Innovation Experiences Lead by Women in the XXI century

Innovation experiences and lessons learnt on the way

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and
the 8th General Assembly of the COIMBRA Group of Brazilian Universities (GCUB)

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A little bit about me…

Licenciatura in Chemistry
University of Valencia, Spain
1995

MSc Bio-Chemistry
University of Leiden, The Netherlands
2000

PhD Chemistry
University of Manchester
2001

Research Associate
Organic Materials Innovation Centre,
University of Manchester
2005

Consultant (PT)
Senior Scientist (FT)
Nanoco Technologies Ltd.,
Spin-out from the University of Manchester
2009

Lecturer in Enterprise and Sustainability
Manchester Enterprise Centre,
University of Manchester
2012

present

2013
University Technology Innovation Centres in the UK

A 2002 UK Department for Trade and Industry initiative to promote long-term, regionally-based research partnerships between business and academia

Aims:

- Support collaborative R&D
- Support knowledge transfer
- Provide a range of services to partners
- Benefits for SMEs and large corporations
- Train world-class scientists with the required skills
- Focus on regionally important sectors
- Ultimately act as hubs for economic growth
- Emphasis on delivering competitive advantage
Organic Materials Innovation Centre (OMIC, www.omic.org.uk)

- Centre for the specialty organic materials and polymer industries
- Based at the School of Chemistry, in 2002 received initial 2 years investment of £4.3m from the DTI
- Applications as diverse as smart coatings, flexible and stretchable electronics, biomaterials, smart packaging, smart textiles, home and personal care, ...
- Further funding sources: UKRC, UK TSB, EC collaborative research grants, consultancy, licensing IP, training,...
- International CPD courses for academics and industrial partners. Ex, Inkjet Academy (IMI Europe)
- National and International industrial clients and partners: BP, Domino, Merck, Xennia, TenCate, Byotrol, Eastman, Nanoco Technologies,…
- From 2003-2014:
  - Carried out 150 projects for over 75 companies
  - Total project value > £5M
Knowledge transfer example 1:
From proof-of-principle to new product development

From research lab to market:

- **The client:** Eastman Chemicals
- **Their ‘problem’:**
  - Market shift for printed of graphics from analogue printing (flexography) to digital printing (inkjet printing)
  - Cellulose esters for flexography
  - No expertise in inkjet printing
- **OMIC’s service:** Cellulose esters inkjet formulation and printing feasibility study
- **The solution:** Cellulose ester inkjet additive Eastman Solus™ 2100

[http://www.eastman.com/Literature_Center/T/TT100.pdf](http://www.eastman.com/Literature_Center/T/TT100.pdf)
Skills for the ‘real world’: Science With Innovation For Technology (SWIFT) UK Training Programme (2006-2007 Fellow)

Aims:

• Improve the awareness of and support for commercial development of research within the university,

• Boost a climate of entrepreneurship and innovation within the university

• Deliver a cultural change of academic and research staff

• Create a UK network of SWIFT fellows across the partnership universities
SWIFT training programme

Residential workshops and mentoring:

- Introduction to technology and commercial audit
- Commercial exploitation
- Intellectual property protection
- Communication / listening skills
- Writing business plans
- Case-studies on spin-outs and licensing
- Finance and accountancy
Knowledge transfer example 2:
Digital Fabrication - *the 3\textsuperscript{rd} Industrial Revolution*

**Digital Fabrication** is defined as a potential *manufacturing revolution* in which computer controlled tools and processes transform digital designs directly into physical products.
Knowledge transfer example 2: European Roadmap for Digital Fabrication

The aim: assess and promote the potential of Digital Fabrication for the future of manufacturing and materials research in Europe.

The objectives:
- Map most promising applications and material innovation domains
- Identify business drivers, KTCs and new business opportunities
- Understand Materials & production technologies: need for better match
- Connect to & involve stakeholders. Deliver common framework.
- Provide guidance for innovation in DF technologies, materials and applications
- Influence EU programs towards new sustainable economic growth

Diginova

Innovation for Digital Fabrication

Coordination & support action project 290557; theme NMP.2011.2.3-3

March 2012 - March 2014
http://www.diginova-eu.org/
Knowledge transfer example 2: European Roadmap for Digital Fabrication

Figure A2. Graphical representation of the process that has been followed in the Diginova project for identification of most promising opportunities for Digital Fabrication.

Table 2. Ranking and emerging applications for 3D digital fabrication

Knowledge transfer example 2: European Roadmap for Digital Fabrication

9 most promising applications for DF…

- Digital Graphical printing
- Digital printed textiles
- Functional 3D printed end-use parts
- Additively manufactured objects with embedded printed intelligence
- OLED lighting and displays
- Smart Windows
- Printed Sensors
- Personalised Diagnostics & Drug Delivery
- Medical Microfactories

Knowledge transfer example 2:
European Roadmap for Digital Fabrication

... and the key technology challenges and research recommendations to address these

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<tr>
<th>Technology challenge area</th>
<th>Research recommendations to address challenges</th>
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| Process implementation and economics       | • Develop approaches to improve the reliability and repeatability of the Digital Fabrication processes  
                                           | • Research methodologies to reduce the amount of wasted raw materials on some Digital Fabrication processes |
| Core process technology                    | • Research on process fundamentals, process physics and chemistry  
                                           | • Implement programme for the improvement of core components of material deposition engines |
| Design systems                              | • Research appropriate methodologies for product design data handling, eliminating current limitations holding back the adoption of Digital Fabrication |
| Supporting processes                        | • Develop quality control methodologies tailored to the specifics of Digital Fabrication, allowing a build-up of confidence in the user base |
| Supply chain support                        | • Address the lack of commercialisation efforts by supporting near to market technology development |
| Education, legal and political agenda       | • Develop a strategy to establish the required training for Digital Fabrication on multiple levels, including engagement in schools, professional training, and tailored courses in higher education  
                                           | • Research requirements for a legal framework improving user confidence in the commercial implementation of the technology. |
| Improvement of material properties          | • Research materials matching the performance of conventionally processed polymers, metals and ceramics  
                                           | • Fundamental research into novel materials capable of delivering properties required by novel applications enabled by Digital Fabrication  
                                           | • Research into materials suitable for the Digital Fabrication of multifunctional components  
                                           | • Research methodologies to reduce the amount of wasted raw materials on some Digital Fabrication processes |

Manchester Digital Fabrication Centre
(www.digital-fabrication.manchester.ac.uk)
From innovative research to *innovative education*: Manchester Enterprise Centre (MEC)  
(www.mec.portals.mbs.ac.uk)

- Recognised as a leader in **enterprise education**
- Focal point for **student enterprise and entrepreneurship** learning at The University of Manchester
- **Aim** to inspire, educate and develop enterprising individuals and enable them to positively impact the growth of dynamic organisations.
- **Objective:** transferring knowledge from the classrooms and laboratories to market opportunities
- **How?**: Through enterprise teaching, learning and business start-up support
From innovative research to **innovative education**: Innovation and Commercialisation of Research

- **British Council Researcher Links scheme**
- 3 day workshop in Cali, Colombia on 26-28 November 2014.
- Early Career Researchers (ECR) to explore possible **UK-Colombia research and innovation cooperation opportunities** in the following areas:
  - The future of science and innovation policy
  - The future of agriculture and biodiversity
  - The future of climate change research
  - The future of entrepreneurship
  - The future of cities & urban planning
Combining the strengths of UMIST and The Victoria University of Manchester

From innovative research to innovative education: Innovation and Commercialisation of Research in an international context

- British Council Researcher Links scheme
- UK-Colombia research and innovation cooperation opportunities
- The future of entrepreneurship most feasible project:
  - A Manchester-Colombia mobility scheme for academics and early career researchers
  - Delegates from Colombia to participate in MEC’s summer 3-day workshop in Innovation and Commercialisation of Research
  - Aim: to share knowledge and skills in enterprise education
  - Mixed funding: COLSCIENCIAS and MEC
Lessons I have learnt

*Innovation is not about ideas—it is about being productive with those ideas. It is about implementing them and generating shared value*

The University of Manchester ‘innovation eco-system’ has been key to my ‘innovation experiences’

Thanks for listening!