



Hartree Centre

Science & Technology Facilities Council

Cliff Brereton

Director, Hartree Centre

Being 'Essential'



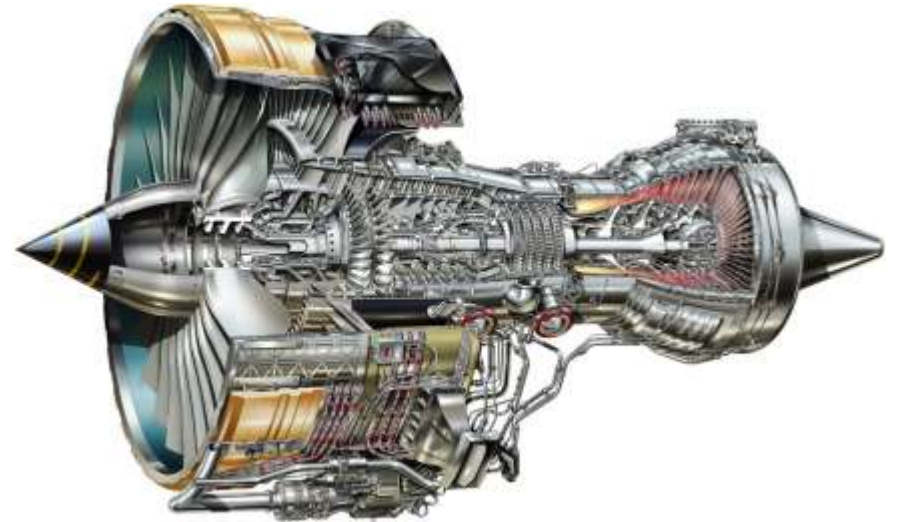
E-Infrastructure

- 2011 Tildesley Report
- £160M Investment from BIS
- Economic Impact through Software & Modelling

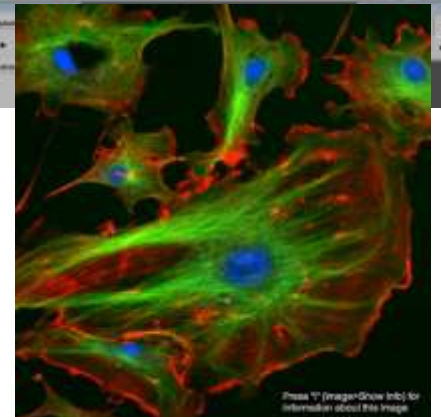
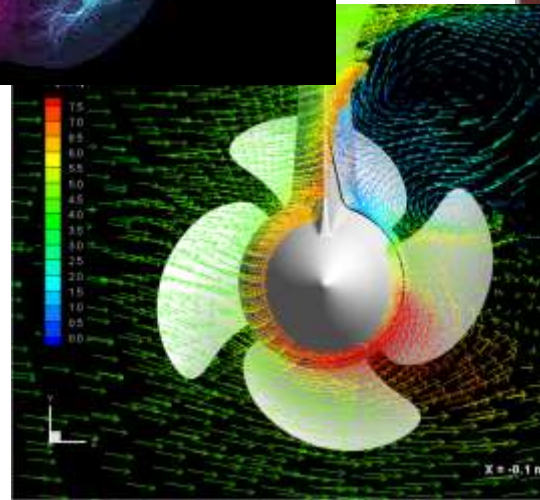
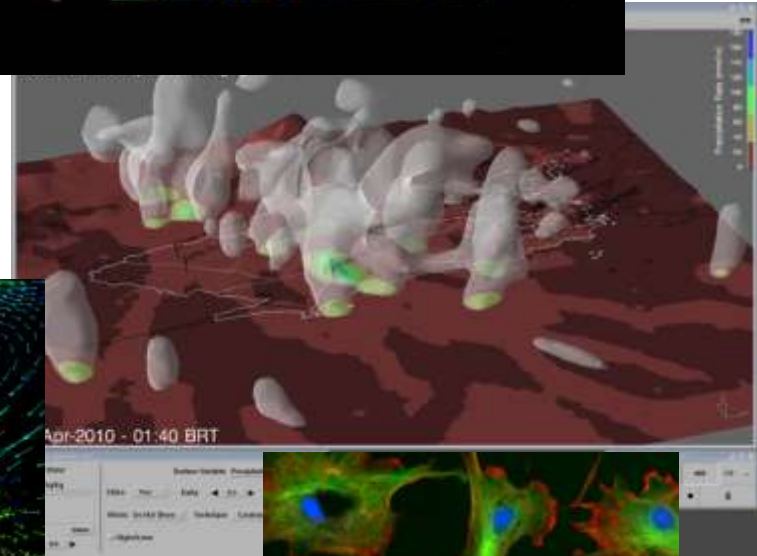
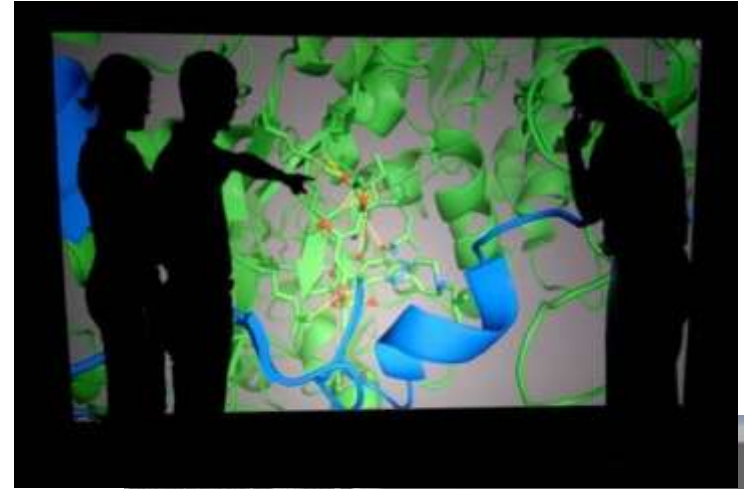
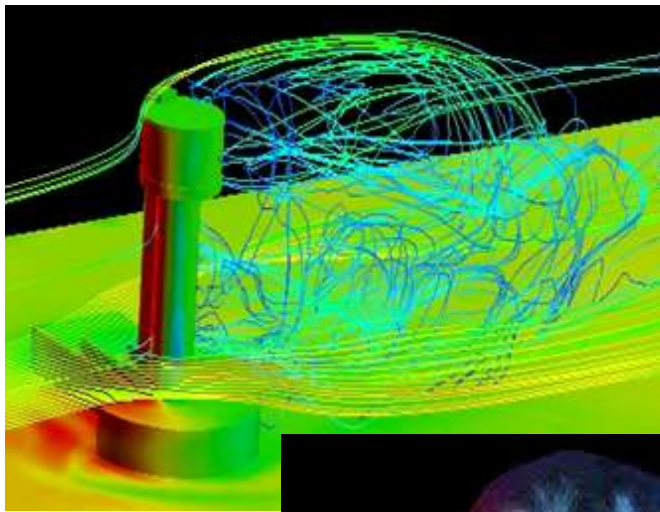
“To out compute is to out compete”



By Design



ARM, BAE, Bentley, Glaxo Smithkline, Unilever, JLR,



‘Value’

"It costs £500,000 to do each physical test of a car crash, and it's not repeatable. It costs £12 to run a virtual simulation of a car crash, and it's fully repeatable"
Andy Searle, Head of Computer Aided Engineering,
Jaguar Land Rover.

Our customers tell us ‘Value’
is defined as:

- More Sales, More Customers
- Products developed Better, Faster, Cheaper
- = Competitive Advantage



Client Projects include

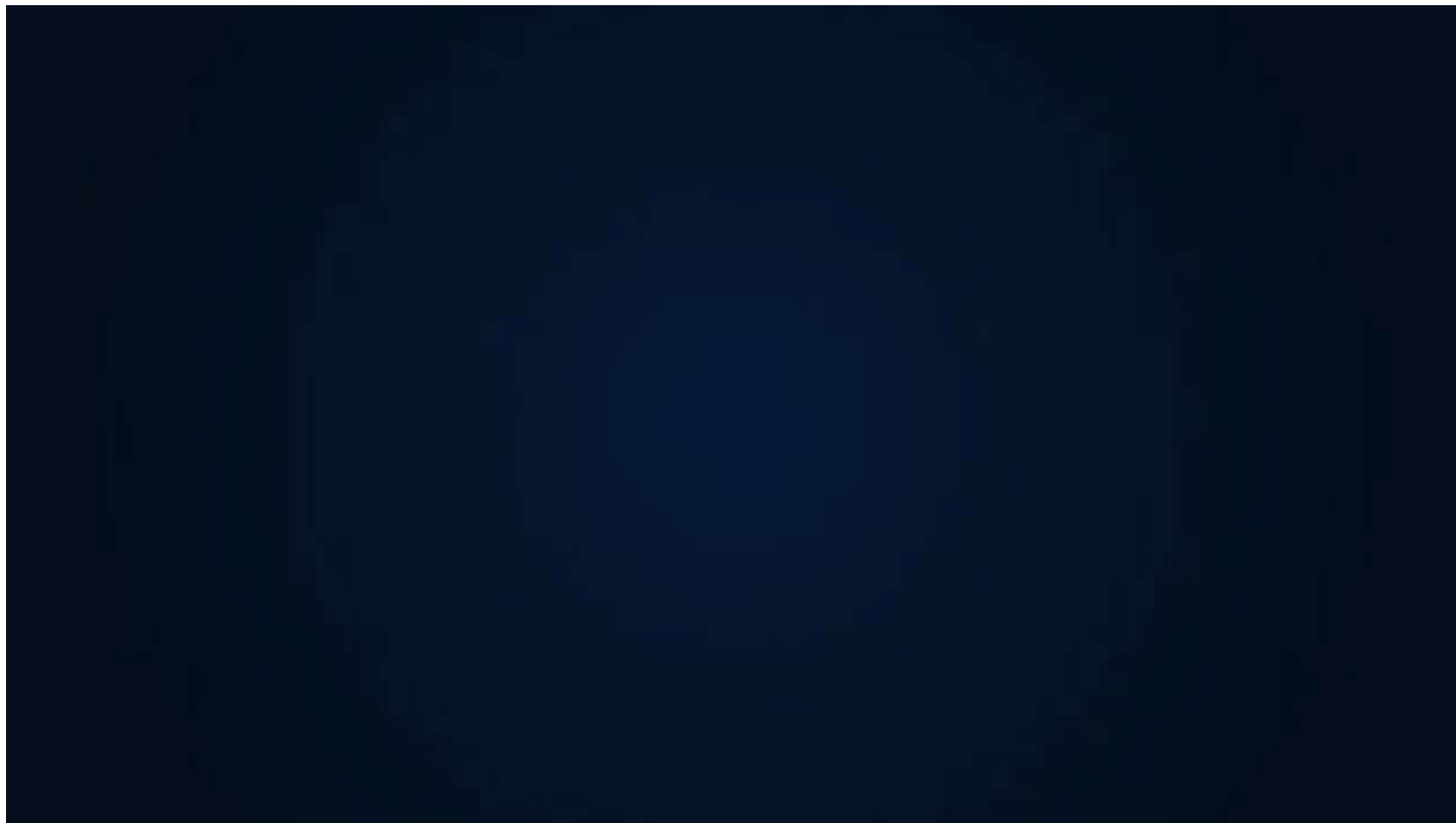
- Engineering & Manufacturing
 - Vehicle Design & Testing
 - Consumer Electronics Design
 - Consumer Packaged Goods Design
- Environment
 - Weather modelling
- Life Sciences
 - Genomics for better crop yields
- Energy
 - Advanced Battery Cell Design
 - Efficient Well Head Oil extraction
- Financial Services
 - Risk Management
 - Service Modelling



Unilever



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Hartree Compute assets

- Blue Joule 98,000 Cores (1.2 Pflops)
- Blue Wonder 20,000 Cores
- 9PB of Disk Storage
- 15 PB of Tape Storage
- 3 Visualisation Walls
- Big Data Analytics Cluster (288TB)
 - At Rest
 - Streaming
- ‘Novel’ server technologies
- STFC / e-Infrastructure South
 - Nvidia Tesla GPU Cluster



Our People

- Engineers
- Chemists
- Life Scientists
- Mathematicians
- Software Developers
- Data Scientists



Hartree Service Offerings

- **Collaborative R&D**
 - Outcome focused projects
 - “Help me make a better....”
 - Primary cost element is staff
- **Software & Algorithms**
 - New software applications for HPC or Big Data
 - New Algorithms
 - Optimisation of existing codes for new platforms / architectures
- **Training & Skills**
 - Logical course curriculum to broaden and deepen adoption and application of Modeling & Simulation
- **Platform as a Service**
 - Timeshare use of Hartree assets
 - Predominantly self service
 - Primary cost element is machine asset time
 - May or may not include Hartree owned software assets
 - May include some separately costed Hartree staff effort



Hartree Centre and LLNL HPC Innovation Centre



- Agreement signed August, 2013
- Sponsorship from respective Governments.
 - To share & grow ‘know how’ and competitive advantage
 - Industry Focus
 - Technical - Software
 - Emerging technologies – Big Data, Energy Efficient compute, etc
 - To support ‘Anglo-American’ Commercial Client Engagements
- Commitment from a shared industry partner - IBM



Workflow within our Partnership

- Industry Days
- Collaborative workshops
- Joint client projects
 - Engineering
 - Life Sciences
- Client Engagement support
 - Scale and skills
- Technology Exploration



Summing Up

- E-Infrastructure provides better products, faster and cheaper.
 - Competitive advantage and ROI
- Accessing these assets is easy
- Partnerships provide:
 - Access to clients
 - Skills
 - Know how
 - Technologies
 - $1+1=5$



Thank you



**Science & Technology
Facilities Council**

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