Science Foundation Ireland

Centres for Science Engineering and Technology (CSET) June 2010

Rory Jordan
SFI - A Few Facts and Figures

- Year of establishment: 2000
- Funded through Department (Ministry) of Enterprise, Trade and Employment
- Sister agencies; IDA Ireland, Enterprise Ireland, FORFAS
- SFI Research remit:
  - Life Sciences
  - Information Communication and Emergent Technologies
  - Sustainable Energy and Energy Efficient Technologies
- Number of Employees: 54
- Annual Budget: €176 m (2009)
- Total Funding Commitment to date; 550 Research Groups, 2,500 Researchers
SFI CSETs - Overview

- **SFI funding**: up to €25m (€5m/yr), over 5 yrs, renewable once.
- **Partnerships with industry**: 20% cost share (particularly people)
  Real intellectual partnerships
- **Strategically important to Ireland Inc.**: advancing BioT and ICT
- **True centre**: whole greater than sum of parts, synergy…
- **Research excellence**: potential to be best in world – “edge”
- **Outstanding Director**
- **Important Education & Outreach component**
CSET Programme – Universities and Centres

- 7 Universities in Rep Ireland – shown
- Currently 9 CSET Centres
- All in National Focus areas
- Multi-university nature of CSETs
- Up to 5 universities collaborating in a single Centre
- All Centre’s have host university
SFI CSET Programme Overview

Evaluation:
External scientific peer review + national strategic review
Progress reviews on average every 18 months
Panel of 6 - 7 onsite for 2 - 3 days examine all aspects of operation

Currently
9 Centres in programme opened since 2003
481 Researchers (of which 204 are PhD students) CSET award funded
(Note: > 1000 in leveraged entities)
€27.6M invested by SFI in 2009
€185M total investment by SFI since 2003 (€245M currently committed)
€65M from industry, €45M from other public funding and €16M from foreign public funding

80 Current industry partners with 32 onsite industry researchers.
Overall growth to >136 Industry Partners in leveraged collaborations
## CSET position in R&D Spectrum

<table>
<thead>
<tr>
<th>Partial List of Programs/Centers Visited</th>
<th>Stage 1 (basic research)</th>
<th>Stage 5 (product/marketing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK: Tissue Engineering Initiative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan: Advanced Industrial Science and Technology (AIST)</td>
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<td></td>
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<tr>
<td>Korea: Korea Advanced Institute of Science and Technology (KAIST)</td>
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<tr>
<td>Korea: ERC Program, National Core Research Centers (NCRC) Program</td>
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<td></td>
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<tr>
<td>U.S.: Engineering Research Center Program</td>
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<tr>
<td>Japan: Institute for Nano Quantum Information Electronics (CINQIE)</td>
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<td></td>
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<tr>
<td>Belgium: International Microelectronics Center (IMEC)</td>
<td></td>
<td></td>
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<tr>
<td>Korea: Samsung Institute for Advanced Technology (SAIT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK: Energy Futures Lab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK: Leeds Particle Science Institute</td>
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<td></td>
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<tr>
<td>Ireland: (CSET)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK: Innovative Manufacturing Research Centers (IMCRC) Program</td>
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<td></td>
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<tr>
<td>UK: Warwick Manufacturing Group</td>
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<td></td>
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<tr>
<td>UK: Rolls Royce Vibration Technology Center</td>
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<tr>
<td>Germany: Fraunhofer Institutes</td>
<td></td>
<td></td>
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<tr>
<td>Belgium: Flanders’ Mechatronics Technology Centre</td>
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<td></td>
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<tr>
<td>China: National Engineering Research Center (NERC) Program</td>
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<tr>
<td>Korea: Institute for Advanced Engineering</td>
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</tr>
</tbody>
</table>

Courtesy of NSF
CSET Programme - Governance

**Governance Committee** – Primarily oversight function, meets quarterly. University reps plus external membership.

**Scientific Advisory Board**
As per current role and composition.

**CSET Governance Committee**

**CSET Management Committee**

**Industry Advisory Board**
- recent addition, scalable input of industry partners.
  
  Each CSET industry partner may be represented on the Board. Provide industry input to CSET strategy and operation. Meeting frequency to be decided by IAB, but suggest 6 monthly.

Research for Ireland’s Future
CSET Programme – Centre management

Required Roles or functions

**Scientific Director** – Centre vision, scientific direction, strategy
**Operational Director** – Infrastructure, staffing, finances, funding, metrics
**Industrial Liaison** – Contact point, industry partners growth, manage relationships
**IP Manager** – Invention disclosures, researcher education, multiple projects IP management.

As Centre develops - dedicated Integration Managers, FP7 Co-ordinators, Commercialisation Managers

Also additional roles and support can be centre specific – e.g. large equipment, animal facilities, trials etc.

Roles then feed into units/committees which incorporate relevant stakeholders.

‘**Translational Roles**’ very important – academic/industry culture
Integrating academic - industry worlds

UK – Professors of Practice,
NSF ERC – Industrial Liaison
CSET - Commercialisation Development,

UK - Professors of Practice

Backgrounds
Business skills, technical expertise & research interests
High-tech entrepreneurs with strong academic credentials

Positions (half time) in Business School within Science City themes

Activities
Awareness-raising of user needs, commercial strategies
Liaise with departments & schools and external partners
Teaching & seminar programmes
Communication & marketing strategies
Knowledge transfer activities & policy formulation
Shaping relationships between science community & Business School

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Senior Ex-Industry Professionals
NSF: ERC Industrial Liaison Officers

Erik Sander, Particle Engineering Research Centre ERC
University of Florida
  • Director of Industry Programs
NASA, Lockheed Martin, General Electric, and Pratt & Whitney
Project manager and Technology Transfer

Jim Williams, Data Storage Systems Center
Operations Director & Industrial Liaison Officer
Seagate
  • Former Research Director of Advanced Technology

Joe Giachino, Wireless Integrated MicroSystems ERC
Ford Motor Company (1976 – 2001)
  • Program Manager, Sensor Business Resource Center
Fellow of the IEEE (1997)
CSET - Translational Function

Case Study: DERI CSET (www.deri.org) Web Science
CEO role (Mike Turley)
Applied Innovations Unit – Manages the academic-industry integration
Run by Bill McDaniel (Adobe Snr. Scientist, CTO and CRO for many companies) Ex-Industry professionals.

STRATEGY
• Leverage world-class research expertise at DERI in commercial exploitation
• Blend research, industrial, and entrepreneurial experience from DERI team members
• Partner with leading industrial partners, high-potential start-ups (HPSU), and CEOs
• Produce quality-driven software, patents, licensing, spinout, spin-in companies
Overview

- Strong team with proven track record in industry and academia
  - 1 Senior Researcher, 6 Lab leaders, 15+ Researcher engineers
- All funding is project-based
  - Wide portfolio of projects - 6 Active projects, 2 under review
  - Continuity achieved by overlapping projects
- Diverse industrial partnerships including start-ups, SME, and MNC.
  - 12 Active industrial partners, 2 in proposal stage
  - 1 Spin-in (2 in discussion stage)
  - A number of researchers in pre-spin-out phase
CSET - Translational Function

DERI CSET (www.deri.org) Applied Innovations Unit

- Commercialize DERI technology by partnering researchers with entrepreneurs
-集中在研究和发展新技术

Applied Innovations Unit

- Bizstart
- Advanced Innovative Technology (AIT)
- Advanced Translational Research (ATR)
- Advanced Technology Implementation (ATI)

Look for appropriate technologies to fill the needs of commercialization efforts

Implement specific projects meeting Enterprise needs

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DERI CSET - Filling the GAP between Research and Commercialisation

“Innovating R&D”


Input
- Idea
- Concept
- Original thinking
- Review research output
- Review domain opportunity
- Review domain trend
- Specification
- Prototype
- Business Case
- Libraries
- Engineered Components
- Business Case, Plan
- Marketing Study
- Plan
- Investment

Output
- Papers, Demonstrator
- Algorithms
- Methodologies
- Specifications
- Standards
- New Approach
- Application problem desc.
- Papers, Prototypes
- Know How
- IP
- Patents
- Pilot System
- Documentation
- APIs/Libraries
- Engineered Components
- Business Plan
- Partners/Customers
- Start-ups
- Software Products
- Infrastructure

Activity
- Scientific Evaluation
- State of the Art Review
- Participation on Standards
- Participation in bodies
- Dissemination
- Good Engineering Practice
- Architectural Design
- Dissemination
- Domain state of the Art
- Evaluation
- State of the Art Review
- Industrial Class Engineering
- Architectural Design
- Agile Software Development
- Full testing
- Business Plan Authoring
- Productization
- Localization
- Build Business Infrastructure
- Form Alliances

Skill Set
- Research Ability
- Computer Literacy
- Architectural Experience
- Research Ability
- Industrial Experience
- Business Experience
- Domain Experience
- Marketing/Sales
- Business Strategy Planning
- Risk Analysis
- Raising Capital
- Corporate Infrastructure
- Trend Analysis

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Courtesy of DERI
CSET Programme – Industry Partners

80 Current industry partners in programme cost share
Cost share dominated by MNC’s
Smaller number of SME’s and start-ups involved
Centres have >216 Industry Partners in leveraged collaborations

More focus on indigenous SME involvement – Supported by EI

NOTE: Where you are on research spectrum and duration of commitment will determine industry partner profile.
Original CSET model and remit of use-oriented basic research has favoured larger industry partners (long term, resources required).
Carried out a recent Industry partner survey to get full picture of nature of industry interactions

Note: Breakdown by MNC/SME important in interpretation of needs

<table>
<thead>
<tr>
<th>Annual Contribution</th>
<th>Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10k</td>
<td>24%</td>
</tr>
<tr>
<td>10k - 50k</td>
<td>16%</td>
</tr>
<tr>
<td>50k - 100k</td>
<td>12%</td>
</tr>
<tr>
<td>100k - 250K</td>
<td>20%</td>
</tr>
<tr>
<td>Greater than 250k</td>
<td>28%</td>
</tr>
</tbody>
</table>
CSET Programme – Recent Industry Partner Survey

Is Obtaining Company Approval for Participation in a CSET (or academic collaborative project) more difficult now than it was 3 years ago

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48%</td>
</tr>
<tr>
<td>No</td>
<td>8%</td>
</tr>
<tr>
<td>The same</td>
<td>16%</td>
</tr>
<tr>
<td>Not Applicable/New Project</td>
<td>28%</td>
</tr>
</tbody>
</table>

Is so, why? Primary Reasons were..

• Market Conditions
• Resource limitations/budget tightening
• Understanding of the ROI/Internal competition

Research for Ireland’s Future
## CSET Programme – Industry Partners

At the time that your company first decided to participate in the CSET, can you rate the following in terms of influence on the decision.

<table>
<thead>
<tr>
<th>Access to new ideas/know-how</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52%</td>
<td>36%</td>
<td>12%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to intellectual property</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4%</td>
<td>24%</td>
<td>36%</td>
<td>28%</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to equipment/facilities</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8%</td>
<td>16%</td>
<td>4%</td>
<td>52%</td>
<td>20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to CSET students as prospective new hires</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4%</td>
<td>13%</td>
<td>33%</td>
<td>38%</td>
<td>13%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to CSET expertise</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28%</td>
<td>24%</td>
<td>40%</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunity to interact with other companies in the CSET</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20%</td>
<td>28%</td>
<td>36%</td>
<td>12%</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities for joint projects</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8%</td>
<td>40%</td>
<td>28%</td>
<td>20%</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>Primary reason</th>
<th>Very Important</th>
<th>Important</th>
<th>Not important</th>
<th>Not interested in this aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50%</td>
<td>17%</td>
<td>0%</td>
<td>17%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Has your company, as a direct result of your participation in the CSET:

<table>
<thead>
<tr>
<th>Has your company, as a direct result of your participation in the CSET:</th>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtained access to new ideas, know-how or technologies?</td>
<td>80.00%</td>
<td>20.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Received direct technical assistance from the CSET?</td>
<td>41.70%</td>
<td>58.30%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hired a CSET student or graduate?</td>
<td>25.00%</td>
<td>70.80%</td>
<td>4.20%</td>
</tr>
<tr>
<td>Improved a product or process?</td>
<td>28.00%</td>
<td>64.00%</td>
<td>8.00%</td>
</tr>
<tr>
<td>Increased interaction with other companies through participation in the CSET?</td>
<td>58.30%</td>
<td>41.70%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Provided customers with improved technical information?</td>
<td>17.40%</td>
<td>69.60%</td>
<td>17.40%</td>
</tr>
</tbody>
</table>
CSET Programme – Growing Industry Partners

Indigenous Industry

ENTERPRISE IRELAND

Sponsored research

Networking

CSET AWARD
Funds core research and management to enable larger entity

Larger Integrated Entity

FDI

INDUSTRY DEVELOPMENT AUTHORITY OF IRELAND

Research for Ireland’s Future
CSET Technology Transfer

• CSET TT and commercialisation activities go through the university Technology Transfer Office.

• Joint funded by state body (Enterprise Ireland) and University
  • Manage university owned IP assets – agents for licensing IP, university IP policies

• Create relationships, partnerships and opportunities.
• Educate research community on sound IP practices.

• Moving into company incubation and business support.

• CSETs
• Dedicated TT person for each Centre – joint funded position
• Liaison in multi-university Centres, centre IP management etc.
CSET Technology Transfer - Outputs

Tangible Metrics measured, SFI targets set in conjunction with
CSET management and Technology Transfer Offices

Commercialisation outputs to date (Very crude, 42 centre years,
various stage of maturity)

122 Invention disclosures
65 patent applications in system
10 patents awarded
11 license agreements signed
24 Technologies approved for additional funding
4 Spin out companies produced
11 spin out processes initiated

Plus intangible benefits, knowledge, ideas...
CSET Programme – Some of the Lessons learned

- One size does not fit all – Life Sciences/ICT
- Common goals and expectations important
- Structures should be scalable
- Direct communication with stakeholder groups
- Takes long time to build relationships/reputations
- Centres have been agents of change – bring everyone along
- Biggest benefits are intangible

Research for Ireland’s Future
## 10 SFI CSETs

<table>
<thead>
<tr>
<th>CSET</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems Biology Ireland</td>
<td>APC - Alimentary Pharmabiotic Centre, UCC</td>
</tr>
<tr>
<td></td>
<td>BDI - Biomedical Diagnostics, DCU</td>
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<td></td>
<td>REMEDI - Regenerative Medicine, NUIG</td>
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<tr>
<td></td>
<td>DERI – Web Science, NUIG</td>
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<tr>
<td></td>
<td>Lero - Software Engineering, UL</td>
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<tr>
<td></td>
<td>CNGL – Localisation Technologies, DCU</td>
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<td></td>
<td>CLARITY – Sensor Web, UCD</td>
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<td></td>
<td>CRANN – Nanoscience and technology, TCD</td>
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<tr>
<td></td>
<td>CTVR - Telecommunications, TCD</td>
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