

# Nanofactory: The commercialisation of nanotechnology in the Yorkshire and Humber region

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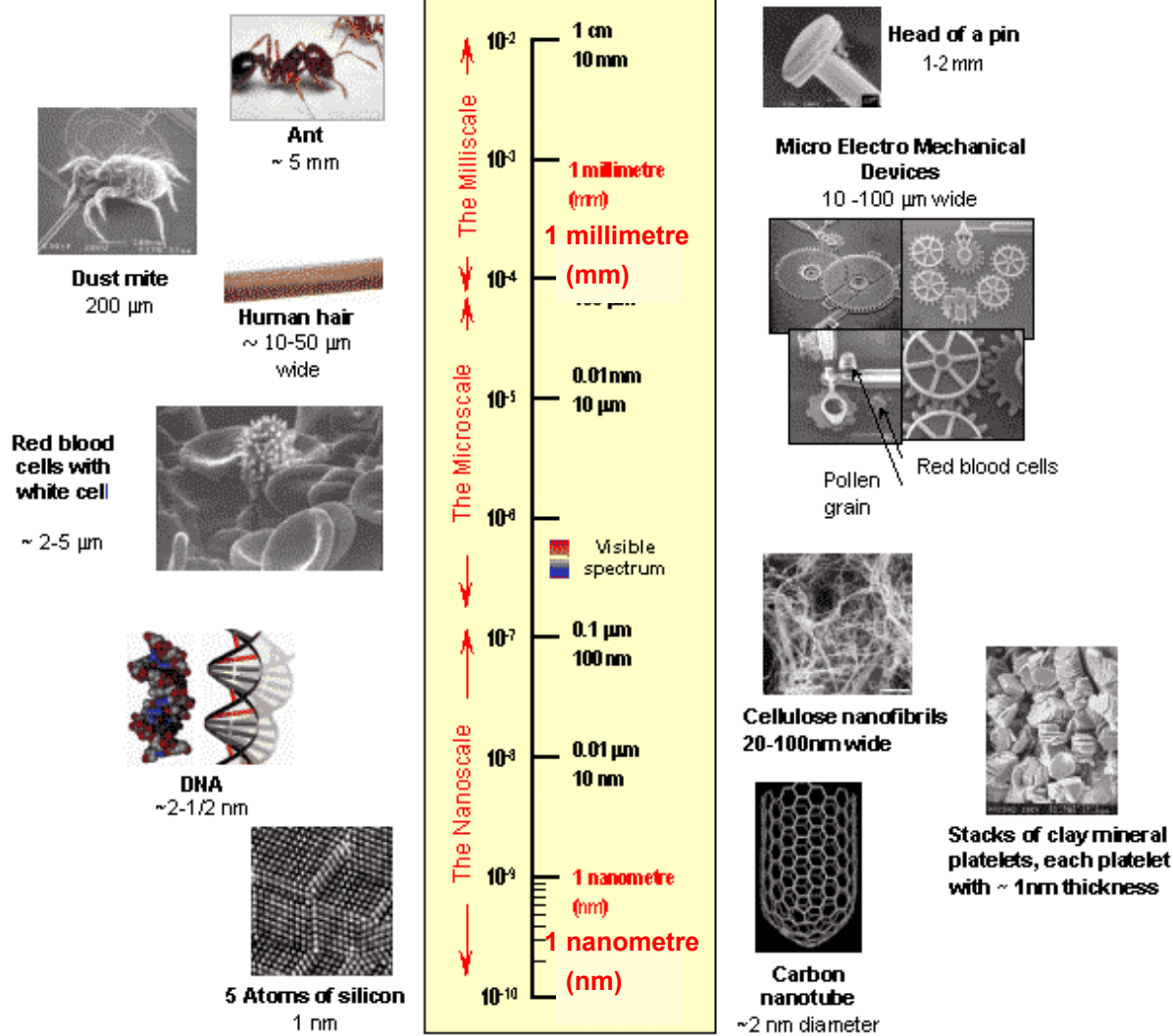


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*Nanotechnology is the understanding and control of matter and processes at the nano-scale, typically, but not exclusively, below 100 nanometers in 1 or more dimensions where the onset of size-dependent phenomena usually enables novel applications*

# Proliferation Of Nano-enabled Products... Check Your Cupboards!

Hundreds of consumer nano products listed at:

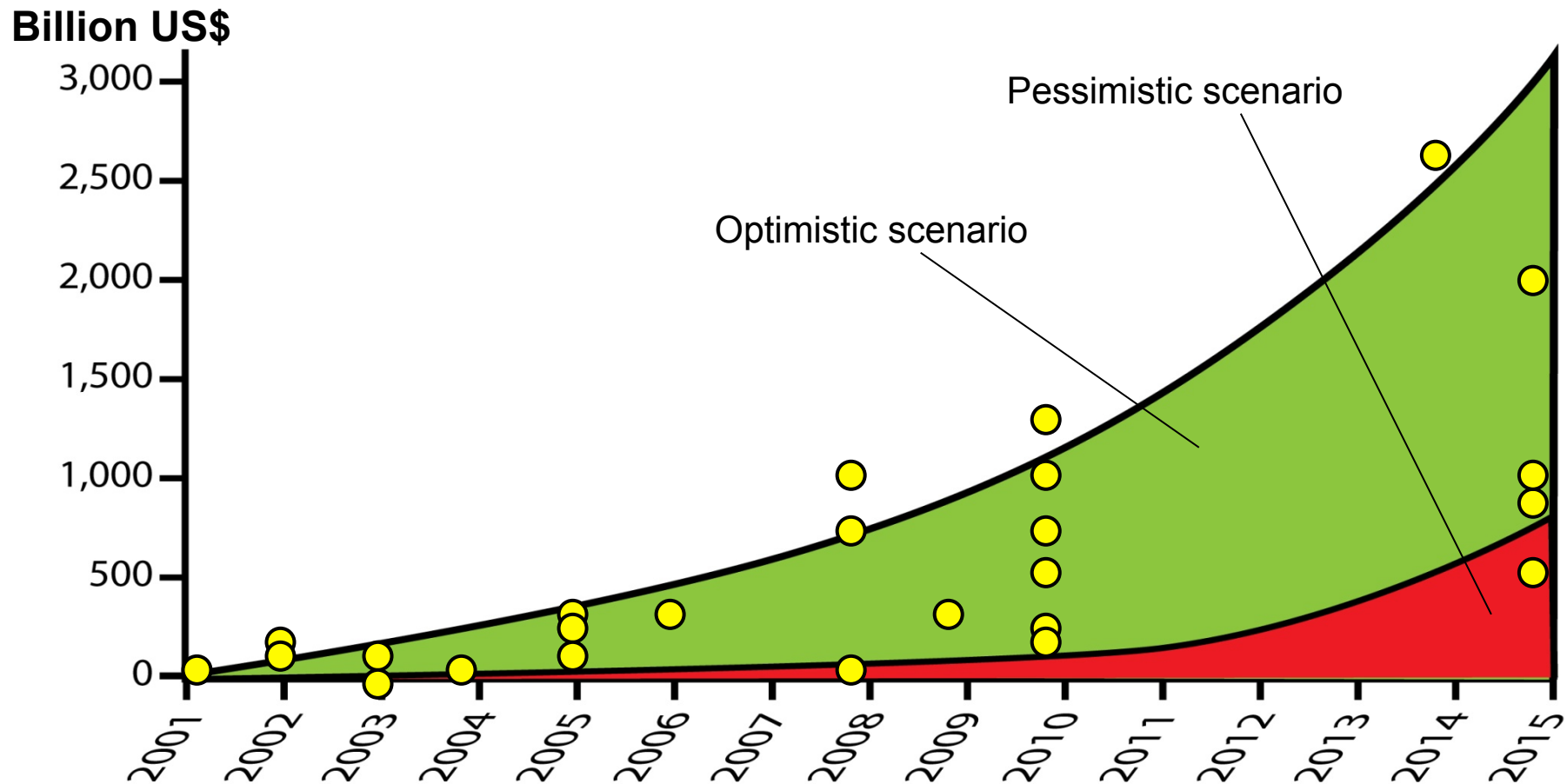
<http://www.nanotechproject.org/index.php>



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# World Market Forecasts For Nanotechnology



Sources: German Government, Evolution Capital, NSF2001, Evolution Capital 2001, Sal. Oppenheim 2001, DG Bank 2001, DTI 2001, US Nanobusiness Alliance 2001, Cientifica 2002, In Realis 2002, Mitsubishi Research Institute 2002, Deutsche Bank 2003, Nomura Research Institute 2003, BCC 2004, GEMZ corp. 2004, Helmut Kaiser Consultancy 2004, Lux Research 2004, Hullman (2006).

# Yorkshire and Humber Region



- Population c. 5m
- 270,000 businesses
- Diverse SME base
- 2001-2005 increase in GDP of 12% (overall UK increase 9%)
- Number of companies working with universities 7%
- 0.5% of region's GVA invested in R&D (overall English average 1.4-1.6%)

# Universities in Yorkshire and Humber

- Fourteen universities in the region with 206,000 students and 39,000 staff
- Research investment 12% above EU average
- R&D spend over £340m
- C. 106 active firms spun out

# Barriers to Innovation for Regional SMEs

- Lack of knowledge
  - SMEs must have an awareness of nanotechnology before embracing it
- Lack of funding
  - SMEs unable/ unwilling to invest in R&D
- Lack of market awareness
  - Need to understand opportunities offered by nanotechnology
- Lack of regional network
  - Businesses rarely innovate in isolation

# The Project : **Aims**

1. Bring together a network of the established regional expertise in nanotechnology (i.e. get the partners to work together!);
2. Increase regional R&D spend on nanotechnology;
3. Deliver new technologies through to the market as new products and processes.

# The Project : **Development**

- Tailored to meet funder requirements
- Strategic alignment with RES / RIS / ERDF OP (Priority 1)
- ERDF attractive, because it forms a strong regional network of partners who all have something to contribute
- Seen as high-risk, because it brings together a network of strong regional partners .....

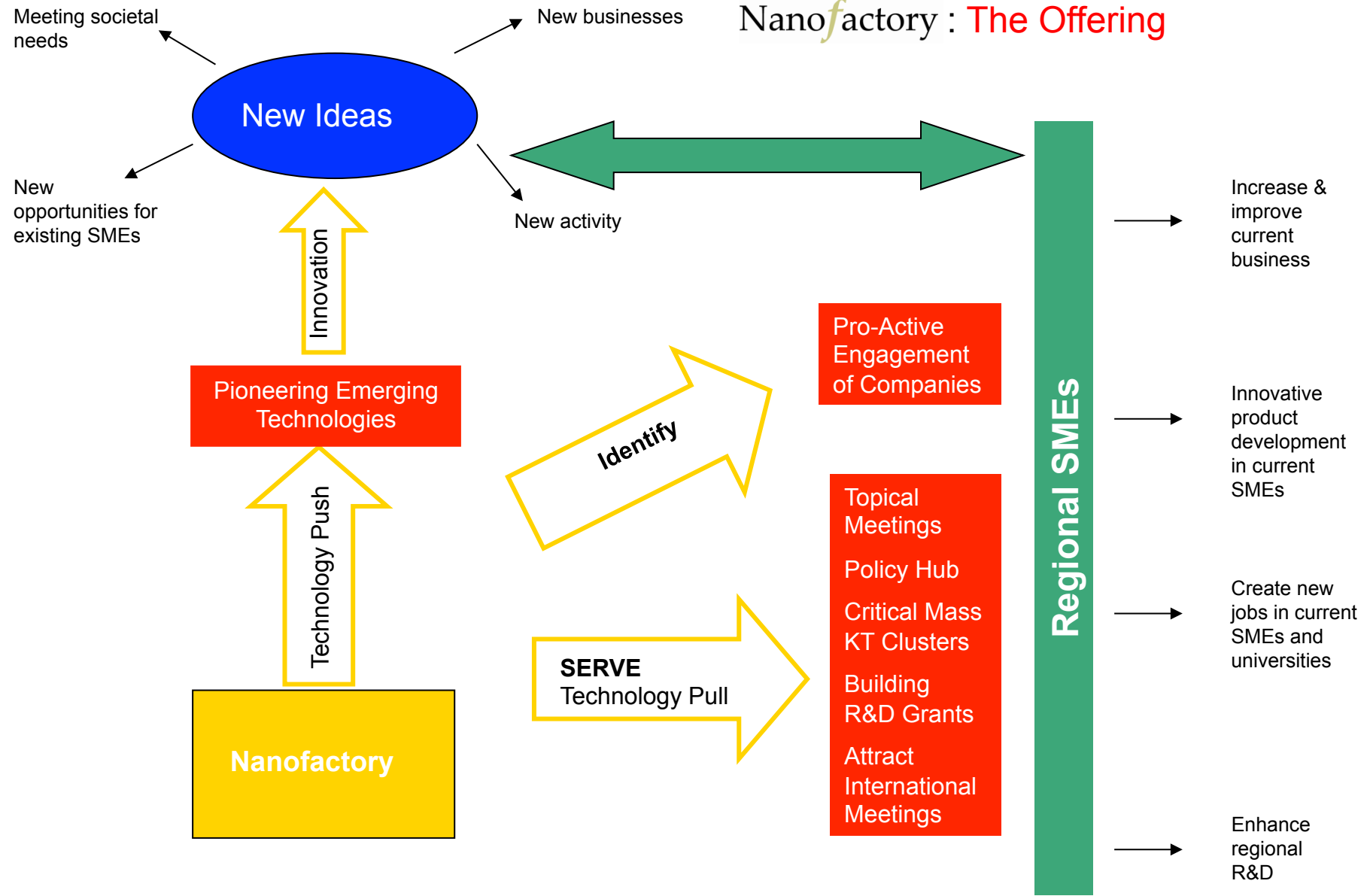
# The Project : **Key Issues**

- Maintaining an effective collaboration, not reverting to individual HEIs
- Establishing & maintaining effective communication across the partnership
- Project management not strong enough to provide cohesion / lack of capacity
- Changes in one or more of partner organisations and / or funding scenarios

# Nanofactory : Partner Capabilities

Partner Universities	Areas of Expertise in Nanotechnology
University of Bradford	Skin and Hair Follicle Biology Cancer Therapeutics and Genetic and Reproductive Toxicology Polymer Engineering Pharmaceutical Innovation Wireless Communications
University of Huddersfield	Biomolecular Sciences Manufacturing Control and Machine Performance Surface Engineering
University of Leeds	Membrane and Systems Biology Microwaves and Photonics Engineering Fluid Mechanics and Tribology Advanced Energy Engineering Particle Science and Engineering Technical Textiles Dental Materials Genetics Medical Physics Colour Chemistry Polymer Physics Spintronics and Quantum Computing Nanomanufacturing
University of Sheffield	Biomaterials and Tissue Engineering Stem Cell Biology Advanced Magnetic Materials and Devices Microstructural and Mechanical Process Engineering Advanced Manufacturing Cancer Studies Aging Research Nanomaterials Engineering Polymer Chemistry
Sheffield Hallam University	Thin films and sensors Materials Analysis and Research Advanced Composites and Coatings
University of York	Structural Biology Green Chemistry Electron Microscopy and Nanolithography Nanophysics

# Nanofactory : The Offering

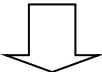


# Nanofactory Organogram

**Nanofactory Board Members**  
**Bradford:** Ben Whiteside / Phil Coates  
**Huddersfield:** Phil Harrison / Liam Blunt  
**Leeds:** Richard Williams / Simon Lawson  
**Sheffield:** Richard Jones / Liam Sutton  
**Sheffield Hallam:** Nick Farmilo / Chris Care  
**York:** Ed Boyes / Pratibha Gai

**Responsibilities:**

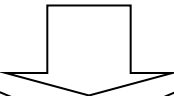
- Represent partner's interests
- Strategic direction of project
- Receive reports from activity groups



**Nanofactory Executive**  
**Nanofactory Director:** Richard Williams  
**Yorkshire Forward representative:** Hilda Coulseay  
**Project Manager:** Sue Sladen  
**Nanofactory Board representative:** Liam Sutton  
 (appointed by Board)

**Responsibilities:**

- Day-to-day operational management of project
- Provide guidance to project manager
- Provide reports to Board



# The Project : Activity Strands

	Main Project Contact	Web-site	Inter-national Events	Topical Mtgs	Pro-Active Eng't	Policy Hubs	Inter-national Mtgs	KT Dev	R&D Grants	Critical Mass KT Clusters	Emerging Tech
Bradford	Ben W.	Ben W.	Ben W.	Ben W.	Ben W.	Ben W.	Phil C.	Ben W.	Phil C.	Ben W.	Ben W.
Huddersfield	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.	Phil H.
Leeds	Richard W.	Sean K.	Terry Wilkins	Sean K.	Simon Lawson	Sean K.	Richard W.	Richard W.	Richard W.	Simon Lawson	Simon Biggs
Sheffield	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.	Liam S.
Sheffield Hallam	Nick F.	Darren S.	Nick F.	Darren S.	Darren S.	Nick F.	Nick F.	Darren S.	Nick F.	Nick F.	Nick F.
York	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.	Ed B.

Project Activity Strands have designated 'Activity Leaders' and responsible staff at each HEI. A matrix structure has been formed to deliver an integrated programme of activity.

# The Project : **Communication**

- Always known to be the greatest project 'risk'
- Formal mechanisms across partners (Board / Exec Group / Activity Leaders / PM Reports)
- Formal mechanisms internal to partners (Lead Officers / Financial Checks)
- Informal mechanisms (Project Manager / Business Development Manager / Lead Officers)

**Works because of the people not because  
of the processes**

# The Project : Contracted Outputs

Activity strand	Outputs to Project Activity					
	SME Assist	Bus. Created	Jobs Created	Research Jobs Created	Jobs Safeguarded	GVA increased
Project Manager	These project activity strands don't contribute towards the Contracted Project Outputs					
Project Support (Admin)						
Project Management - general						
Web-site						
International events (x 3)					5	
Topical Meetings						
Pro-active engagement of companies	42		36		8	£2,500,000
Policy Hubs	10		10		2	£2,500,000
Attraction of international mtg to region						
KT development staff				10		
Building of R&D grants		2	4			
Critical mass KT clusters (networking)		1				
Pioneering Emerging Technologies	30	3	16	15	20	£1,000,000
<b>Output Totals</b>	<b>82</b>	<b>6</b>	<b>66</b>	<b>25</b>	<b>35</b>	<b>£6,000,000</b>

# Nanofactory : Success Factors

	Bradford	Hudds	Leeds	Sheffield	SHU	York
Number of academics engaged in Nanofactory	20	10	50	40	12	8
Number of academics engaged in new research proposals	5	5	10	8	8	4
Number of new grants won	5	4	10	8	6	4
Number of new collaborative grants with other Nanofactory partners won	4	2	8	6	4	2
Amount of SME business won	£200K	£80K	£200k	£160K	£100K	£20K
Number of students internees into SMES	2	0	20	16	0	2
Number of SME internees into University	4	0	5	4	1	0
Number of new KTPs	3	1	5	4	3	2
Number of licenses agreed	2	1	10	8	0	2
Number of new companies	1	3	1	1	0	0
Press stories	2 per annum	2 per annum	1 per month	2 per month	4	2 per annum

# The Project : **Lessons Learnt**

- Communication, Communication, Communication !
- Different things work for different partners, and that's not a problem
- Project funding can not be allowed to drive project activity, balancing funder and partners aspirations is challenging
- Peripetetic project management is a necessity not an ideal

# Acknowledgements

- Nanofactory partners



- European Regional Development Fund

Nanofactory is scheduled to receive £2.59m from Priority 1 of the Yorkshire and Humber 2007-2013 ERDF Operational Programme



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**Case study**  
**University of Leeds**

Designing 'intelligent' buildings to resist earthquakes could potentially save thousands of lives every year. The University of Leeds has been collaborating on a £9.5m EU funded project with a number of partners, including 'Instrumentel' a Yorkshire based SME, to test ways of building safer housing in earthquake zones. With self-healing polymers and wireless, battery-less sensors to provide early warning, incorporated into the walls, the eventual prototype will be built on a Greek mountainside in Amfilochia.



**Case study**  
**University of Bradford**

There are over 100 million root canal treatments performed worldwide in the course of a year & these treatments are the major cause of complaints against dental practices with a 30% failure rate for traditional treatments. Bradford University worked with DRFP Ltd to develop nano-materials and a manufacturing route for a new treatment product which significantly reduces the requirement for re-treatment or extraction.

This process won 'Best Technology Application' at the Plastics Industry Awards 2008.

### *Case study*

#### **Sheffield Hallam University**

Sheffield Hallam University worked with 'Hydra Clarkson International Ltd' investigating ways to improve the life of cutting tools, sold for use in the dry-drilling and milling of aerospace and automotive alloys.

A range of new nanoscale PVD coatings were developed which combined high hardness, low friction and chemical inertness.

Tests have shown that coated tools had a significantly improved life, producing 130 holes compared to one to two holes with uncoated tools, and out-performed competing coatings by a factor of three.



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