



Growing research which computes

Nick Jones
Director
New Zealand eScience Infrastructure





eScience in a national context



National Statement of Science Investment

First National Science Strategy launched

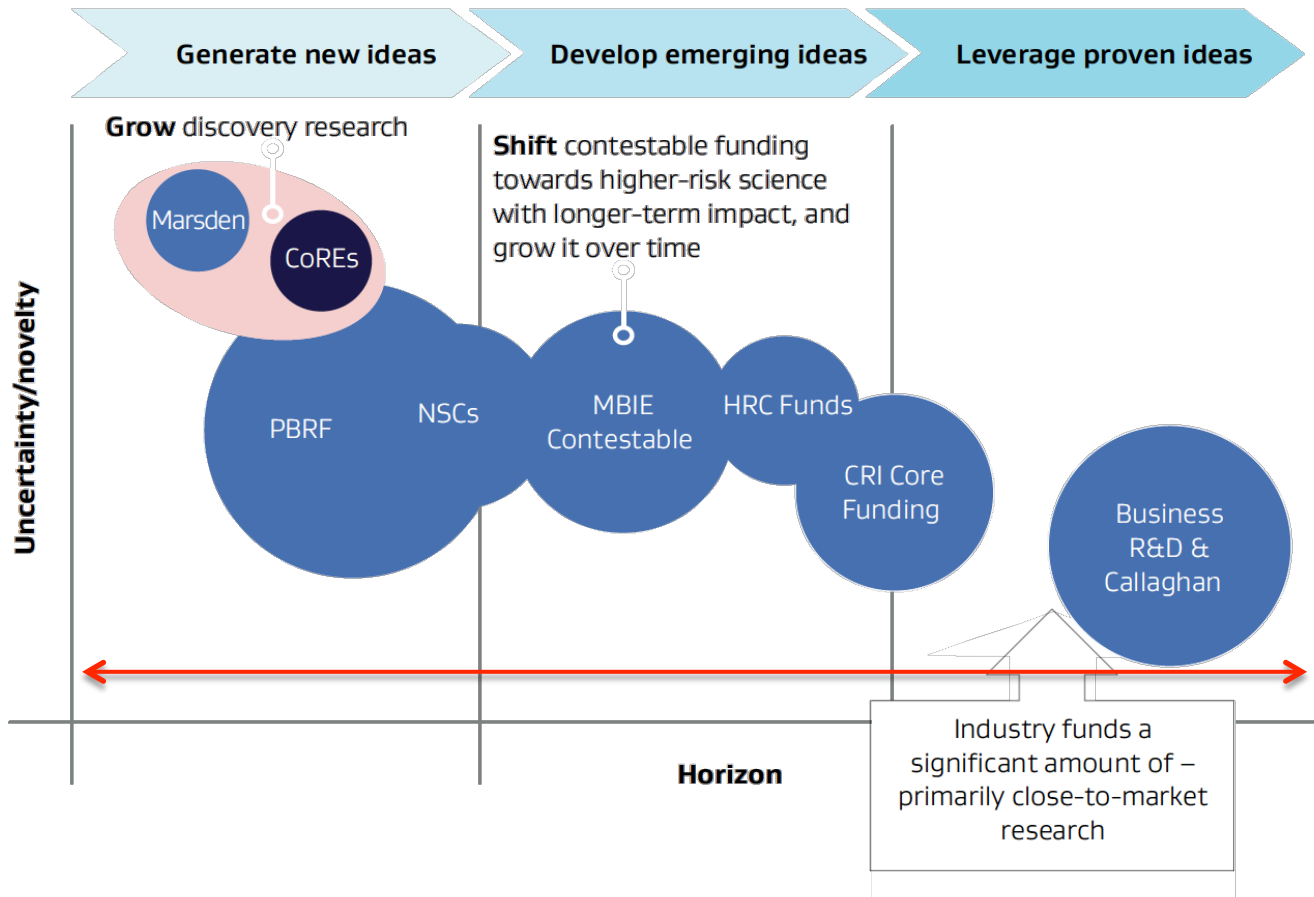
Steven Joyce, 5 October 2015

“Over the next five to 10 years, the science system will be increasingly prominent as it both shapes and is shaped by an economy that is increasingly innovation-led, ...

“This first NSSI responds to the need to plan more strategically, target New Zealand’s growing science investments more effectively, and leverage them to maximise their long-term value to New Zealand.”

Growth in collaborative research

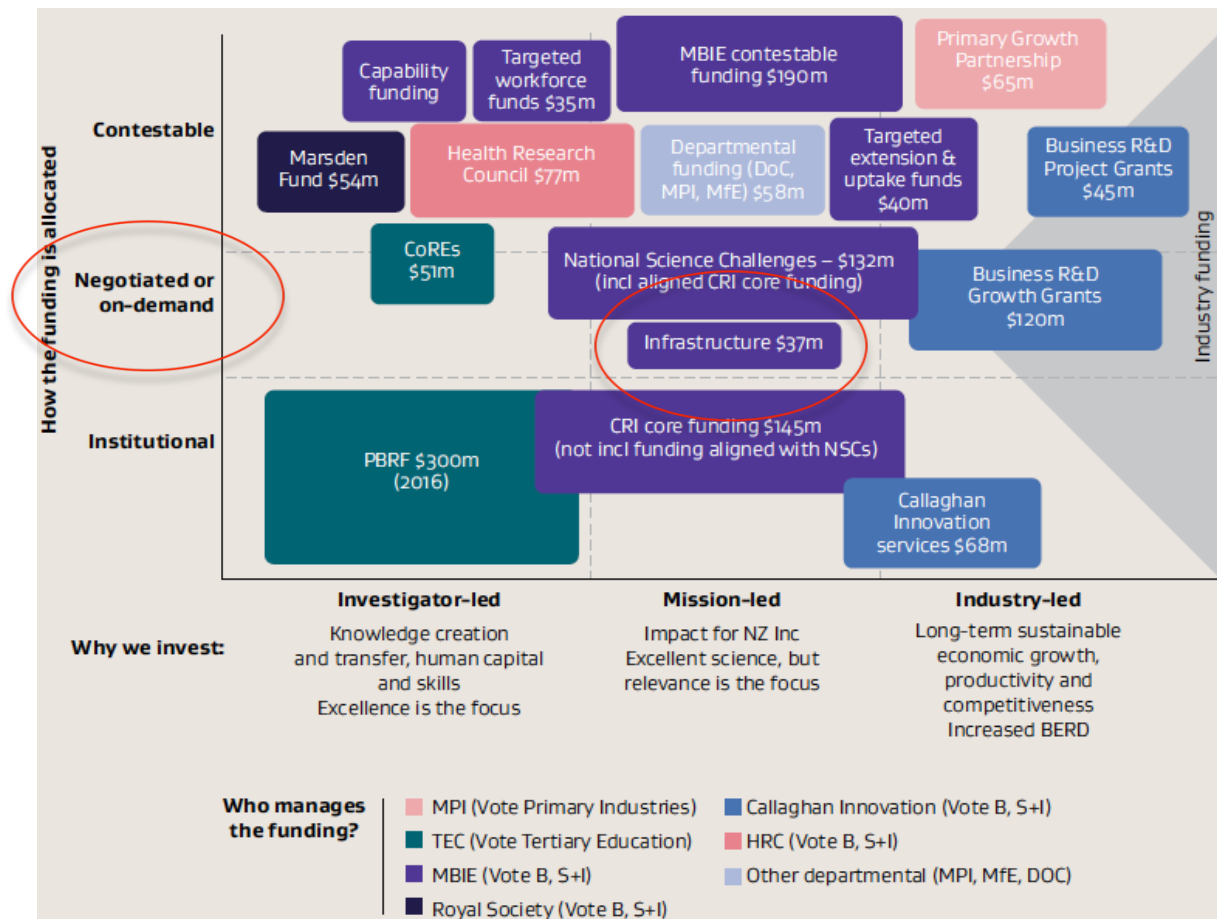
Long-term research plans (5+5)



Large Scale Research Infrastructure, funded via an on-demand investment

sector (senior leaders of all institutions) endorsed as a national investment

as a sector, we've chosen to collaborate (rather than compete) to realise eResearch infrastructure

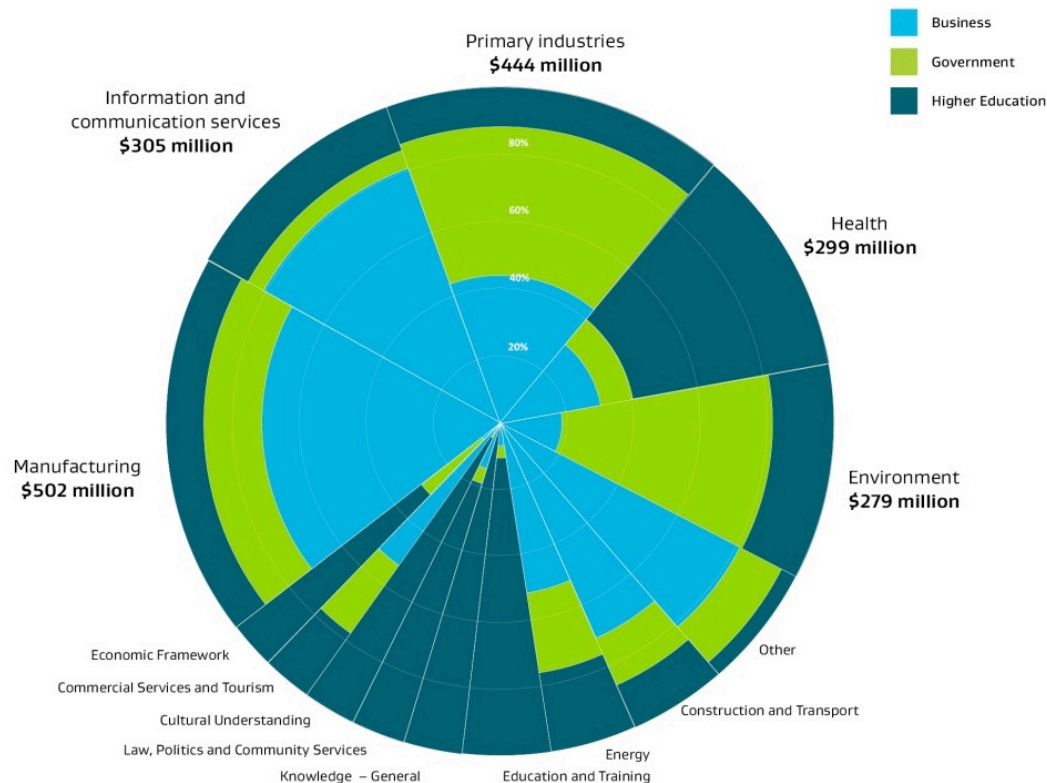


Business Growth Agenda

Building Innovation

Developing NZ as a
hub for high-value,
knowledge-
intensive businesses
and conducting
more R&D to lift
innovation

Expenditure on R&D, purpose of research and sector of expenditure



Source: Statistics New Zealand R&D Survey 2014



eResearch 2020: Conversations for change

eResearch challenges in New Zealand

eResearch 2020, March 2015

“... international research norms have begun a shift to digitally driven research methods and to new standards in terms of evidence and publishing. The future impact of New Zealand research and researchers will depend on the ability of the sector to adopt these new tools and to excel against the new expectations.

“To address this we need a coordinated approach across the research sector. Most importantly we need to alter the culture in our research institutions towards quality engagement with digital research methods and 21st century standards.”

eResearch Challenges in New Zealand

Discussion Document

eResearch
2020

Conversations
for change.
March 2015

1
2
3
4

Skills Lag

We are under-investing in research skills and methodological training

Research Communities

eResearch strategy needs to fit with the needs of different research-disciplines

Align Incentives

Research and institutional planning need to be better aligned

Future Infrastructure

We must prioritise investment in data, visualisation, and digital research expertise



New Zealand eScience Infrastructure

The Power Behind Researchers

Growing the computing capability of New Zealand
researchers to ensure our future prosperity

Delivering value through eScience services



High Performance Computing
– computation and analytics



Consultancy
Training



Data sharing and transfer

Public and
private
sector
researchers

Access Policy

... supports
individuals
and
institutions



New Zealand's specialist land-based university



CallaghanInnovation

REANWZ



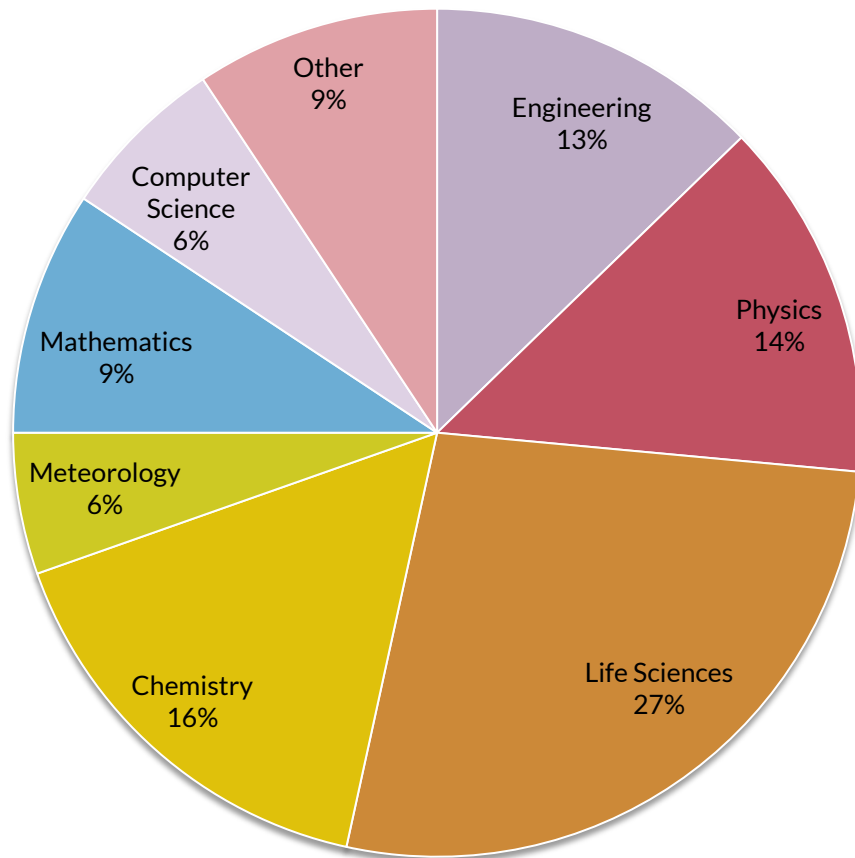
The power behind researchers



Research projects by discipline

2015

204 new
projects



Service performance 2015

89% of users (strongly) agree NeSI's services meet their needs

99.3% availability of services

Case studies



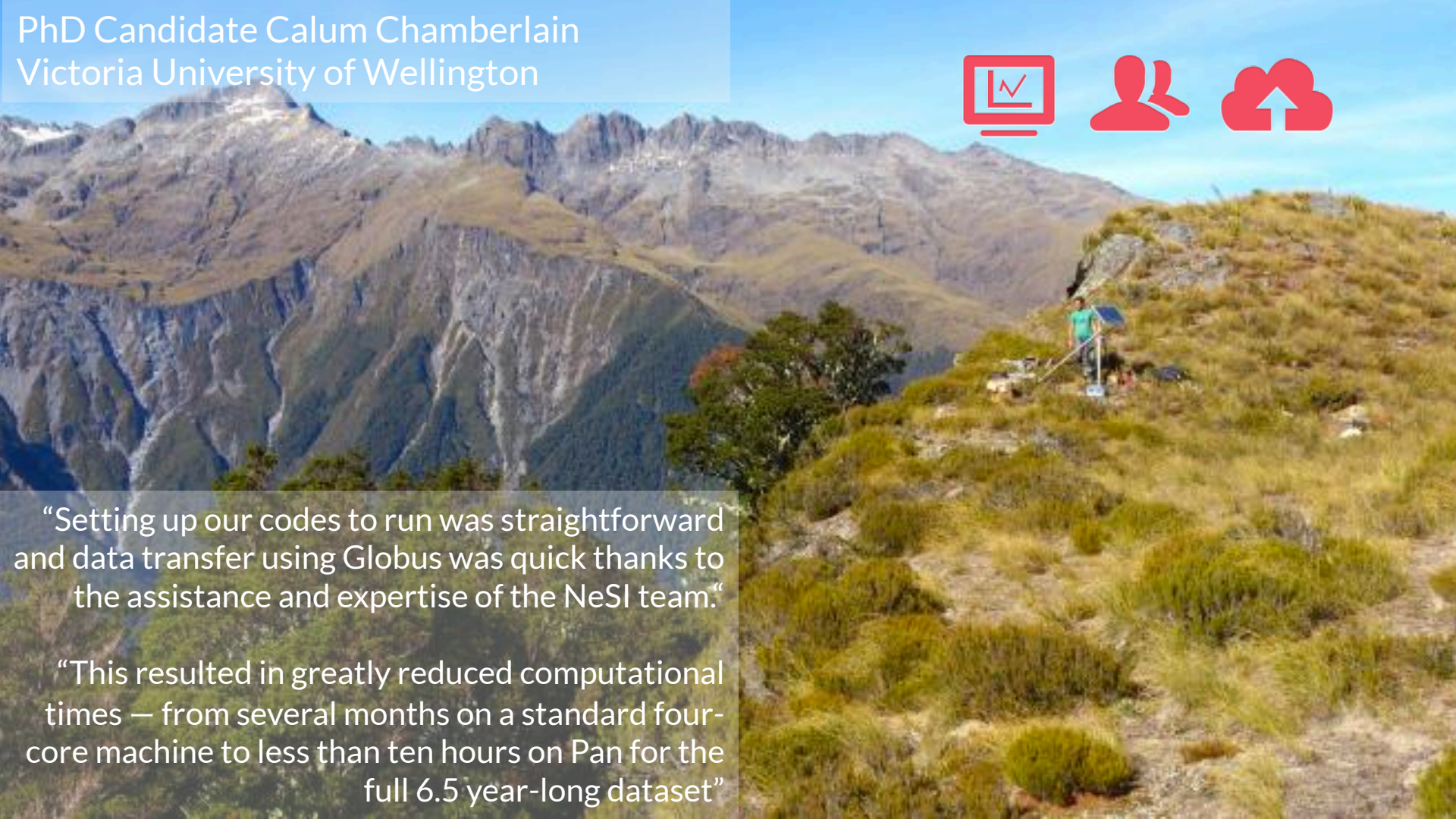
High Performance Computing
– computation and analytics



Consultancy
Training

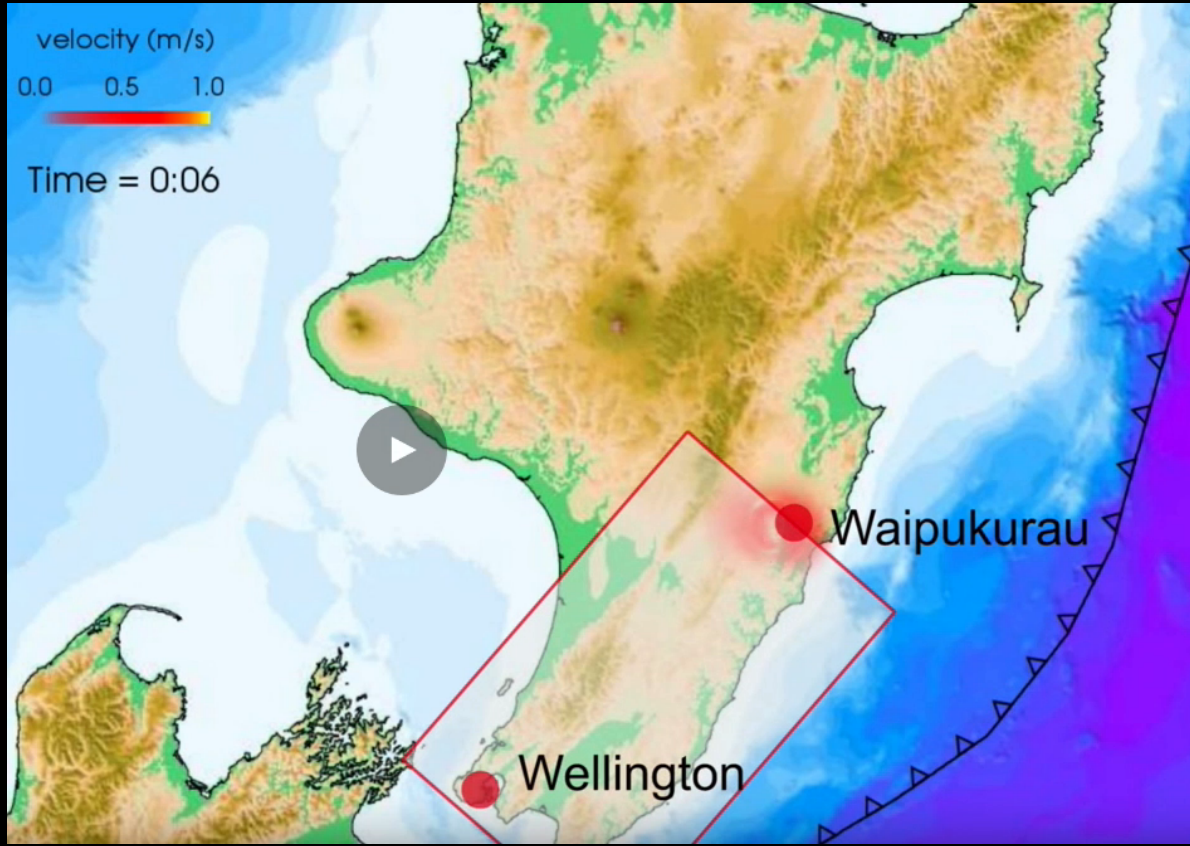


Data sharing and transfer



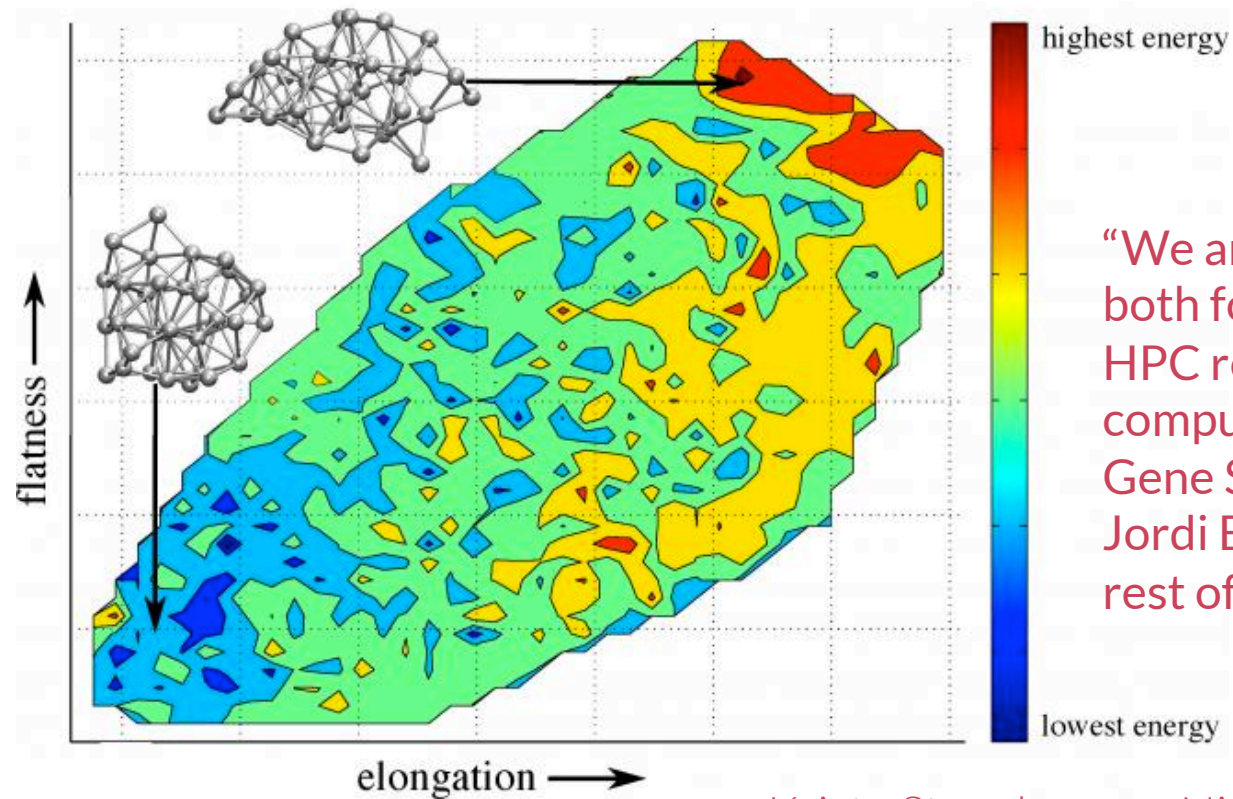
“Setting up our codes to run was straightforward and data transfer using Globus was quick thanks to the assistance and expertise of the NeSI team.”

“This resulted in greatly reduced computational times — from several months on a standard four-core machine to less than ten hours on Pan for the full 6.5 year-long dataset”



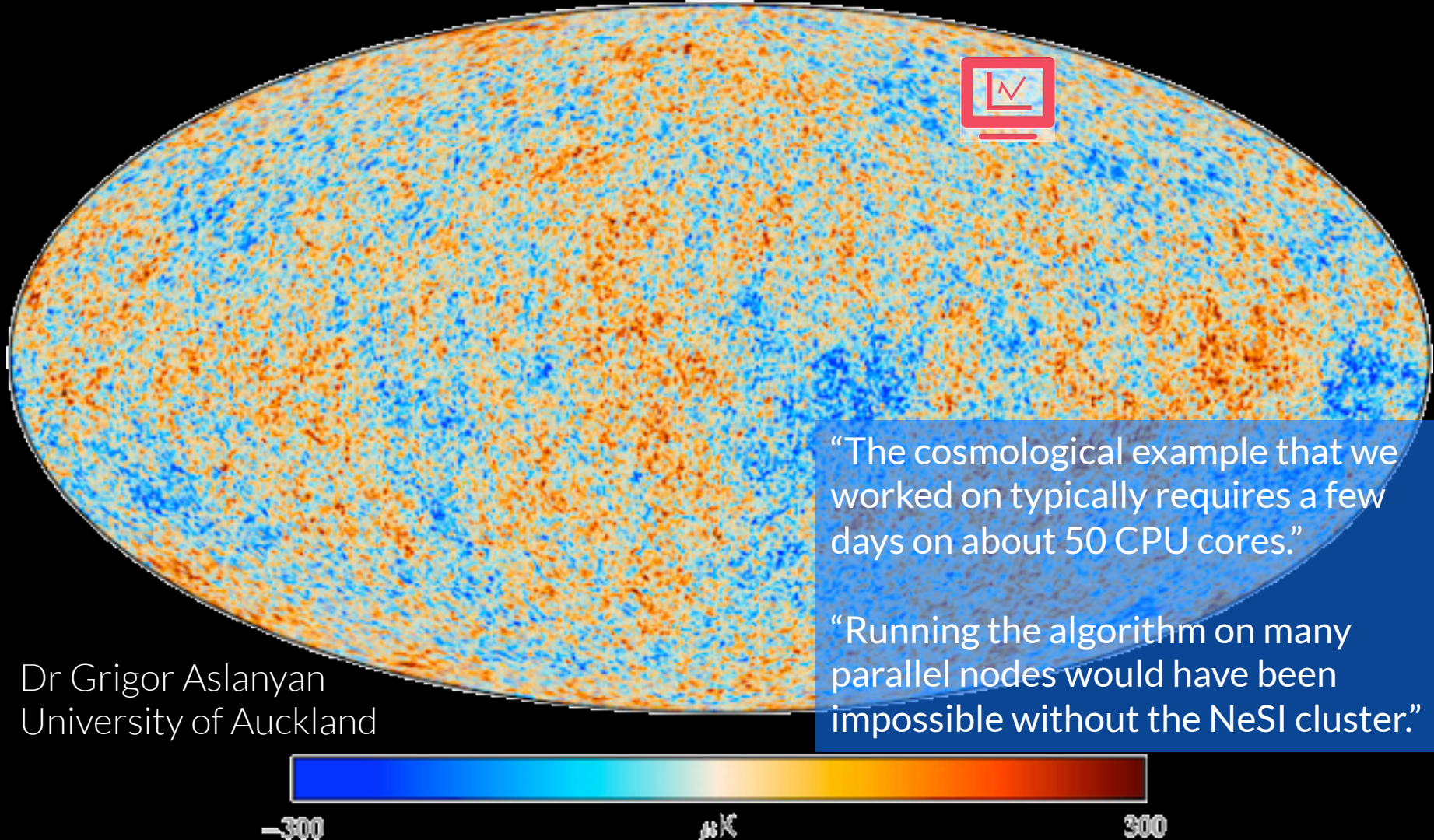
“Without NeSI’s supercomputer, we cannot run our simulations with a sufficient resolution.”

Seismologist Yoshi Kaneko
GNS Science



“We are very grateful to NeSI – both for the access to powerful HPC resources as well the excellent computational support provided by Gene Soudlenkov, Francois Bissey, Jordi Blasco, Ben Roberts and the rest of the NeSI team.”

Krista Steenberg, Nicola Gaston
Massey University, Victoria University of Wellington



Dr Grigor Aslanyan
University of Auckland

“The cosmological example that we worked on typically requires a few days on about 50 CPU cores.”

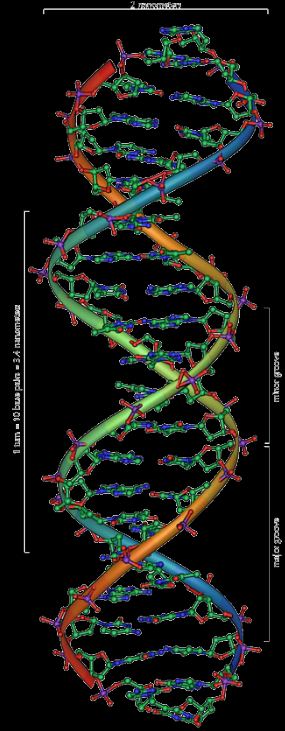
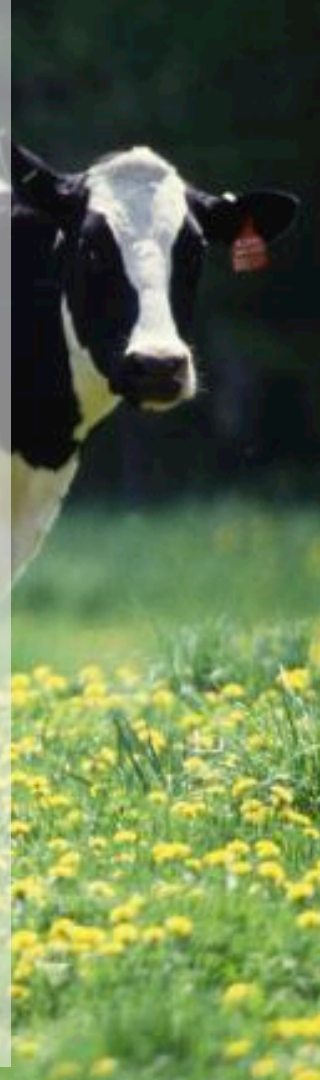
“Running the algorithm on many parallel nodes would have been impossible without the NeSI cluster.”

“Undoubtedly, the amount of data and the complexity of analysis will continue to grow in the future. This makes it very important to have such computational resources as NeSI.”

“Using a large number of computational cores allowed us to run analyses in one week which otherwise would have taken maybe 100 years of computational time.”

“The technical and consulting support provided by NeSI staff was extremely important and, in some cases, crucial for our project.”

Maksim Struchalin
LIC, Livestock Improvement Corporation





NeSI

New Zealand eScience
Infrastructure

The Power Behind Researchers

Growing the computing capability of New Zealand
researchers to ensure our future prosperity



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@ eResearch NZ 2016

NeSI Board

Crown Observers

As the Crown is a key partner supporting NeSI, the Crown appoints observers to Board discussions :



Rick Christie



Murray Poulter



Stephen Whiteside



Andrew Rohl



Steve Weaver



Rob Ballagh

A year of intense
activity and
transformational
change



Rick Christie
Chair

Moving from local to national

Organisation re-design

... defining how we collaborate

Then: 6 teams working in 5 locations

- » Functions replicated at each site
- » Local approaches to delivering services and supporting researchers

Soon: 1 virtual organisation across 5 locations

- » National teams around common functions
- » Delivering common services with consistent delivery model to all institutions
- » National governance over future investments

Next steps:

- » Recruitment for / appointment to new positions

NeSI Senior Leadership Team



Georgina Rae



Brian Corrie



Michael Uddstrom



Aleksandra Pawlik



Robin Bensley



Mike Ladd

Development of infrastructure



HPC Compute & Analytics



New national governance mechanism rolled out – **National Platforms Framework** review

Cloud-bursting pilot underway, working with Microsoft Azure & Nimbix

Platforms Framework revised:

- replacement HPC platforms commissioning and go live July 2017
- scope incorporates core **Data Analytics technologies & tools**
- recruit a data analytics leader

Development of infrastructure



Research Data

Review of current offerings – and our future directions: data analytics & workflows



Support for National Research Data Programme, via eResearch 2020

Research Data Alliance



Growth in skills



Training

10 training events in 2015

Leadership in instructor training:
Software Carpentry & Data Carpentry
20 Instructors trained (2016)

++ increase in workshops in 2016

3 training events (2016):
first (2) Research Bazaars in NZ
200+ researchers trained

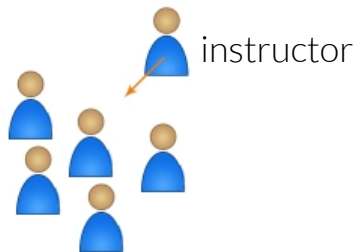


Training Strategy - Phase 1 (2014 ~)



Basic skills

- Mostly directly delivered or led by NeSI
- Local instructors/helpers if available
- Very positive feedback : 4.34/5.0 overall rate

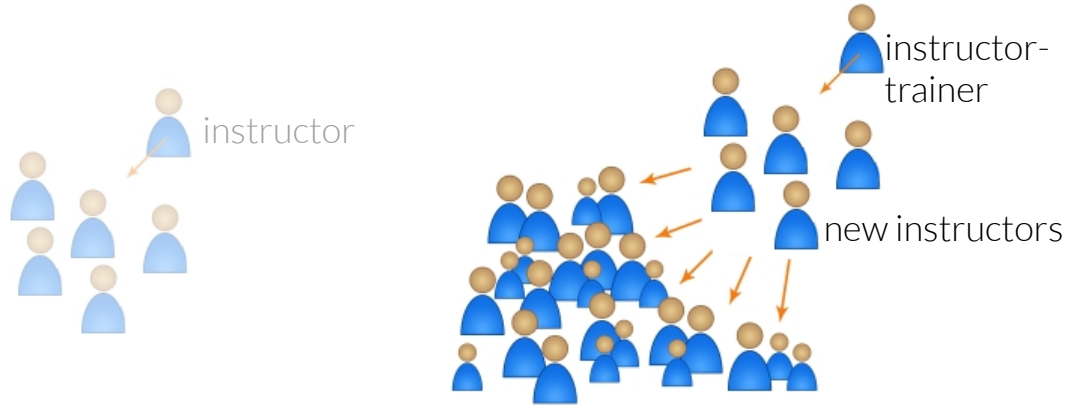


Training Strategy - Phase 2 (2016 ~)



Train the trainer

- Support communities to lead the basic skill training
- Build partnerships to sustain capabilities over time

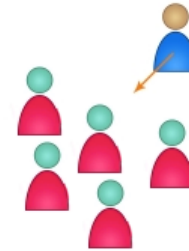
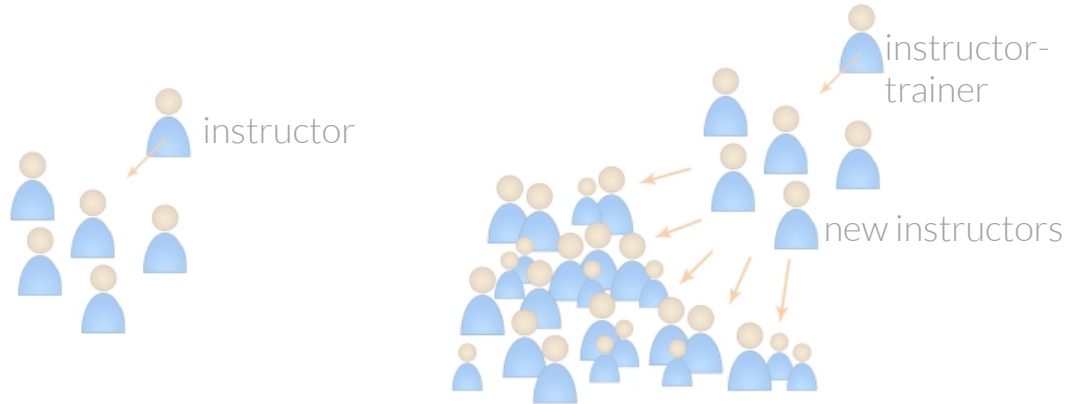


Training Strategy - Phase 3 (2017 ~)



Advanced topics

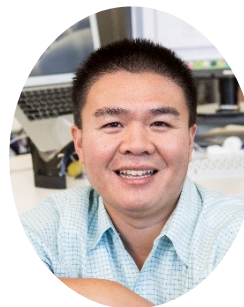
- Research applications and methods
- Existing training continue as BAU



*Advanced skills in
applications and
methods*

NeSI 'Tuesday' at eResearch NZ 2016

11:15 (Queenstown)	NeSI Update	Nick Jones
11:45 (Remarkables)	Growing NZ's Researcher's Computing Capability	Georgina Rae & John Rugis
14:30 (Queenstown)	An HPC Implementation of the Finite Element Method	John Rugis
16:00 (Queenstown)	The NeSI National Platform Framework	Michael Uddstrom
16:30 (Queenstown)	Early Experiences with Cloud Bursting	Jordi Blasco
16:30 (Remarkables)	NeSI NZGL Alliance	Dan Sun & Nic Mair (NZGL)
17:00 (Queenstown)	Acceleration Made Easy	Wolfgang Hayek





Research Reference Group

Research Reference Group



Sam Dean



Cristin Print



Susan Wells



Ian Foster



Barbara Chapman



Blair Blakie



Joseph Lane



Nauman Maqbool



Growing research which computes

Nick Jones
Director
New Zealand eScience Infrastructure



