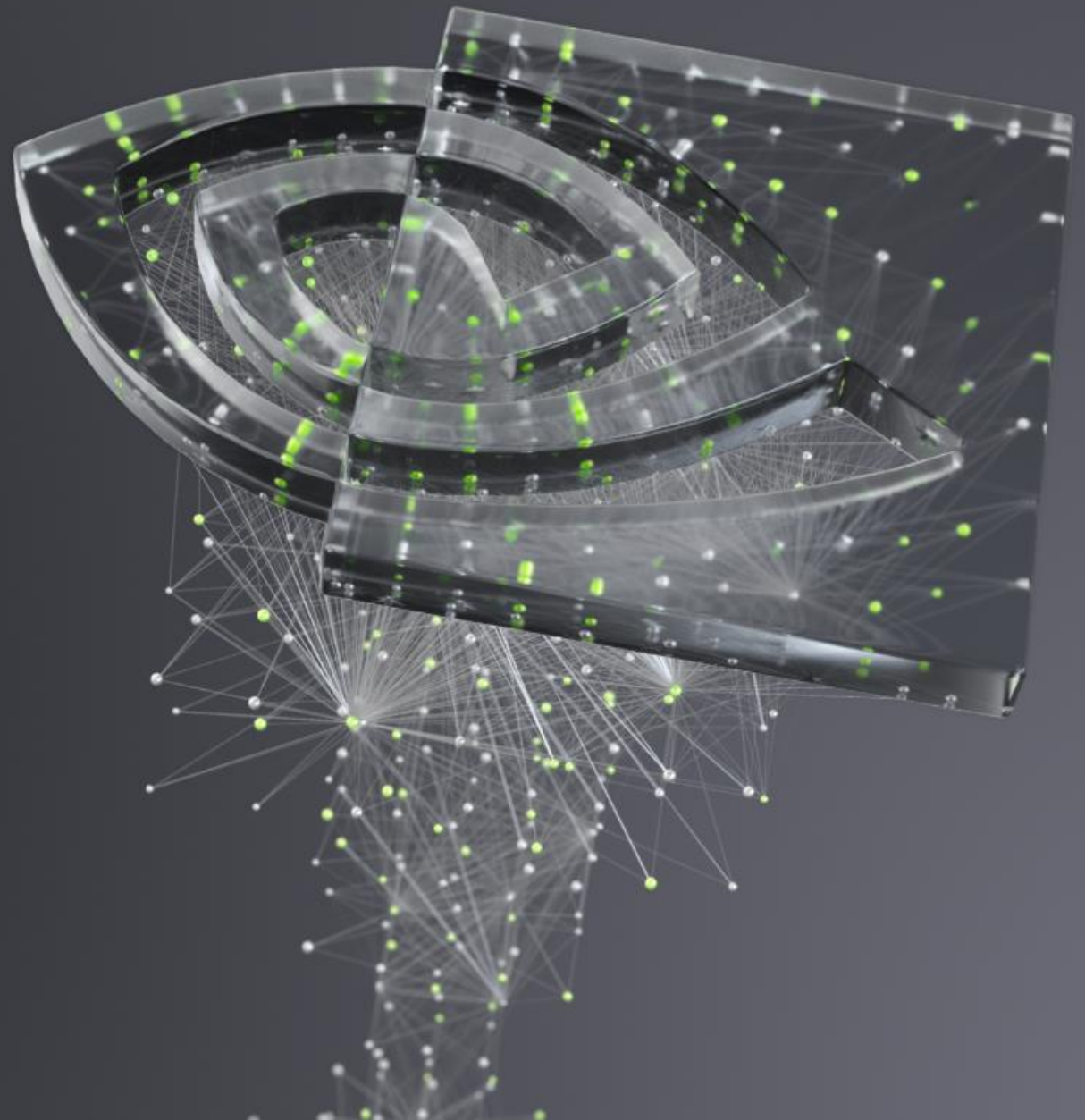

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LIV.DAT Careers Workshop

Paul Graham, Senior Solutions Architect, NVIDIA

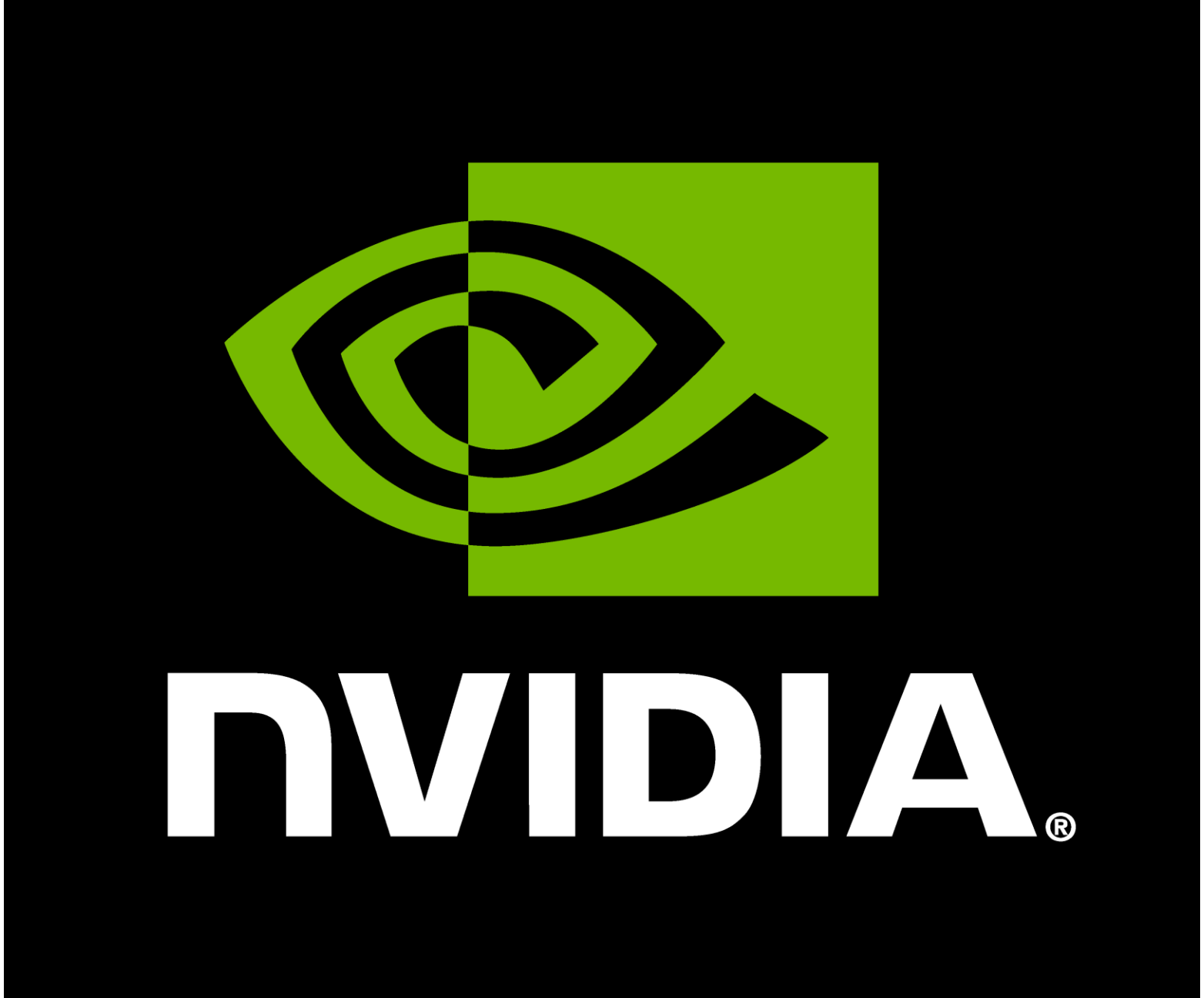
March 2021

9

I SURVIVED FAT SAMS
Edinburgh

THE STAND
COMEDY CLUB
EDINBURGH

epcc
THE UNIVERSITY OF EDINBURGH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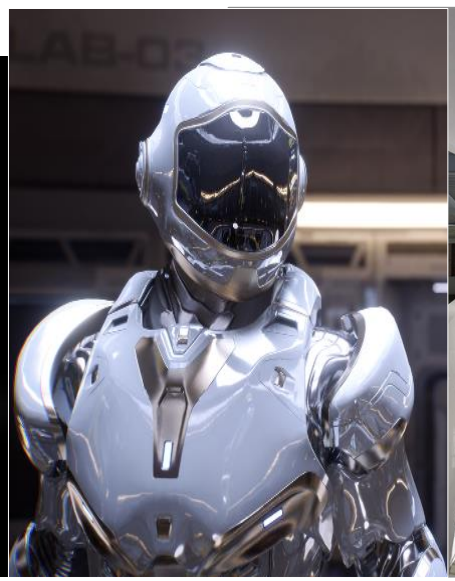
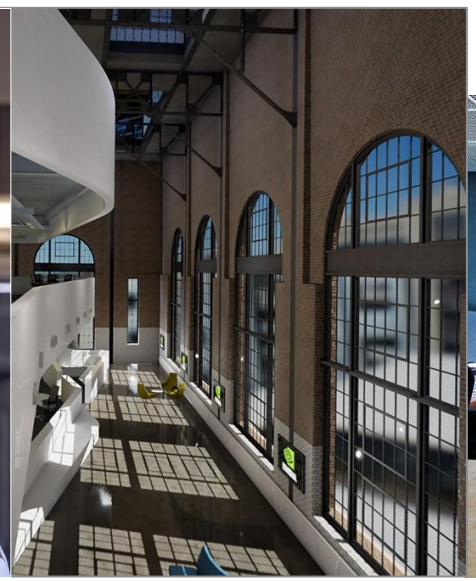
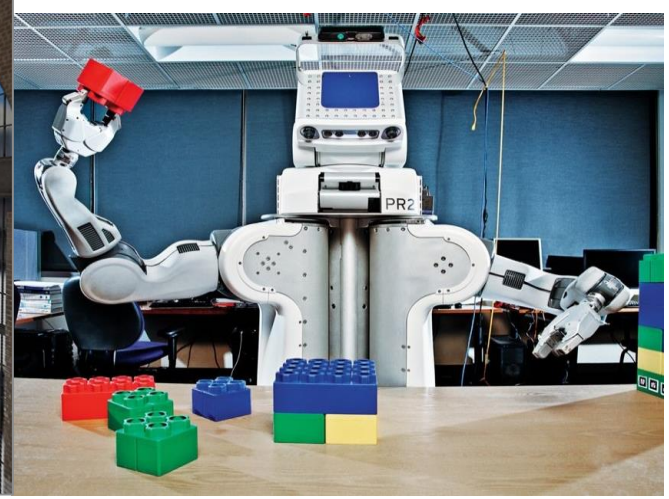
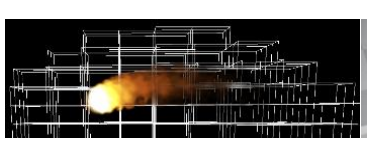






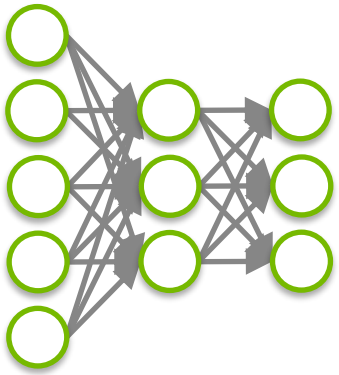


GPU Computing

Computer Graphics

Artificial Intelligence

THE BIG BANG IN MACHINE LEARNING

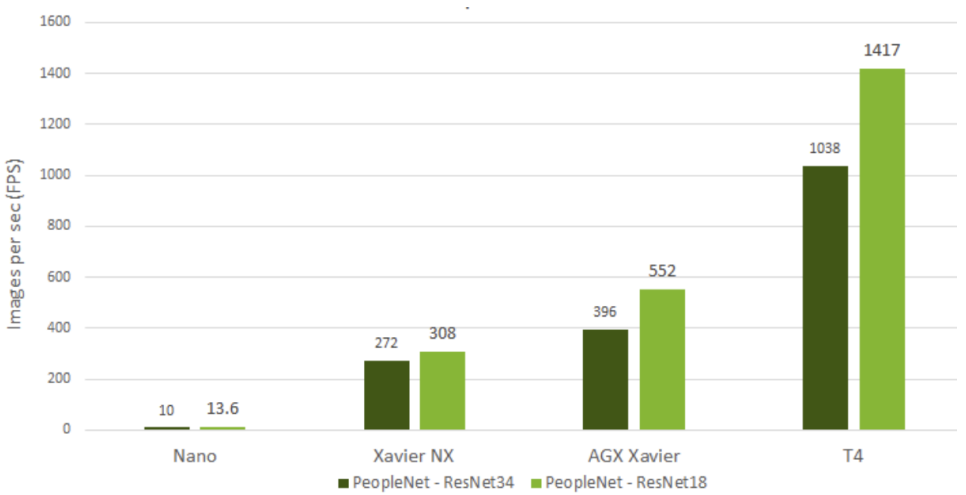


DNN

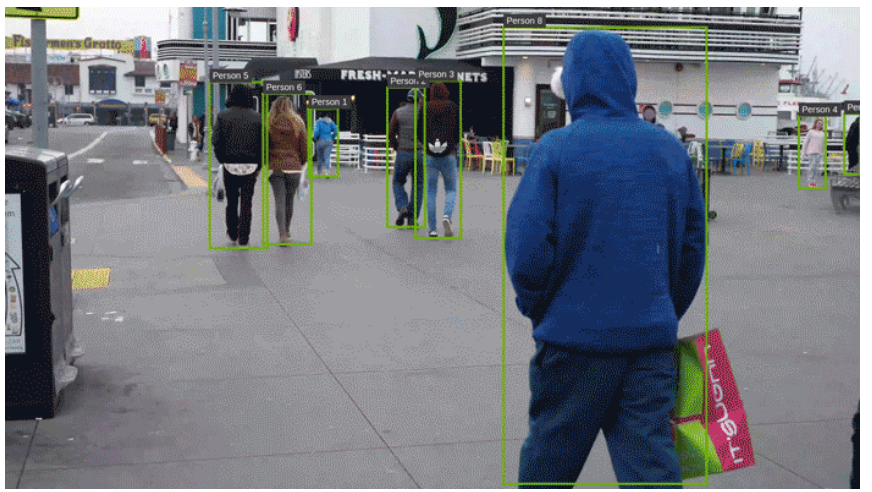
GPU

PEOPLENET: REAL-TIME INFERENCE PERFORMANCE

Detect persons, bags and faces



VIDEO DEMO



Number of classes: 3
Dataset: 750k frames

Accuracy
84%

https://ngc.nvidia.com/catalog/models/nvidia:tlt_peoplenet

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VIDEO DEMO

TrafficCamNet and VehicleMakeNet In-Action

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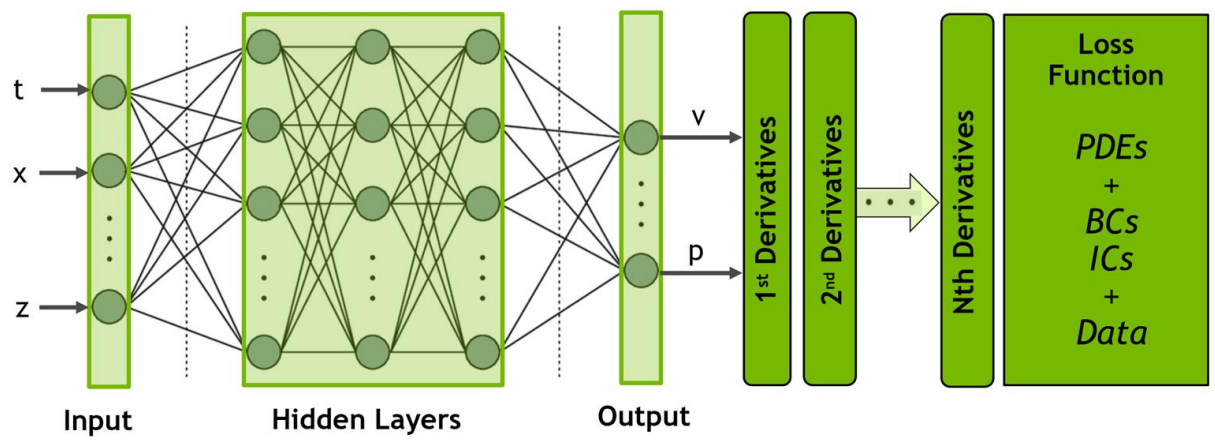
SIMNET

AI toolkit for multi-Physics Simulation

- General ODE/PDE neural network solver:
  - Engineering Physics (+ Computational Bio/Chem, Hi-energy Physics, Finance etc.)
  - Strong/Differential or Weak/Variational form
- Physics driven
- General Geometry/Shape modeling
- Multiple network architectures and features
- Parametrization of Geometry & Physics
- Performance optimized for single & multiple GPUs/Nodes
- APIs for customized development



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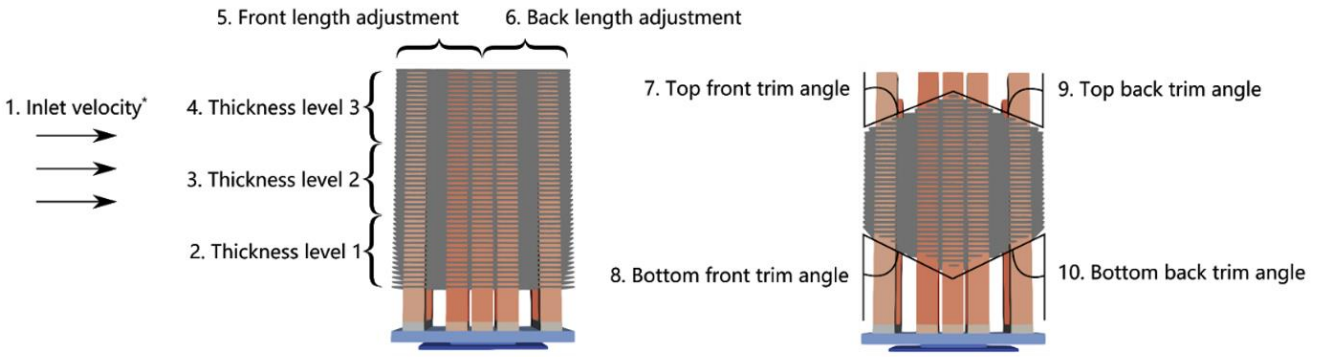
PARAMETERIZED DGX-A100 NVSWITCH HEAT SINK

Multi-Physics Application: Fluids + Heat Transfer

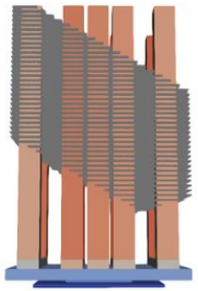
Limerock Design Variables



*Inlet velocity is not a design variable. It will be used for robust design optimization of Limerock in future.

Limerock Optimal Design

1. Inlet velocity: 5.7 m/s
2. Thickness level 1: 0.0031
3. Thickness level 2: 0.0044
4. Thickness level 3: 0.0030
5. Front length adjustment: -0.0124
6. Back length adjustment: 0.0025
7. Top front trim angle: 0.0223 rad
8. Bottom front trim angle: 0.5197 rad
9. Top back trim angle: 0.5147 rad
10. Bottom back trim angle: 0.2217 rad



Max allowed pressure drop: 2.59
Number of random design evaluations: 4M

Peak temperature: 38.25 degC
Pressure drop: 2.5896

Computational Times (10 parameters, 3 values per parameter)	
SimNet	**1000 V100 GPU hrs.**
Traditional Solver (OpenFOAM) 59,049 separate runs (26 wall hours on 12 CPU cores)	**18.4 Million CPU hrs.**

BRAKE
ACC
49 mph

OMNIVERSE - COLLABORATIVE PLATFORM FOR VISUALISATION

Visualizing COVID-19 Spikes in Action: https://www.youtube.com/watch?v=Y9N_lmvwnUI

PLATFORMS AND FRAMEWORKS

SDKs and Reference Applications

- RAPIDS – Open GPU Data Science
- Jarvis - Multimodal conversational AI services
- Merlin – Recommender systems
- CLARA – Healthcare: AI, Medical Imaging, Genomics
- ISAAC – Robotics: training and simulation
- Metropolis – Smart cities: edge to cloud
- Drive – Autonomous driving

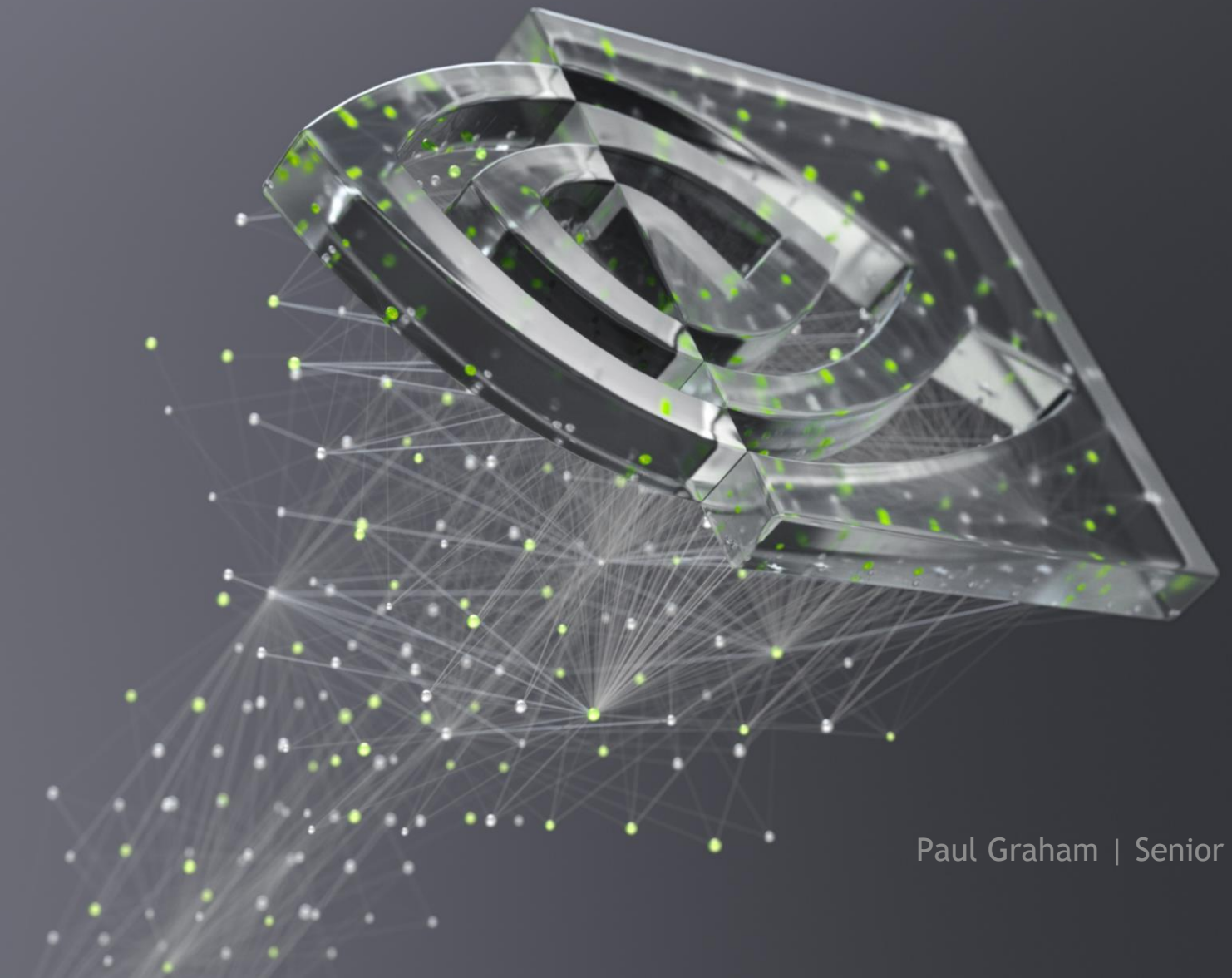
CAREER

https://www.nvidia.com/en-gb/about-nvidia/careers/university-recruiting/

- Engineering
- Business Development and Sales
- DevTech
- NVResearch
- Solution Architect
- Internships, NCG programme
- Amazing place to work

"We want NVIDIA to be a place where the best people can do their life's work."

- Jensen Huang, President and CEO



Q & A

Paul Graham | Senior Solutions Architect

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