

Inventique®

The newsletter of Wessex Round Table of Inventors December 2006

BREAKTHROUGH IN AUXETIC MATERIALS – see page 3

Gowers' bombshell

PATENT OFFICE OVERHAUL IS RECOMMENDED

THE GOWERS REVIEW of Intellectual Property, presented to the government this month, recommends:

- New powers for Trading Standards to take action against infringement of copyright law;
- IP crime recognised as an area for police action;
- Tougher penalties for online

copyright infringement – with a maximum 10 years imprisonment;

- Lowering the costs of litigation through mediation and consulting on the fast-track limit (the Review acknowledges that prohibitive legal costs affect the ability of many to defend and challenge IP); and
- Ensuring that an effective and dissuasive system of damages exists.

The Review's key conclusions are that the UK Patent Office be restructured as the UK Intellectual Property Office, providing greater support and advice for businesses using IP domestically; that business representatives sit on a new independent Strategic Advisory Board on IP Policy; and that the government improve support and advice internationally – including that to India and China – to enable UK businesses to protect their investment around the world.

● www.hm-treasury.gov.uk/gowers

Next WRTI meeting WEDNESDAY 10 JANUARY Patent and trade mark attorney Andy MacKenzie's talk 'Intellectual Property is a lot more than Patents' is followed by an Intellectual Property Clinic. Room HC 017, Herbert Collins Building, Southampton Solent University, commencing at 6 for 6.30pm.

● Non-members wishing to attend: e-mail secretary@wrti.co.uk or tel: 01420 562 378 Map: www.streetmap.co.uk (SO14 0RP).

DO YOU NEED CASH FOR YOUR BUSINESS IDEA?

THE BBC WILL BE AUDITIONING throughout the coming months to offer budding entrepreneurs across the UK the chance to make their business dreams come true.

The last series was the most successful. 27 year-old Ian Chamings secured investment of £150,000 for his mixing software, aiming to revolutionise dance music downloads on MixAlbum.com.

Matthew Hazell pitched his First Light Solutions 'man overboard' alert system, securing an investment of £100,000 from Australian millionaire Richard Farleigh, and Rob Kinna received an investment of £60,000 for his Bak-Jak – a simple support system to protect car mechanics from back strain injuries.

Of those who could not get investment from the Dragons, plenty still went on to find success. John Moreland Lynn subsequently secured private investment for his designer polo clothing label Polistas and is about to open his flagship store, and Anneliese Pritchard's Nitty Gritty guide to Bristol went on to win a sponsorship deal with a major bank.

And even after the Dragons pooh-poohed her disposable toilet seat covers, Jacqueline Edwards was approached by potential investors and is in discussions to supply them through dispensing machines.

● **To request an application form:**

Tel: 09011 110825 (calls cost 25p)

dragonsden@bbc.co.uk,

www.bbc.co.uk/dragonsden.

DRAGONS' DEN RULES

The entrepreneurs can ask for any amount of investment in return for equity in their business. However, they must get at least the amount they ask for or they will walk away with nothing.

The Dragons are prepared to listen to a pitch for any kind of business but they must be convinced that it will make money.

Ideas, businesses and products that meet some or all of the criteria below stand a good chance of securing the Dragons' interest:

- **THE UNIQUE SELLING POINT:** A product that serves a need like nothing else.
- **SCALABILITY:** Something that can be upscaled to make real money.
- **ROUTE TO MARKET:** The clear way the product can be sold and marketed.
- **MUTUALLY BENEFICIAL ARRANGEMENT:** Just what will the Dragons get out of it?
- **EXIT STRATEGY:** A plan of how the entrepreneur/Dragon will exit and make money.

Wessex Round Table of Inventors meet at 6.30pm on the second Wednesday of each month at Southampton Solent University, East Park Terrace SO14 0RP

INSIDE View from the Chair • Evan Davis • Dave Skertchley • Design from Nature • DCX etc...

VIEW FROM THE CHAIR

THE LATEST advertisements from Audi tell us that they have filed 9,621 patents in relation to the new Audi A6 car – that's more than NASA. Who would have thought that there were so many things left to invent in relation to a motor car...? Invention is still clearly valued in the German engineering world, thank goodness, and I'd imagine that Ingolstadt – where Audi produce over 2m cars per year – is a good place to practise as a patent agent.

On reflection, one thing strikes me about this information. The average fuel consumption (at a little under 30mpg) of a 2007 Audi A6 petrol 'executive' saloon is pretty much the same as a 1957 Morris Oxford petrol 'executive' saloon, and also pretty much the same as a 'Model A' Ford Tourer from the 1920's – although the new Audi has roughly twice the performance and acceleration of the Morris and four times that of the Ford (and it's far safer and quieter).

It seems to me that this shows how many more patents are still left to be filed, because innovation is still required to bring contemporary levels of technological improvement to the fuel economy of cars (and so much else). The news is full of horror stories about what will happen if we don't reduce fuel consumption but, human nature being what it is, we don't want to miss out personally. Innovation is the key to a situation where we can have what we want, yet consume less.

They say there's a book in everyone, so it stands to reason that there's a patent in everyone as well – so here's an opportunity to resolve the problem of what your New Year's resolution might be: just invent some nice and simple way of keeping what we have whilst reducing the demand on natural resources in terms of consumption and emissions. Easy, eh? Send your patented ideas in and get some publicity this time next year.

Sincerely, Richard

RICHARD LITTLE, WRTI Chairman

INVENTORATOR Evan Davis

A lot goes on in the City of London

MONEY MOVES AROUND IN QUANTITIES TOO LARGE FOR MOST OF US TO COMPREHEND...

THE ANNUAL TURNOVER on the London Stock Exchange is about £2.5 trillion, (over £40,000 for every man, woman and child in the country). UK banks have assets of £5.5 trillion. Currency worth £1.2 trillion is traded every day.

And by taking small commissions on transactions involving such large volumes of money, the City makes billions for its well-paid staff, and for the economy more generally.

But even though a lot of the money handled by Britain's financial sector is international, the UK financial institutions still operate at the core of Britain's national financial system. The city still has to operate on the back of the real economy. There's no point in trading shares, if there are no companies in which it's worth owning them. No-one would care about British bonds or sterling as a currency, in the absence of things to spend our money on.

So, the flourishing financial sector has to sit on the foundation of non-financial wealth creation: old businesses producing things and, above all, new businesses inventing them.

And yet, compared to the sums handled in the city, the scale of investment in new businesses is surprisingly small in the UK.

Smaller and yet smaller

According to the British Venture Capital Association, in 2005 only 491 new businesses were given venture capital finance in Britain with a total amount of £382 million (which amounts to about three quarters of a million pounds

per company), either as start-ups or as early-stage investments.

Now, that is not very much funding for start-up businesses. £382 million amounts to 0.03 per cent of our national income, or £6 pounds for each person in the country; not much, relative to the £5.5 trillion in the banks.

In fact, even the venture capital industry itself invests most of its money in management buy-outs and private equity investments that do not finance early-stage companies at all, but merely change the ownership structure of established firms.

Where there's a Will?

Clearly, money is a binding constraint on the ambitions of most entrepreneurs. Some would read all this and assume something is wrong. The economy is mis-directing its resources, they would say, and failing to support entrepreneurs. And it's certainly true that Britain needs more than 491 new businesses a year.

Fortunately, there are other ways to start up a company than to secure several hundred thousand pounds from venture capitalists. ■

Continued next month

© Evan Davis 2006

● *Evan Davis is the BBC's Economics Editor and presenter of BBC TWO's Dragons' Den.*

If you are an entrepreneur with a fantastic business idea, the Dragons' Den team would like to hear from you. For an application form:

Tel: 09011 110 825 (calls cost 25p).

dragonsden@bbc.co.uk

bbc.co.uk/dragonsden

AUXETIC MATERIALS

LET'S JUST DO an experiment. Take an elastic band and pull it. If you look carefully you will see that it gets thinner. Pull it some more and it becomes so thin that it breaks.

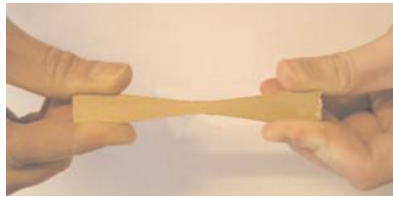
This is the way our world works. Intuitively it would seem logical that the volume of material remains constant, which is why its gets thinner as it is extended.

But this intuitive view is wrong. The relationship between extension and reduction in area is not the same for all materials, and they are all different. This is known as Poisson's ratio, which is a positive value for all but a few of the materials we use.

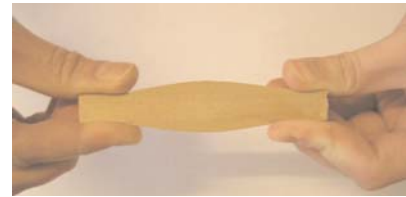
However, some materials have a *negative* Poisson's ratio, including some types of skin, brick structures used in nuclear reactors, and PTFE, a fluoropolymer commonly used as a non-stick coating for cookware.

Auxetic materials occur when the structure is arranged in the classic 'bow tie' shape. The best example of this effect is an Auxetic honeycomb. In the example shown

WRTI member Dave Skertchley introduces an amazing new material first produced at the University of Bolton



Above: Stretch a standard material (which has a positive Poisson's ratio), and it becomes thinner.



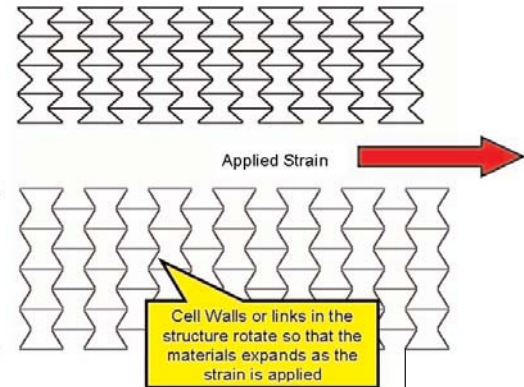
Above: Stretch an Auxetic material (which has a negative Poisson's ratio) and against all logic it becomes fatter.

on the right, it can be seen that the y axis walls of the cells rotate as the x axis strain is applied, creating the effect that the honeycomb sheet is getting larger as it is stretched.

Feel the benefit

The benefits of Auxetic materials can be quite extraordinary; it is probable that cracks in Auxetic materials will be self-healing, for example, and there is evidence that this may indeed be the case.

There are certain to be many applications which have not yet been invented, and some existing ideas which have not been developed (no-one can yet make Auxetic honeycomb at a commercial price, for example). There are undoubtedly opportunities for inventors to develop further specialist products and processes.



Above: Classic example of an Auxetic honeycomb uses a bow tie structure.

Auxetic materials are a major area for research and exploitation. Auxetic Technologies Limited – a spin-out company formed by the University of Bolton and Enterprise Ventures Limited – is already developing significant applications.

I have set up an Auxetics page on my website (see below), which contains useful information for inventors and from which links to the Auxetic Technologies website can also be found.

Auxetic Technologies Limited can provide commercial technical support. In the meantime I will happily discuss WRTI members' ideas free of charge.

It is worth stating that I would never have had the confidence to try inventing anything if I had not been a member of the WRTI. ■

© David Skertchley 2006

● *Dave Skertchley is director of Product Technik and a consultant with Auxetic Technologies. His areas of expertise include aerospace, defence and high-performance automotive technologies.*

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www.product-technik.co.uk

A MAJOR BREAKTHROUGH for Auxetic materials occurred in 2001 and 2002, when the University of Bolton's Dr Kim Alderson and her researcher Ginny Simkins developed a novel melt extrusion process to produce the world's first reported auxetic filaments (which until then had remained a theoretical principle).

Auxetic materials offer huge potential through enhancements in properties such as indentation resistance, low velocity impact resistance, fracture toughness, energy absorption and other potential but as yet untested property enhancements.

FIRST UK SURVEY OF WOMEN BUSINESS OWNERS

PROWESS is conducting a national survey of women who own businesses in Science, Engineering, Construction and Technology, writes Alice Kent.

The survey studies the numbers and characteristics of such businesses and what more the government and business support providers could be doing to better meet the needs of this business sector.

The survey is online and takes on average 5-7minutes to complete.

Prowess has 250 members who support over 100,000 women in business each year.

● www.surveymonkey.com/s.asp?u=965282784641

**Prowess, Lion House, 20-28 Muspole St
Norwich NR3 1DJ Tel: 01603 762355
www.prowess.org.uk**

ALL ORGANISMS need to measure distances in order to know how big they are, and – in conjunction with a calibrated spring of some sort – what loads they are supporting internally (from their weight or movement) or externally.

For insects and spiders, which have an external skeleton (the cuticle), such strain gauges are deformable holes extending through the cuticle, arranged so that the shape changes in response to specific loads.

This shape change is rotated through 90° by the suspension of a bell-shaped cap over the hole, whose deflection is detected by a cell beneath the cuticle (top right), and which is can be sensitive to displacements of the order of 1nm.

Modelling essential morphology – a hole formed in a plate of fibrous composite material – showed that global deformation of the plate (which can be flat, curved or a tube) induces higher local deformation of the hole due to its locally higher compliance. This local effect can amplify the global strain by a factor of 10 or more, depending on the details of the structure.

It seems that even greater sensitivity can be achieved by arranging the holes in a regular pattern. If the hole is oval it can be ‘aimed’ to sense specific strain directions, and by controlling the shape of the hole or its relationship with other holes, it can have a tuned response to dynamic strains and thus be a vibration sensor.

Engineers who believe holes weaken a structure view them with suspicion. But this is plainly wrong, since insects and spiders, which may have thousands of holes distributed over their wings and legs, never suffer as a result. And the holes are always in the most highly loaded parts, since that is where the

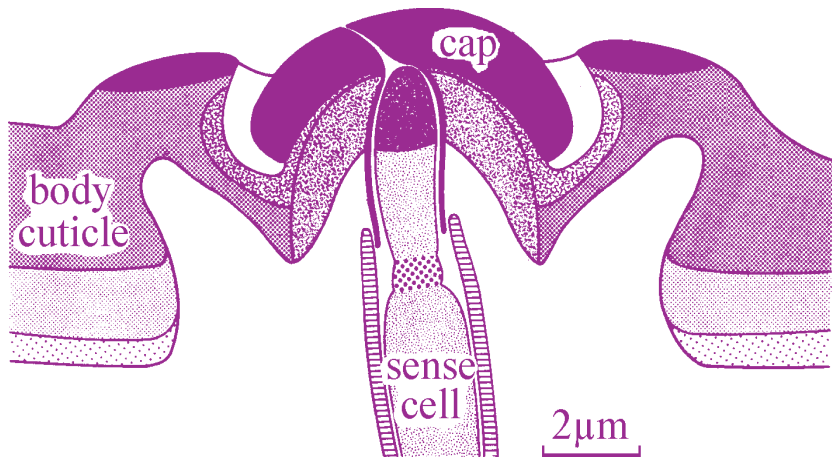
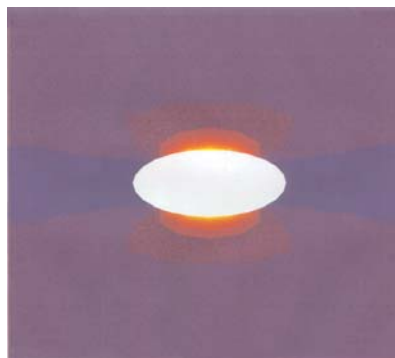


Fig 1. Section through an insect strain gauge. The dome is suspended across the middle of the hole. It moves up and down as the hole is deformed diametrically. Movement is sensed by the sense cell.



Above: Finite element model of a hole drilled in a plate of composite material. Blue is low strain; red through to yellow is high strain: danger!



Above: As left, except the hole is formed with the fibres going round it. Strain is much more evenly distributed and the danger spots have gone. This is safe.

information is of most use. The secret is in keeping the hole small and arranging the cuticle fibres around the hole to re-arrange the strains.

The colour pictures above show a plate of composite material in which the fibres are arranged horizontally and stretched in the same direction. Bottom left shows what happens when an oval hole is drilled in the plate, interrupting the fibres; bottom right shows how the intact fibres can carry the load safely around a formed hole, increasing the amount of deformation at the same time.

Such holes are integral with the structure in this environment, so cannot peel off the surface as a conventional strain gauge might. They can be interrogated remotely by laser, or have carbon-loaded polymer filling the hole to change capacitance or resistance; two oval holes with mutually orthogonal long axes can measure tension, compression and torsion. At Bath we are developing ideas based on holes with high aspect ratios, which can be tuned to measure defined vibration frequencies. ■

In accordance with Professor Vincent's commitment to the principles of Open Access, the ideas presented here are freely available. In demand as a lecturer and consultant to industry, he welcomes consultation or research enquiries by companies and entrepreneurs.

Julian F V Vincent is Professor of Biomimetics at the University of Bath. Biomimetics is the concept of taking ideas from nature and implementing them in another technology, such as computing, design or engineering.

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www.bath.ac.uk/Departments/Eng/biomimetics**

"In America, failure is seen as a rite of passage; in the UK it's seen as a black mark" – Grant Thornton, consultants

www.wrti.org.uk

THE INVENTORS WEBSITE

CENTRE OF EXCELLENCE dcxworld.com

Online investors...

MARRYING INVESTMENT TO THE OPPORTUNITY

ARE YOU one of the thousands of start-up or early-stage enterprises seeking funding between £20,000 and £5m?

The Development Capital Exchange (DCX) – the entrepreneurial business clearing house – finds investors who could provide capital and priceless business experience.

When seeking funds, applicants must forward their opportunity to a local DCX Associate found on the website. S/he will post it to the DCX, from where it will be sent through the DCX Newswire to all those investors whose settings your requirements match.

Hold the front page!

The investors will then get in touch with your DCX Associate. Your opportunity will also appear in DCX magazine *Risk & Reward*, which is sent to the 200,000 wealthiest and most successful entrepreneurs and company

directors in the UK.

Based in Leominster, the DCX philosophy is to release information between investors and those seeking funds so that capital can follow.

With postings to the Exchange restricted to professional advisors delivering quality control over business plans and investors' due diligence, a structured market through which investors, advisors and fund-seekers alike can prudently and efficiently operate is delivered.

Mind the gap

There are up to 50,000 enterprises seeking 'equity gap' funding in the UK at any one time, the majority seeking between £250,000 and £750,000.

DCX estimate a core base of between 100,000 to 150,000 investors with available funds, willing to invest between £20,000 and £500,000 in new enterprises. ■

● www.dcxworld.com

WEBSITE OF THE MONTH

www.google.com/patents

It had to happen. Using the most popular search engine ever devised, you can now search over 7 million US patents more easily and efficiently than if searching through the US Patent and Trademark Office's own website.

Google itself was awarded another patent (making 36) for search results page design just a few days after launching their new site this month.

BOOK OF THE MONTH

The Innovator's Dilemma: The Revolutionary Book that Will Change the Way You Do Business

by Clayton M. Christensen

HarperCollins 320 pages
ISBN 0060521996 £12.25

In this old (but still gold) bestseller, Harvard professor Clayton M.

Christensen says outstanding companies can do everything right yet still lose their market leadership – or worse, disappear completely.

And he not only proves what he says, he tells others how to avoid a similar fate. Focusing on 'disruptive technology', Christensen shows why most companies miss 'the next great wave.'

BUSINESS LINK WESSEX INNOVATION CLINICS

Are you thinking about developing a new product or process? Have you invented something and don't know what to do next? Through its series of free Innovation Clinics, Business Link Wessex provides confidential and impartial guidance on such subjects as investigating an innovative idea, developing a new product or process, working with universities, exploiting inventions and intellectual property rights. Innovation clinics are held in the Bournemouth, Portsmouth and Southampton regions.

● **Advice Hotline: 08454 58 85 58** innovation@businesslinkwessex.co.uk www.businesslinkwessex.co.uk/events

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