, smart phone sensors, IoT home sensors, displays, …

Industrial IoT, industrial chemical & environmental sensing, …

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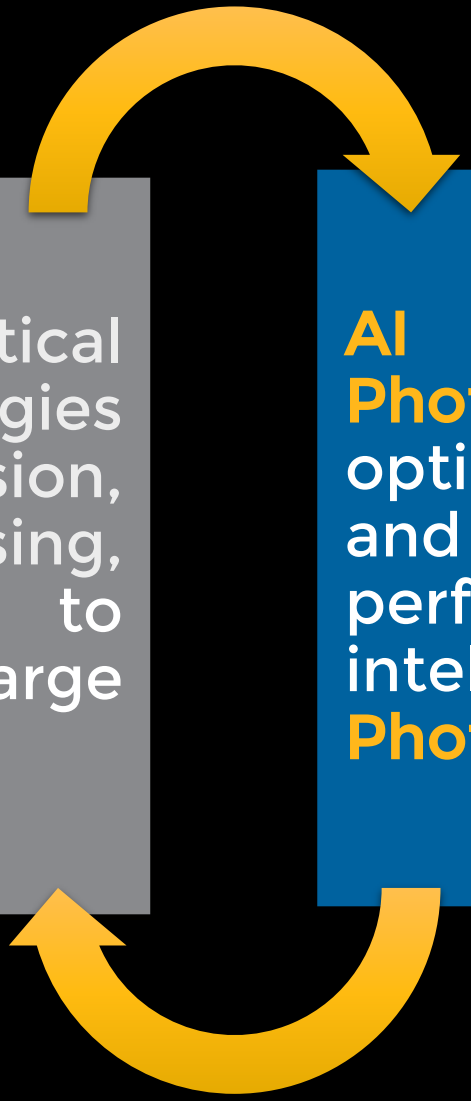
Photonics for AI

Photonics provide the optical components and technologies needed for data transmission, sensing, and processing, enabling **AI** systems to efficiently handle large volumes of data.



AI algorithms leverage **Photonics** technology to optimize optical components and systems, enhancing performance and enabling intelligent decision-making in **Photonics** applications.

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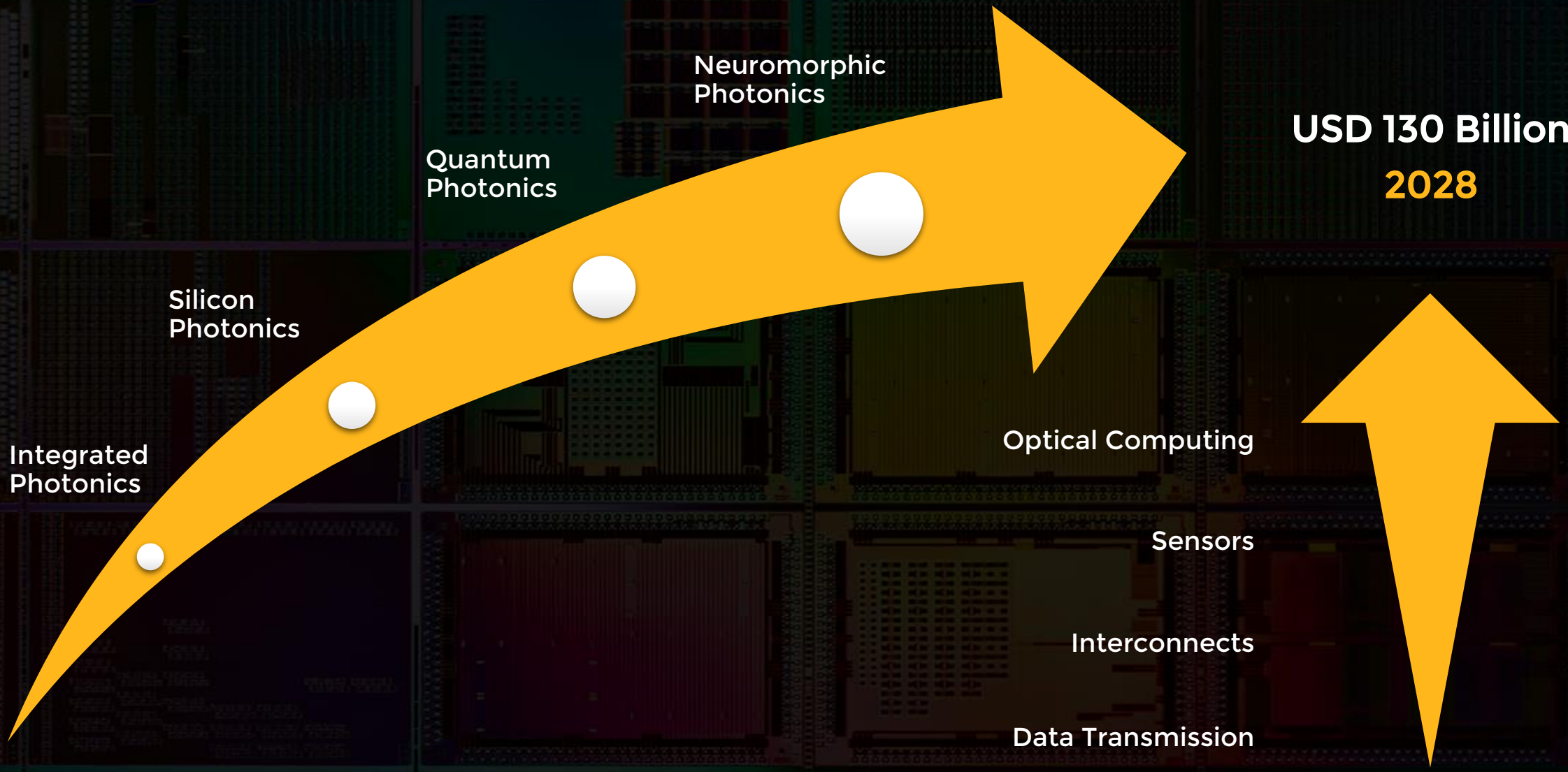
Photonics for AI



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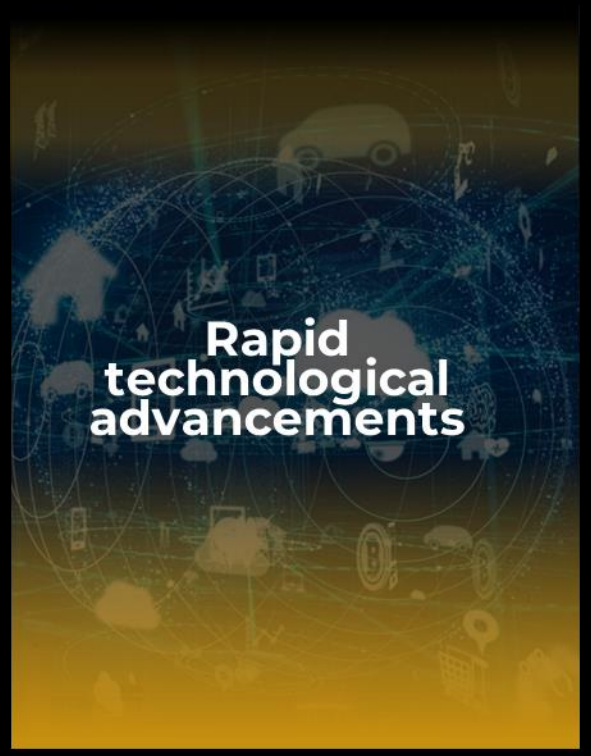
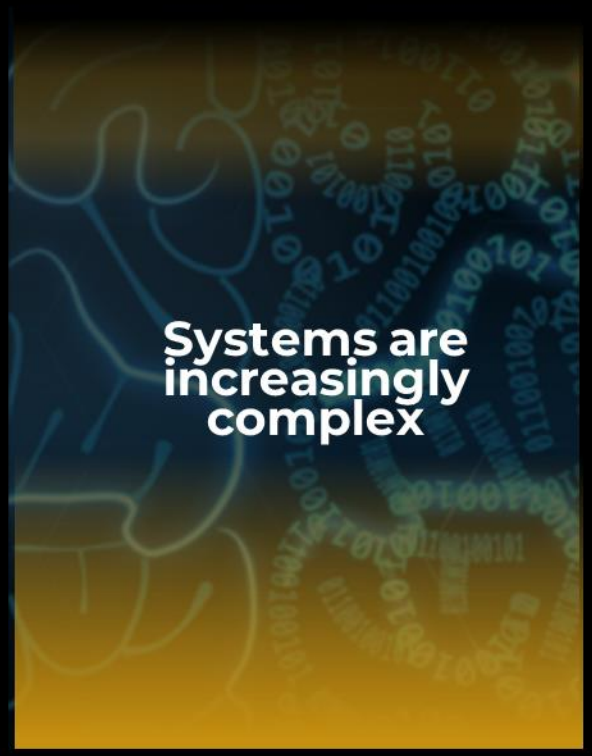
Product development challenges continue to grow



Leaders must keep up with emerging technologies disrupting traditional design process



Requiring multidisciplinary collaboration – often times with globalized engineering & design teams

Engineers must consider factors across the lifecycle upfront, while ensuring compliance with governing bodies

Pressure to make a better product: cheaper and faster

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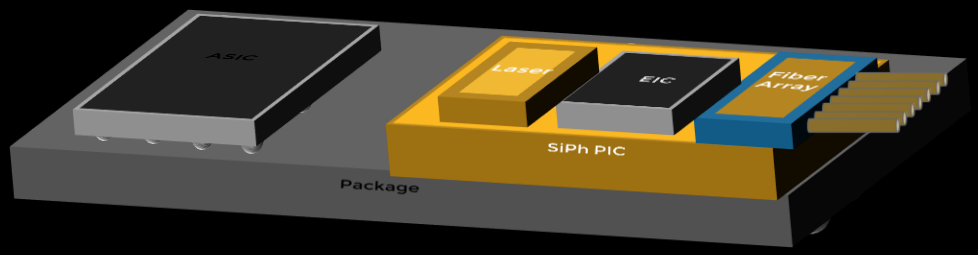
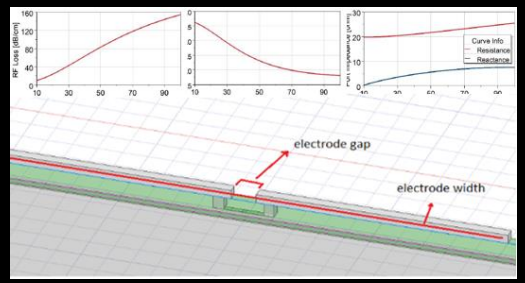
Co-packaged optics challenges

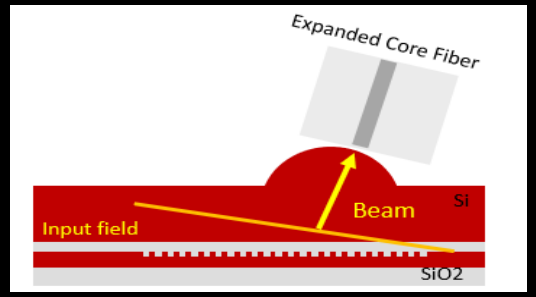
Optical IO Design ⟷ Photonic Chip Design ⟷ Electrical Chip Design ⟷ Thermal



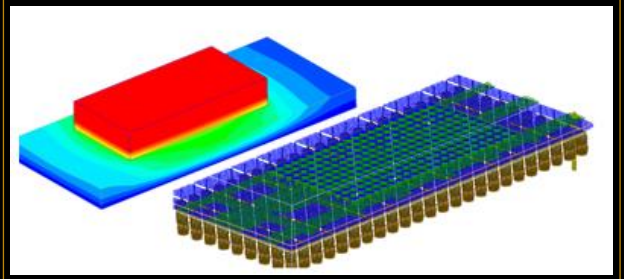
RF Analysis



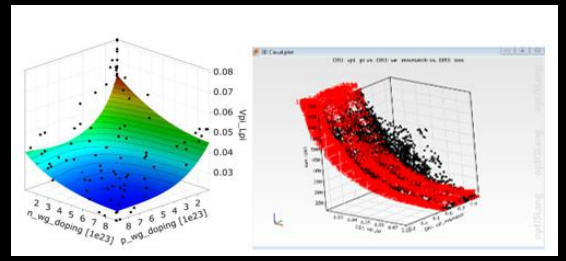
Optical IO Design



Thermal Analysis



Optimization



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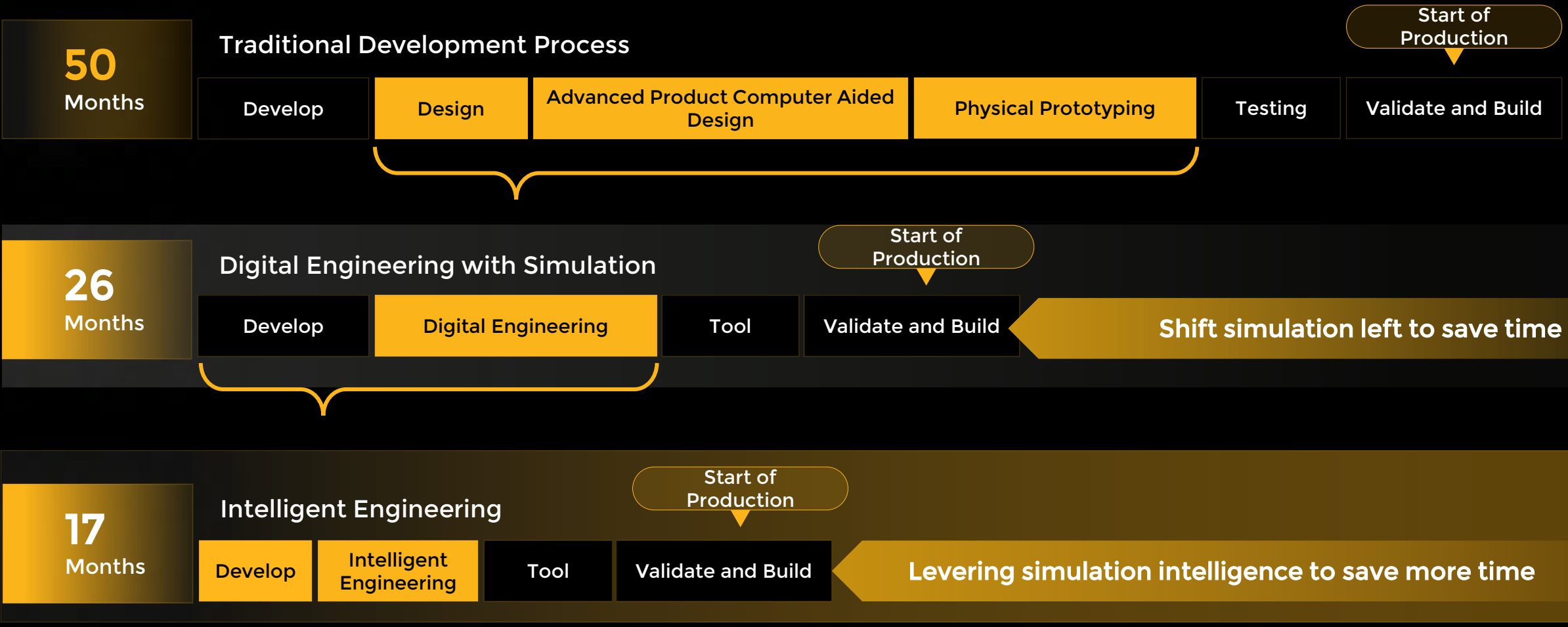
Achieving more with less



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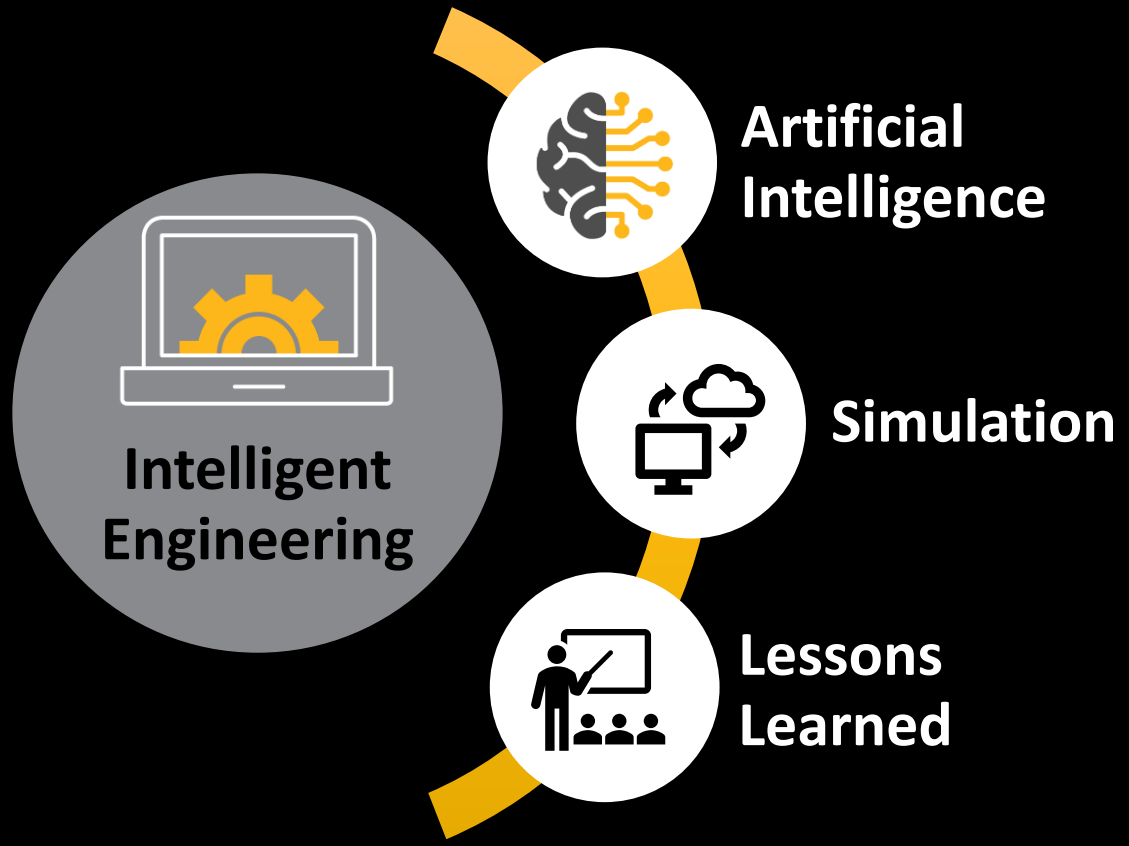
Intelligent Engineering: Shaping the Future



Innovation

Cost Reduction

Risk Mitigation

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AI is transforming **simulation** by **automating** tasks, **optimizing** designs, and **democratizing** access to **advanced** modeling techniques, **accelerating** **innovation** and **efficiency** in the product development process.

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Democratizing Simulation: Making it Accessible to All

- Technology
- People
- Process & data

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Ansys AI – Transforming Simulation at the Speed of AI

Ansys AI+

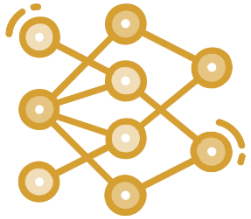
AI Add-ons to Ansys products across portfolio

AI Add-ons to various Ansys simulation products that enhance simulation

Various Improvements

Ansys SIM AI

ML platform for simulation across the physics



Extremely fast and accurate physics predictions which learns from existing data

10x to 1000x Faster

Ansys Intelligence

Democratizing simulation insights

Hyper automation and accessibility through AI-trained optimization apps

Simple & Natural UX

Ansys GPT

Virtual assistant to Ansys products

Natural language assistant for documentation, training

Simple & Natural UX

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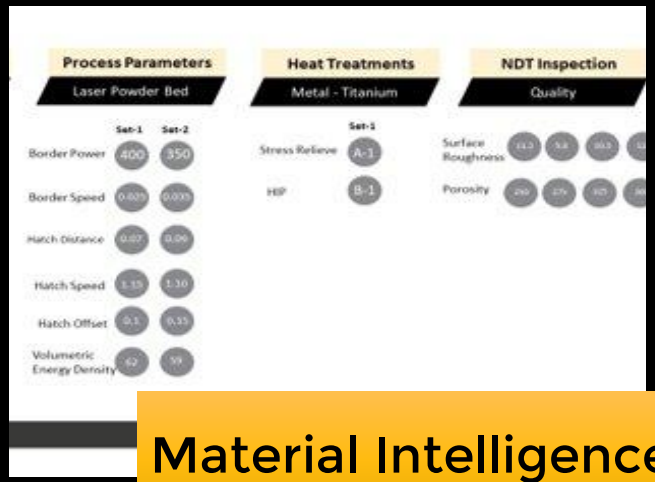
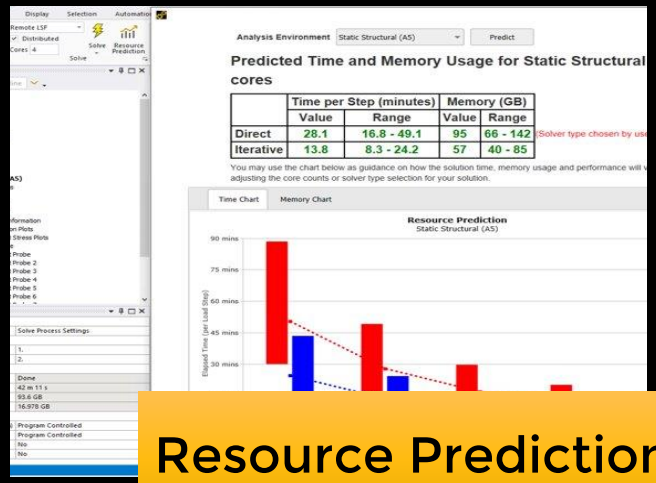
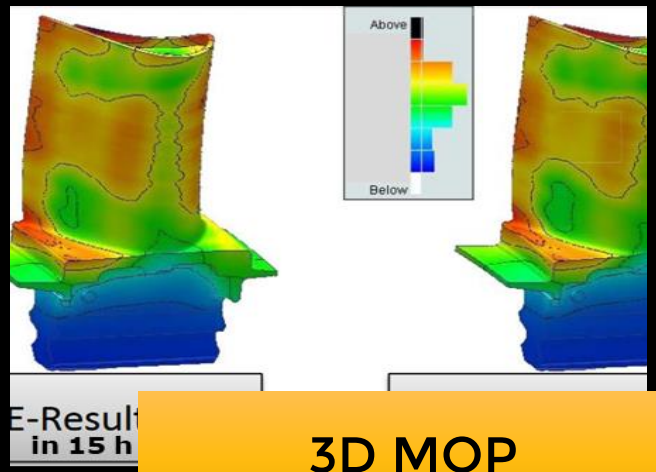
AI+



Material Intelligence



Resource Prediction

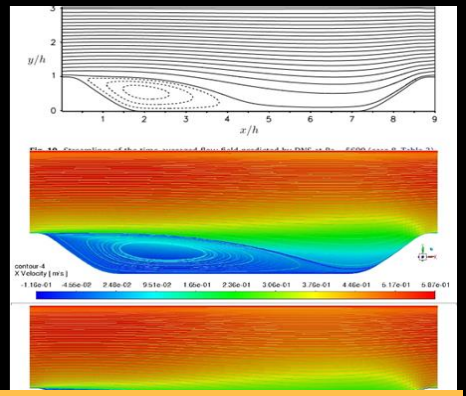


3D MOP

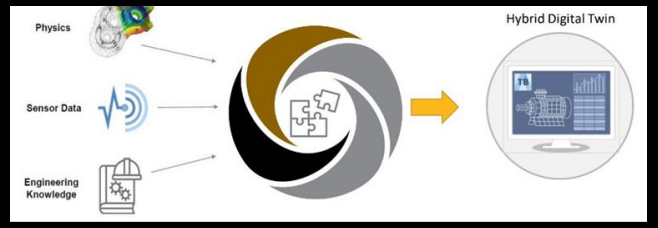
LES Reference

GEKO Default

Neural Network Augmen GEKO



ML-based Simulation Tunning



Fusion compensates for any unmodeled physics or other effects by modeling the difference between a physics model and data

With **Parameter Calibration**, a user can calibrate simulation model parameters with sensor data to closely match simulation results

Fusion Modeling

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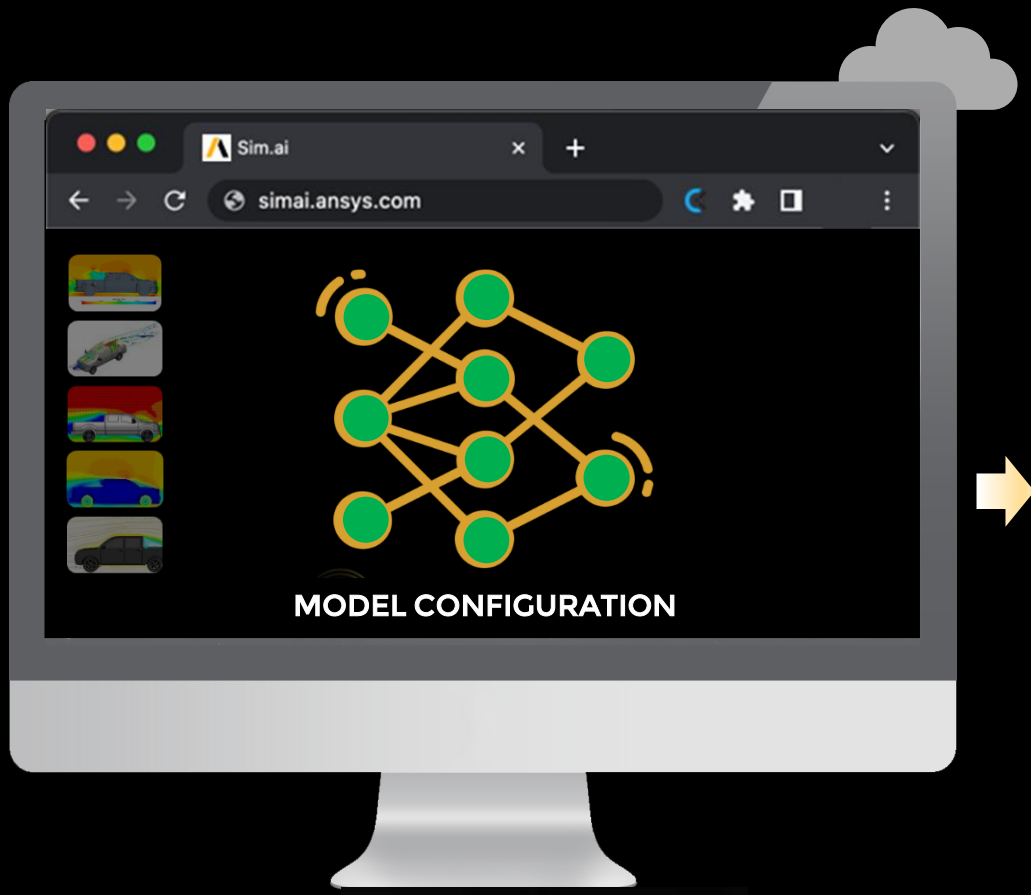
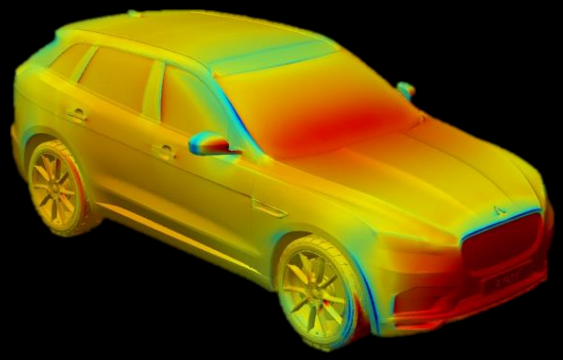
SimAI

New Design





Performance Prediction

Fast. Reliable. Accessible.

1- UPLOAD *Your Past Data*

2- TRAIN *Your AI Model*

3- PREDICT *In Seconds*

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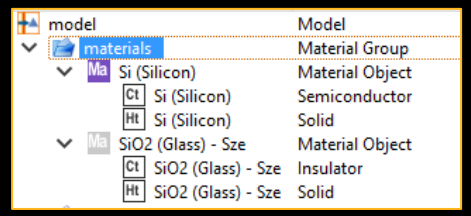
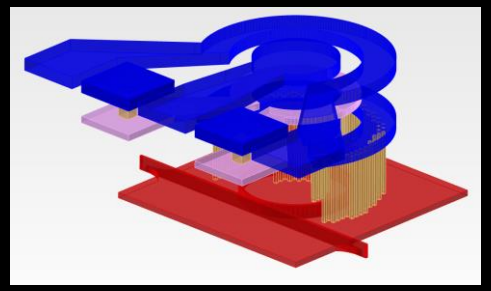
SimAI





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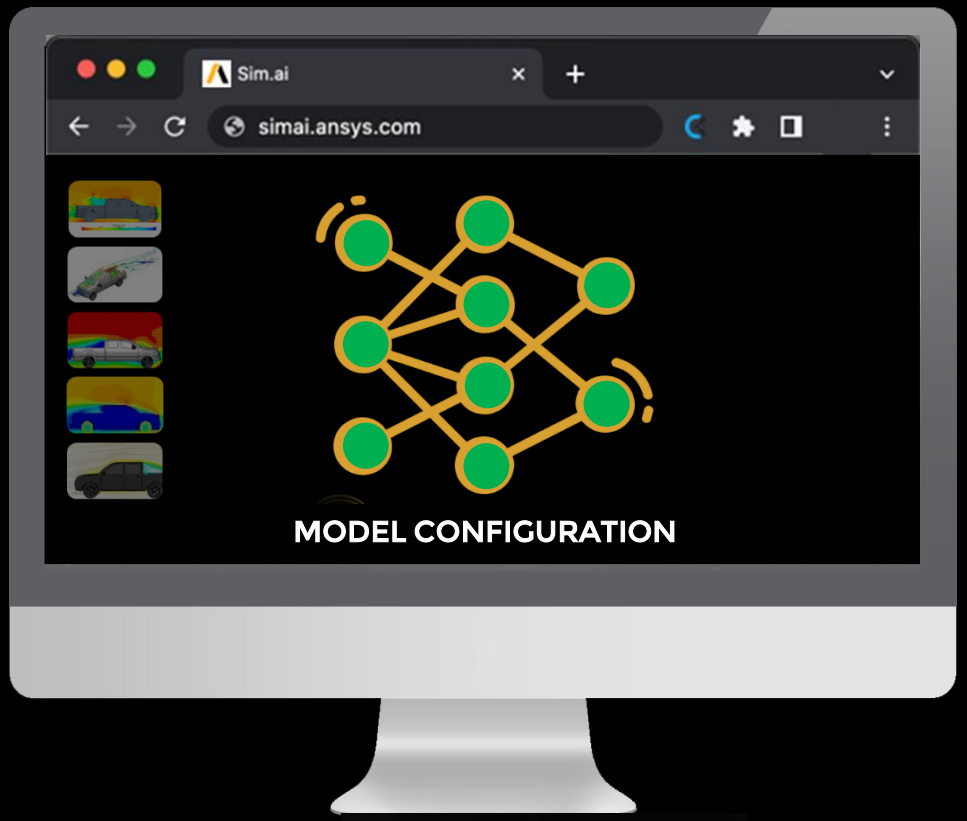

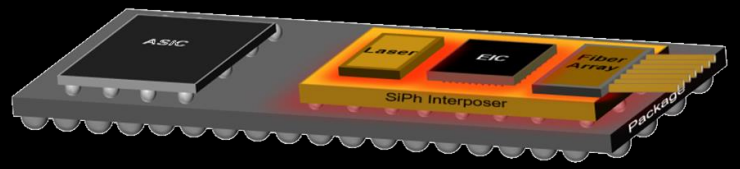

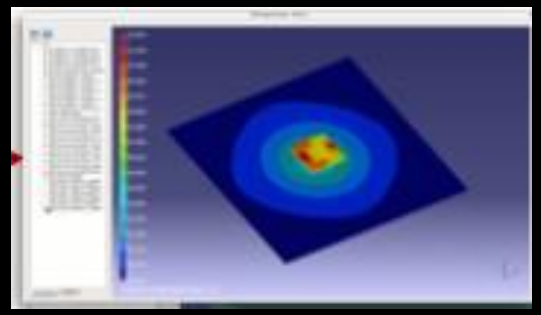

Performance Prediction

Fast. Reliable. Accessible.

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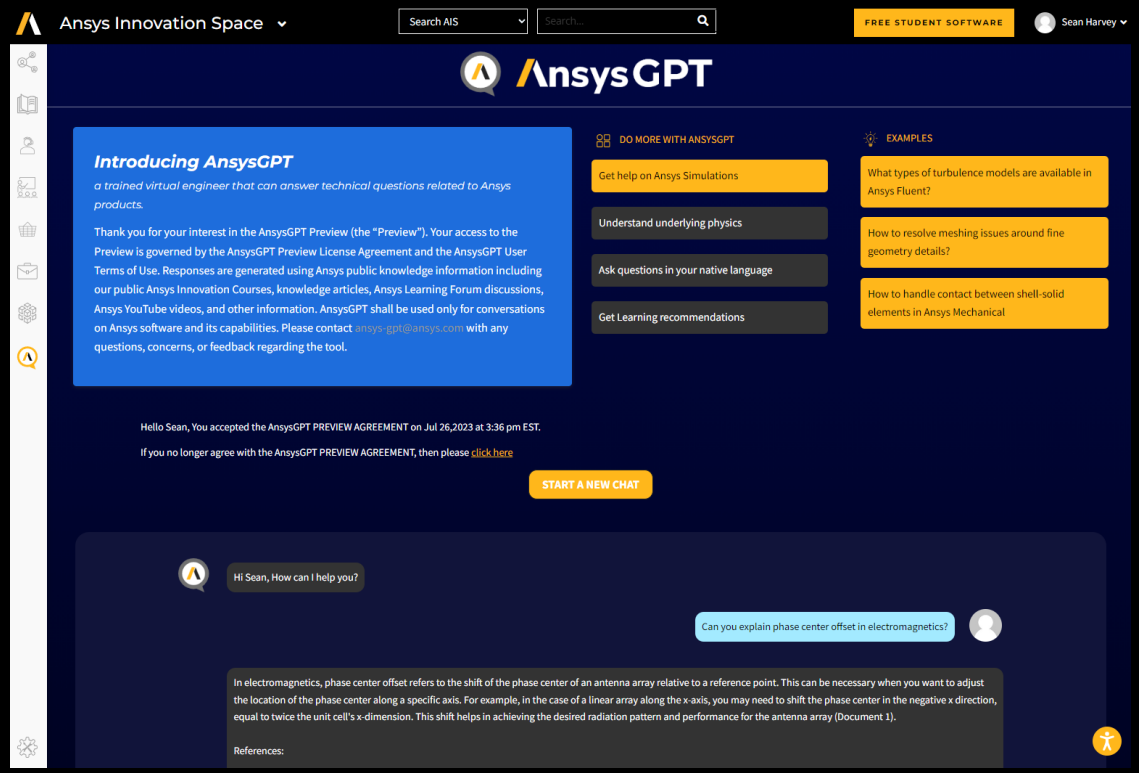
AnsysGPT

/ Desktop Version

Easily integrate into any platform



/ Mobile Version

Easily integrate into any Ansys product

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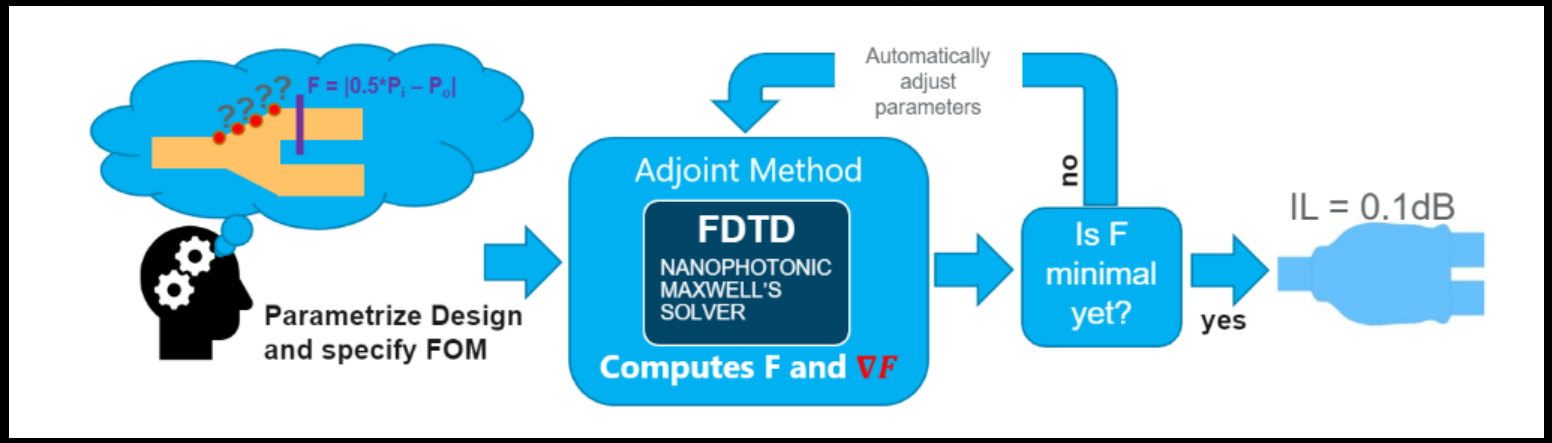
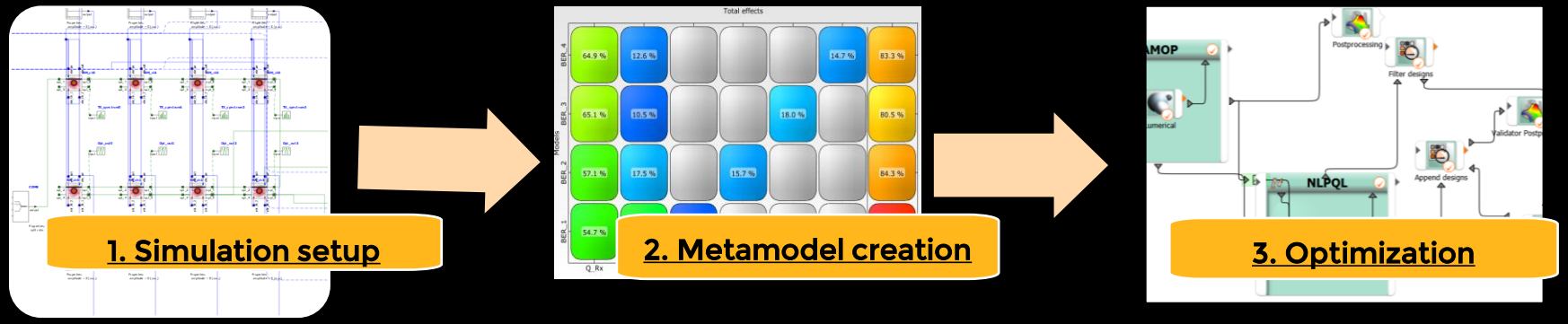
Optimizing Photonic Devices

- Go beyond validating designs and simple design variations
- Use advanced algorithms to explore many dimensional design spaces
- Understand parameter sensitivities and impact on yield

Example 1: Inverse design



Example 2: Optimize metamodel



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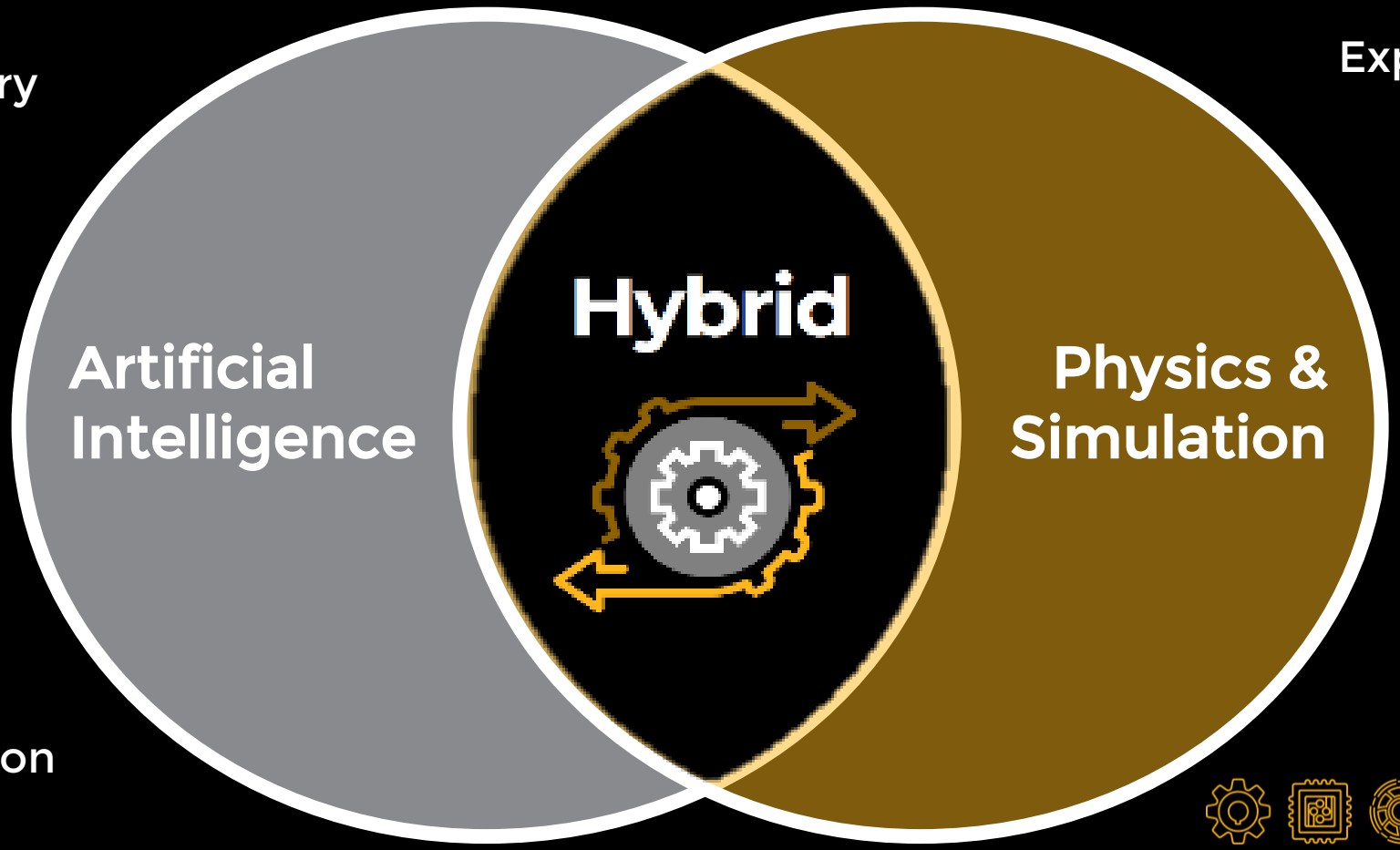
The Future of Simulation: Evolution and Innovation

Multi-disciplinary models

Optimized Models

Pattern Recognition



Experimental Data

Collaborative Design

Simulation Tools

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Ansys AI