What is a Research-Intensive University for and how do we prove that it delivers?

The Singapore example

“All things to all people”
(education, training, research, patents, spin offs, innovation, social mobility, growing industry etc)

Professor Barry Halliwell
Tan Chin Tuan Centennial Professor
Deputy President (Research & Technology)
National University of Singapore
FEATURES OF A LEADING RESEARCH INTENSIVE UNIVERSITY

- Largely bottom up, PI led
- Academics do what they want (if they can find resources)
- How can this apparent chaos lead to value?

THESIS
If you get the right people (academic staff, researchers, students) in the right environment, value will be created.

- Excellent research
- Innovative education with substantial “added value”
- Patents / spin offs / new companies

But the last should not be KPIs (key performance indicators)

For most Universities, there is much more economic contribution in other ways.
### Faculties and Schools
(Undergraduate and Graduate education)

<table>
<thead>
<tr>
<th>No.</th>
<th>Faculty/College</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Arts and Social Sciences</td>
</tr>
<tr>
<td>2.</td>
<td>Business</td>
</tr>
<tr>
<td>3.</td>
<td>Computing</td>
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<td>4.</td>
<td>Dentistry</td>
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<tr>
<td>5.</td>
<td>Design and Environment</td>
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<tr>
<td>6.</td>
<td>Engineering</td>
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<td>7.</td>
<td>Law</td>
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<td>8.</td>
<td>Medicine</td>
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<td>9.</td>
<td>Music</td>
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<tr>
<td>10.</td>
<td>Public Health</td>
</tr>
<tr>
<td>11.</td>
<td>Science</td>
</tr>
<tr>
<td>12.</td>
<td>University Scholars Programme (for Undergraduate only)</td>
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</tbody>
</table>

### Graduate Schools

<table>
<thead>
<tr>
<th>No.</th>
<th>Graduate School</th>
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<tbody>
<tr>
<td>1.</td>
<td>Duke-NUS Graduate Medical School</td>
</tr>
<tr>
<td>2.</td>
<td>Lee Kuan Yew School of Public Policy</td>
</tr>
<tr>
<td>3.</td>
<td>NUS Graduate School for Integrative Sciences and Engineering</td>
</tr>
</tbody>
</table>
University Level RICs
25½ University-level Research Institutes or Centres

- Asia Research Institute
- Centre for International Law
- Centre for Maritime Studies
- Centre for Remote Imaging, Sensing & Processing
- East Asian Institute
- Energy Studies Institute
- NUS Global Asia Institute
- Institute for Mathematical Sciences
- Institute of Real Estate Studies
- Institute of South Asian Studies
- Interactive & Digital Media Institute
- Life Sciences Institute
- Middle East Institute
- NUS Environmental Research Institute
- NUS Nanoscience & Nanotechnology Initiative
- Risk Management Institute
- Singapore Institute for Neurotechnology (SINAPSE)
- Singapore Synchrotron Light Source
- Solar Energy Research Institute of Singapore
- Temasek Laboratories
- The Logistics Institute-Asia Pacific
- Tropical Marine Science Institute

Advantages
Status, access to resources (seed funding), SPACE, ability to bid for large external grants
Research Centres of Excellence (RCEs)

Centre for Quantum Technologies
- Singapore’s first RCE established in 2007
- Conducts interdisciplinary theoretical and experimental research into the fundamental limits of information processing
- $158 million over 10 years from National Research Foundation (NRF) and the Ministry of Education (MOE)

Cancer Science Institute of Singapore
- Set up in March 2008 to become one of the world’s leading centres for cancer research
- $172 million over 7 years from NRF and MOE

Mechanobiology Institute, Singapore
- Established in September 2009
- Work on new ways of studying diseases through the mechanisms of cell & tissue mechanics
- Funding of $150 million over 10 years from NRF and MOE

Singapore Centre on Environmental and Life Sciences Engineering
- NTU-led RCE with substantial NUS input
- Conducts cutting edge research on microbial biofilm communities for water and environmental sustainability
NUS Also Strongly Supports Research in Humanities / Social Sciences / Law / Business

• Important in its own right, e.g. to develop understanding and explanations of human conditions and behaviour.
• Contributes to cross-disciplinary initiatives (environment, sustainability, digital media, ethics, risk management, ageing etc)
• Holistic education of students
• BUT WHAT IS THEIR VALUE?
BUT SINGAPORE IS VERY PRAGMATIC
Demonstrate your value

Advantages
- Location
- Political / social stability
- Stable government
- People / High level of education
- Connectivity
- Good social coherence

- No energy (except some solar)
- Little food
- Little space
- No oil or mineral resources
- Water-constrained
- Climate change
- Very small, minute domestic market
- Low reproduction rate
- Globally connected means risk of disease / financial crisis etc can impact very fast
SI NGAPORE’S NATIONAL AND ONLY COMPREHENSIVE UNIVERSITY

Synergy in Proximity

SINGAPORE'S NATIONAL AND ONLY COMPREHENSIVE UNIVERSITY

Synergy in Proximity

SICS – Singapore Institute for Clinical Science (A*STAR)
Universities in Singapore are complementary to A*STAR research institutes and other “mission oriented” research organisations

One key function of research intensive universities is to provide a strong and broad research base not only to address concerns of today but to create opportunities for tomorrow.

Lord Krebs in his evidence to the House of Commons Innovation, Universities, Science and Skills Committee (2008-9) pointed to a study in which ten key advances in cardiovascular medicine were traced back to about 600 papers from 400 different disciplines which provided the basis for the advances. Over 40% of them had nothing to do with cardiovascular medicine at all and many of them were not carried out in medical departments but in departments of chemistry, engineering, physics, botany, agriculture, zoology etc.

A vision for UK Research, Council for Science and Technology (2010)

Several A*STAR (Agency for Science, Technology & Research) RICs had their origins in NUS.
DEFENDING RESEARCH-INTENSIVE UNIVERSITIES

THE VALUE OF NUS TO SINGAPORE

"The list of the world's top 20 universities is likely to change in the years ahead. Singapore's National University, to name one, is already within striking distance."

Richard C. Levin, President, Yale University (Bloomberg, 9 August 2008)

Vision
A leading global university centred in Asia, influencing the future

Mission
To transform the way people think and do things through education, research and service

AN INTERNAL WORKING DOCUMENT

THE CRITICAL VALUE OF INVESTIGATOR-DRIVEN RESEARCH

A paper submitted by NUS, NTU and SMU as a contribution to the ongoing deliberation and planning for the FY2011-2015 National Budget Cycle.

Summary

Investigator-driven research in Singapore universities plays an essential role in the economy and development of the country.

a. Strong universities attract excellent researchers who wish to pursue their own ideas and thrive in the university environment. In turn, they attract excellent PhD students and post-doctoral scientists and inspire undergraduates.

b. Competitively-funded investigator-driven research provides a flexible source of new ideas. Significant breakthroughs in knowledge, commercialization, or other public good often come unexpectedly from investigator-driven research, especially where the multiple disciplines found in universities intersect. In the changing global arena, we do not know which research areas will suddenly become immediately relevant to the economy.

c. PhD students and post-doctoral scientists trained in leading university laboratories effectively transmit their knowledge to industry and public bodies, or create spin-offs. Their availability, together with the range of high-level research in

IARU Workshop:

The Value of Research Universities – is it possible to define key performance indicators?

Research and higher education have high priority on the political agenda these years. Taxpayers and politicians alike are asking for value for money. The universities are under pressure to document this value. Not only through indicators such as bibliometrics, examples and anecdotes, but through hard facts and bottom line numbers.

Representing some of the world’s leading universities, IARU has constituted an interesting lab for debating this issue for quite some time. The discussion was started at the President’s Meeting in April 2010 and was followed by a workshop at ETH Zürich in October 2010. Since then we have been discussing different qualitative methodologies for measuring the value of universities. The IARU universities such as Cambridge, Oxford, Yale and Berkeley have recently contributed to the public debate by publicizing recent reports on different quantitative aspects of their value to society and to the growth of the economy.

At the IARU Presidents’ Meeting in Copenhagen in April, we want to take the discussion one step further through a workshop on the value of research universities.

During the workshop we are going to identify different “bottom lines” when measuring the universities through the presentation of cases and different ways of quantifying our value. And we propose to critically debate whether or not it is possible to move from advocacy to evidence-based measurement of the universities.

The final output of the workshop could be an IARU position paper presenting “IARU-key indicators” for measuring the value of research intensive universities and assessing the possible problems in applying such a framework.
IARU WORKSHOP
The Value of Research Universities – is it possible to define key performance indicators?
25 April 2012

• IARU members are a group of leading research universities that share a global vision, similar values and a commitment to educating future world leaders. There are 10 members including NUS, namely Berkeley, Yale, Cambridge, Oxford, Copenhagen, ETH Zurich, Tokyo, Peking and ANU.

• The focus of the workshop was to hear best practices of how IARU members create and measure value. Members also discussed the pros and cons of quantitative measures of research value, and flaws in common approaches (rankings, citations, licensing income, etc).

• How can universities help decision makers convince voters that investing in research-intensive universities is good value for money.
How did NUS approach this??

• Cannot easily use local economic arguments that worked for Berkeley etc.

• What if NUS had not existed?
  ✓ Manpower lost
  ✓ Industry not created
  ✓ Industry not attracted
  ✓ “unusual” spin offs, e.g. Conservatory of Music has economic benefit!
NUS CAN NURTURE FOR SINGAPORE NICHE AREAS OF HIGH QUALITY THAT ARE NOT YET THE “FLAVOUR OF THE MONTH”
[e.g. non-medical biology, plant science, humanities and social science (e.g. Asia Research Institute), pure mathematics]

One example
• Molecular basis of crop yields
  (MOU signed with the International Rice Research Institute (IRRI) on 16 Feb 2009)
• Crop resistance to environmental change
• Nutrition, diet and health maintenance in Asians
• Biodiversity
• New competitive grants from NRF and SMF (3 grants totalling $21.2 million were obtained in the food security area)

An example of how “basic” research suddenly becomes relevant!

WE ARE COLLECTING MORE!
Highlights of the workshop

“Creation and dissemination of knowledge for its own sake”

- The value of Research Intensive Universities can be divided into four main interconnected themes (= value flows):
  - Research (production of high-quality articles, publications and access to research; free information for industry, government, public)
  - Education (the knowledge and “soft skills” of candidates, one vehicle for social mobility)
  - Knowledge exchange (collaboration with the outside world, hiring of graduates by industry and public bodies, consultancy, patent/licensing/spin-off companies, creation of high-level jobs)
  - Direct economic contribution to the region (Fiscal contributions, building projects in local areas etc).

- The crux of the specific value of research intensive universities:
  The four main value flows of universities are **interrelated** and **interact** in a way that creates value far beyond the simple sum.

- The fact that the four flows are gathered in one university, in the same geographical space, is a key to understanding the special value of research intensive universities. Research, education and exchange of knowledge with the outside world fertilize each other.

- “Combining research and education to improve society”

Slide compliments of Prof Thomas Bjornholm (KU) and Dr Wang Hui (NUS)
Messages from the workshop

• The need for measuring is real whether we like it or not.

If we do not define how university value can be gauged/measured, someone else (i.e. politicians) will do it for us.

And we are unlikely to like their simplistic views!

• Our target: Decision makers, and those who choose them.

• Our goal: Help decision makers convince their voters (or voters the decision makers), that investing in research intensive universities is good value for money.

• We need a list of key performance indicators in order to measure overall value of research.

• A position paper should also emphasize research based education as a special value and try to quantitate/demonstrate it.

“If you are not keeping score, you are only practicing”

Jan Leschly
Former CEO of SmithKline Beecham

Slide compliments of Prof Thomas Bjornholm (KU) and Dr Wang Hui (NUS)
How can a University help to Tackle Problems like Ageing, Environment and Financial Crisis?
Research at NUS addresses Singapore Problems

<table>
<thead>
<tr>
<th>Challenges Facing Singapore</th>
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<tbody>
<tr>
<td>Energy (more efficient usage, securing supply)</td>
</tr>
<tr>
<td>Environmental management / global warming</td>
</tr>
<tr>
<td>Risk of infectious diseases</td>
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<tr>
<td>Securing the food supply / human nutrition</td>
</tr>
<tr>
<td>Ageing and age-related disease</td>
</tr>
<tr>
<td>World insecurity / financial risks in Asia</td>
</tr>
<tr>
<td>Sustainable cities</td>
</tr>
</tbody>
</table>

LOOKING FORWARD - *be ahead of the pack*
Environmental and Human Health

- Evaluation of biomarkers for diet and disease
- Food safety assessment
- Air pollution and human health
- Safety and environmental impact of engineered nanoparticles

Environmental Surveillance and Treatment

- Sensitive methods for extraction, detection of emerging contaminants from air, water, food, soil
- Novel biological models and sensors for pollution surveillance
- Novel materials for treatment and removal

Impact of Climate Change on the Environment

- Effects of climate change on ecosystems and water bodies
- Terrestrial processes involved in biogenic greenhouse gas emissions from SE Asian peatlands

Green Chemistry & Sustainable Energy

- Bio-inspired solutions for desalination
- Wastewater to energy using microbial fuel cells
- Lignocellulosic waste to useful bioproducts
Interdisciplinary Research, the Finance Cluster

- NUS Global Asia Institute
- Risk Management Institute
- Institute of Real Estate Studies
- Centre for Quantitative Finance
- Centre for Asset Management Research & Investments
- Centre for Behavioral Economics
- Singapore Centre for Applied and Policy Economics
- Office of Risk Management

Professor Ho Teck Hua is in charge of overseeing and building the University's Finance and Risk Management integrative research cluster. He concurrently holds the Tan Chin Tuan Centennial Professorship. Prof Ho has been a consulting professor to the NUS Overseas College in Silicon Valley since 2002.

He received a B.S. with first-class honours in Electrical Engineering (1985) as well as an M.S. in Computer and Information Sciences (1989) from the National University of Singapore. Additionally, from The Wharton School, University of Pennsylvania, he received an M.A. (1991) and a Ph.D. (1993) in Decision Sciences.

Prof Ho is currently the William Halford Jr. Family Professor of Marketing, and the Chair of the Marketing Department at the Haas School of Business at the University of California, Berkeley. He has been a chaired professor at U.C. Berkeley's Haas School of Business from 2002, and is also the Director of the Asia Business Center at the Haas School of Business from October 2007. Ho earned his tenure at The Wharton School, University of Pennsylvania in 1999. He was Assistant Professor of Operations and Technology Management at the UCLA Anderson School of Management from 1994-1997.
## ADVANTAGES OF NUS

### Energy and Environment Cluster

<table>
<thead>
<tr>
<th>Exploratory Science</th>
<th>Future Technology</th>
<th>Policy Implementation</th>
<th>Energy Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Office @ NUS</td>
<td>Solar Energy Research Institute of Singapore (SERIS)</td>
<td>Centre for Total Building Performance (CTBP) A BCA-NUS Centre for Tropical Building Research</td>
<td>Lee Kuan Yew School of Public Policy (LKYSPP)</td>
</tr>
<tr>
<td>NUSNNI / FOE / FOS Sustainable Energy Materials &amp; Systems</td>
<td>NUS Environmental Research Institute (NERI)</td>
<td>Office of Environmental Sustainability (OES)</td>
<td>Centre for Behavioural Economics</td>
</tr>
</tbody>
</table>

### One-stop office on Energy Research, Energy Directions, and Energy Education in NUS
- NUS President’s initiative on Research and Scholarship directed at topics pivotal to Asia’s future
- Singapore’s national institute for Applied Energy Research
- A national policy-research institute in Energy policies (economics, security and the environment)
- Research in areas of Solar Energy, Li-ion Batteries, Hydrogen Production & Storage and Fuel Cells
- Research in Tropical Building Design, Construction, Maintenance and Management
- To develop course structure and training syllabus for the Singapore Certified Energy Manager (SCEM) training programme
- Interdisciplinary research, education and expertise in the environment affecting Singapore and Asia
- To effect a total shift to Environmental Sustainability in all aspects of campus life
- Areas of focus include Asian Energy Security and Energy Governance
- An initiative on Nuclear Science and Engineering programme
- To understand and improve Energy Usage Behaviours
Research Programmes in Life Sciences

Disease-related themes
- Cancer
- Neurodegenerative disease
- Vascular Diseases
- Infectious Diseases
- Human nutrition / disease prevention
- Healthy ageing
- Environmental microbiology
- Lipidomics
- Neuroscience, neuroengineering and cognition

Underpinning Science & Technology
- Molecular Epidemiology / Genetics
  Bioinformatics / Tissue Repository
- Bioengineering/ Neuroengineering / Tissue Engineering
- Medicinal Chemistry / Toxicology / Clinical Trials
- Structural Biology
- Immunology
- Psychology / human cognition

ALL CROSS-FACULTY, CROSS-DISCIPLINARY
National University Health System (NUHS)
- Alice Lee Centre for Nursing Studies
- Faculty of Dentistry
- National University Hospital
- Saw Swee Hock School of Public Health
- Yong Loo Lin School of Medicine

Research goals
- Generate multi-disciplinary, theme-based research
- Establish proof-of-concept and efficacy in humans
- Investigate the Asian phenotype
- Excellence in health services research

Examples
- Early diagnosis of gastric cancer
- Translational research in eye surgery
- Metabolic medicine and diabetes in Asians
What is our Translational Medicine niche?

- Preferred site in Asia for validation & testing of new diagnostics, drugs & devices in man for Asian diseases*
- Deep expertise in disease biology and world-class Proof –of-Concept & early phase clinical trial capability with international accreditation
- Close link of basic biomedical research, engineering, and computing with clinical medicine
- Differences between different ethnic groups

*Diseases more common in Asia, or diseases where symptoms, outcome, and pathology are different, as compared to the rest of the world.
Lung Cancer in Asians may be different from the West
Vorinostat
Histone deacetylase inhibitor under evaluation as anti-cancer drug

Vorinostat

Glucuronidation (UGT2B17)

Vorinostat Glucuronide
(less activity)

4-Anilino-4-oxobutanoic acid

Hydrolysis followed by \( \beta \)-oxidation

UGT2B17*2 (del variant)

- Reduced UGT2B17 activity
- Homozygotes: \(~10\%\) Caucasians
  \(~60-70\%\) Asians

UGT2B17*2 homozygotes present in 62\% of our cohort

Slide courtesy of Prof John Wong
Centenarians now constitute the fastest-growing age group owing to advances in health care.

Source – Nature 467 (2010), 274-275

The International Alliance of Research Universities (IARU) is a collaboration between ten of the world’s leading research-intensive universities who share similar visions for higher education, in particular the education of future leaders. IARU comprises ANU, ETH Zurich, NUS, Peking, Berkeley, Cambridge, University of Copenhagen, Oxford, University of Tokyo and Yale University.
(Virtual) Institute for the Study of Ageing (VISA)

- Anti-aging medicine (ethical)
- Health care delivery / outcomes
- Social aspects (e.g. community support)
- Public policy (e.g. pensions)
- Dementia centre
- Gerontology group

- Basic aging / Neurobiology research
- Ageing & Lifestyle (nutrition, exercise etc)
- Housing for the aged
- Products for the aged
- City design (e.g. public transport)

Diagram:

- VISA
  - Lifestyle and disease prevention
  - Optimal environment (ageing in place)
  - Thought leadership for Government and charities

- NUS Schools and Faculties / Research Institutes/Centres

- Singapore Institute for Clinical Sciences
  - Human studies
  - Industry liaison
  - Translational medicine/nutritional products

- Basic Science
  - Disease-related research
  - Cognitive assessment (NUHS)

- Global Asia Institute
  - Exploring the identity of the 21st century Asia city
  - Healthcare policies
  - Financing the elderly

- Dementia Centre
  - Human studies
  - Subject cohorts
  - Mild cognitive impairment (NUHS)

- Social sciences
  - Humanities
  - Public policy
  - Tsao Foundation
  - Duke-GMS
  - LKY SPP
  - Financial / risk management

Diagram:

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  - Humanities
  - Public policy
  - Tsao Foundation
  - Duke-GMS
  - LKY SPP
  - Financial / risk management
What does VISA aim to do?

• Biological determinants of ageing well

• Environments that best support ageing well

• Fiscal, medical & other policy issues that can be optimised to better support Singaporean ageing population
Maritime Institute @ National University of Singapore (MI@NUS) operates like a Cluster Office to integrate and drive the maritime and offshore education, training and R&D activities within NUS through direct linkages and representatives from:

a) Centre for Offshore Research and Engineering (CORE)
b) Centre for Maritime Studies (CMS)
c) Centre for International Law (CIL)
d) Tropical Marine Science Institute (TMSI)
e) The Logistics Institute - Asia Pacific (TLIAP)
NUS SEeks TO CONDUCT IMPACTFUL RESEARCH

WHAT IS IMPACT OF RESEARCH?

• Outstanding fundamental research of high intellectual impact that attracts attention to Singapore as a country capable of performing such research and grows NUS’ global reputation
• Research which helps to grow new industries for Singapore and to develop existing ones, e.g. by spin-offs and licensing of Intellectual Property (IP)
• Research that helps to attract high-level foreign industry to locate in Singapore
• Research that makes Singapore a better place to live and improves the health and welfare of the population
• Research that expands intellectual breadth and develops ideas and discourses about human experiences which will prepare us more effectively for an increasingly global and cosmopolitan world
• Research that influences and informs government policy
• Research that enhances the security of Singapore (e.g. defence, food, energy supply)

Note that the best research programmes often contribute in several ways.
Assessing Research Impact

*(Annual Assessment)*

What research are you doing and why is it important?
Why Industry on Campus?

- High level, innovative, cutting edge
- Access to facilities
- Joint participation in education (undergraduate/graduate)
- Mutual benefit
VALUE OF A LEADING RESEARCH INTENSIVE UNIVERSITY TO COMPANIES

• Recruit skilled manpower trained in a research intensive environment

• Consultancies and other advisory positions to industry and government bodies [75 companies with ≥ 3 consultancies from NUS (Jan 2008 – Nov 2010)]

• Draw on research published in open literature
Thank You

Questions & Answers

VISION
A leading global university centred in Asia, influencing the future

MISSION
To transform the way people think and do things through education, research and service
Global Recognition for Academic Quality

• In the QS World University Ranking 2012/13, NUS was ranked 25th out of the world’s top 300 universities.

• In the Rankings by Subject, NUS emerged 1st among Asian universities as well as amongst the world's top 30 universities for the following disciplines:
  - Chemical Engineering
  - Civil & Structural Engineering
  - Computer Science & Information Systems
  - Electrical Engineering
  - Mechanical, Aeronautical & Manufacturing Engineering
  - Metallurgy & Materials
  - Mathematics
  - English Language & Literature
  - Modern Languages
  - Chemistry
  - Physics & Astronomy
  - Medicine
  - Pharmacy & Pharmacology
  - Philosophy
  - Psychology
  - Geography & Area Studies
  - Accounting & Finance
  - Economics & Econometrics
  - Law
  - Politics & International Studies
  - Sociology
  - Statistics & Operational Research

• In the THE 2012 World University Rankings, NUS was ranked 29th.
NUS SEEKS TO CONDUCT IMPACTFUL RESEARCH

WHAT IS IMPACT OF RESEARCH?

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Note that the best research programmes often contribute in several ways.
NUS works closely with Industry for mutual benefit

NUS-GE Singapore Water Technology Centre
A unique Industry-University laboratory collaboration

- GE-NUS partnership contributes to Singapore as “global hydrohub”
- Key Research Areas
  - Water Quality & Sensors
  - Sustainable Water Systems
  - Membrane Innovation
  - Water & Wastewater Reclamation
- Projects are carried out in collaboration with NUS Environmental Research Institute
- Analytical Services Laboratory at T-Lab provides cost effective and timely analyses

GE Infrastructure
Water & Process Technologies

NUS
National University of Singapore
NUS works closely with Industry for mutual benefit

NERI-Agilent Environmental Research Research Alliance (NAERA)

- The research alliance involves installing state of the art instrumentation for environmental research in the NERI laboratory
- The alliance is expected to drive NERI’s environmental research programmes with access to new Agilent instrumentation
- In collaboration with NERI, Agilent will showcase its instruments for a wide range of environmental applications, as well as develop new instrumentation and software for environmental applications
Carl Zeiss Innovation Laboratory at NUS (CZILIN)

ZEISS and NUS have formed a Laboratory of Excellence for Advanced Imaging and Patterning to provide state-of-art expertise in the fields of material science research in physical sciences and biology.

Key drivers to achieve imaging excellence are
- sharing of application knowledge, development and engineering,
- latest charged-particle and optical microscopy equipment,
- sample preparation knowledge and equipment,
- appropriate laboratory environment
- user training and support by on-site specialists

ZEISS and NUS will jointly contribute with respect to sharing laboratories, lab equipment, application knowledge, engineering resources as well as their networks in the fields of advanced imaging.

Zeiss and NUS will seek joint research funding from the Singapore Government for Advanced Research Projects that will be at the cutting edge of nano scale imaging and patterning.
Medad Pte Ltd

Founded in 2011 as a Start up Company to Commercialise the World’s First AD enhanced Multi Effect Desalination Plant. Comprising of the Inventors of Silica-gel based AD Technology and MED+AD Technology where the Primary goal is to Increase Yields of Multi Effect Desalination Plants (MED).

Envirotech and Consulting Pte Ltd (NUS Spin-off)

The BlueSeas BWMS is the first technology developed by the partnership of National University of Singapore (NUS), The Maritime and Port Authority of Singapore, the Neptune Orient Lines for the disinfection of ballast water prior to discharge without the use of chemicals.

GCoreLab Pte Ltd

The technology from NUS revolves around miniature oblique fins used to significantly enhance the convective heat transfer performance. The company provide solutions in thermal management system for Concentrated Photovoltaic, Wind Turbine and Consumer Electronics markets.
BioMers

Founded as a spin-off from NUS, BioMers is a medical device company that specializes in the development of novel polymer composite technology for biomedical applications. Through its patented technological breakthrough, BioMers introduced SimpliClear, the world’s only completely clear orthodontic solution that can be used to treat a wide range of teeth irregularities, from mild to complex patient cases. With SimpliClear, patients can undergo orthodontic treatment without the embarrassment of unsightly metal braces.

Clearbridge Accelerator

- Clearbridge Biomedics: Microdevice to isolate Circulating Tumor Cells from blood
- Clearbridge Nanomedics: Nanofibre patch for delivery of active compounds (for cosmetics and wound healing)
Darius Cheong and Varun Chatterji graduate from NUS Overseas College (NOC) in 2003. They found tenCube in 2005 along with NUS alumni Rishi Israni and Indradeep Biswas. The group incubated at NEI. In 2006, they won the Start-Up@Singapore business plan competition and received $30,000 prize which was used as seed funding. They launched WaveSecure technology in 2007. tenCube was acquired by McAfee in 2010.
Oliver (left) and Wesley Oxenham at StubHub, which recently acquired their startup company Peekspy.

Targeted at ticket sellers for concerts and sports events, Fanvenues garnered some big names in ticketing services. With Peekspy’s acquisition, both founders will be relocating to San Francisco where StubHub is based.

2005: Oliver attended NOC at Silicon Valley and mentored by Peter Purushotma (NEC mentor).

Oliver and Wesley graduated from SOC (2006) and SDE (2008) respectively

Peekspy was founded in 2008. Developed a prototype of an online 3D view of chosen seats in a venue at PGP incubator

First commercial project secured with NUS Central Library

March 2012 acquired by Stubhub, subsidiary of eBay

NUS CREATES NEW INDUSTRY
INFORMATION TECHNOLOGY

• Developed a software called Fanvenues that enables ticket sellers to present their customers with an interactive map of the venue as well as allow users to drill down to the seat level when choosing their seat for an event.