



# GIRTON LABS

Lyndsay Williams – 26 August 2009

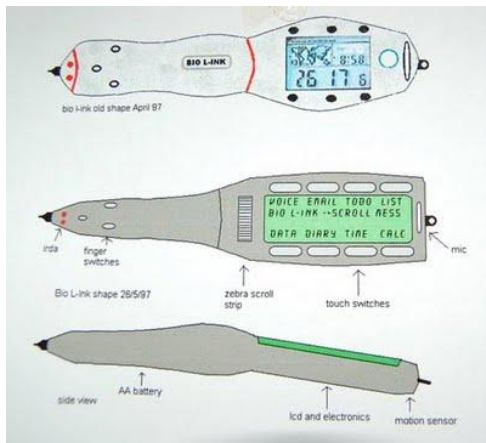
# Company Introduction

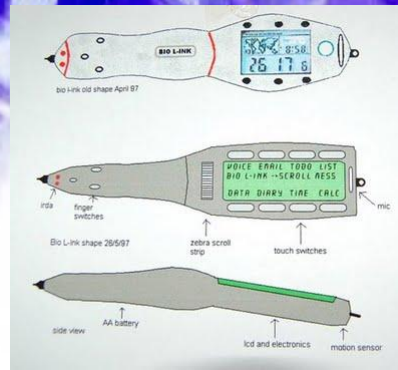
- About Us
  - Girton Labs Ltd, Cambridge was founded by Lyndsay Williams in 2007.
  - Williams has degree in BioMedical Electronics Hons from the University of Salford, UK, and is a Computer Scientist in the field of Human Computer Interaction (HCI )
  - The company specialises in embedded digital and analogue microcontroller systems, 3D multi-touch computer surfaces, digital audio , sensors, and GSM wireless sensors.
  - Won 2 EEDA Grants for Research and Development, 2008,2009 for computers for Alzheimer's patients



# William's History

- Design of digital audio soundcards for PC's in 1980's for Commodore, (1984) Datel, (1982), Amstrad, Philips, Eindhoven (1988) etc
- Psion Computers
- Senior Research Fellow BT Labs Martlesham 1997-1998  
 Hardware Researcher for Microsoft Research 1998-2007, 16 patents filed  
 Currently Part Time Consulting Expert for Apple Inc on iPhone Patent 2008



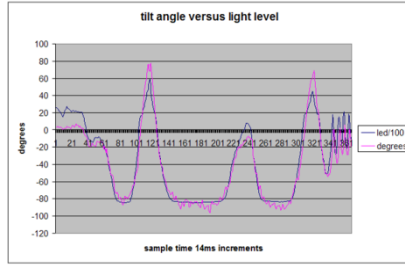


# SmartQuill

- Application of accelerometers for tilt control of screen, electrical output for controls, e.g. Volume, first invented & patented by Williams in 1997
- Sale of Williams' BT patent for mobile phone with sensors, i.e. Accelerometers, to Apple Inc in 2007, (now in 90 million mobile phones) face proximity detection and many other claims
- Part Time Consulting Expert for Apple Inc on iPhone

6,956,564, Re. S.N. 12/255,557, Oct. 21, 2008, Cl. 345/000, PORTABLE COMPUTERS, Hilary Lyndsay Williams, Owner of Record: APPLE INC., Attorney or Agent: Tracy W. Druce, Ex. Gp.: 1661

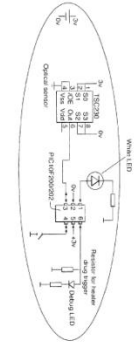




# Williams - Microsoft Research Cambridge 1998-2007

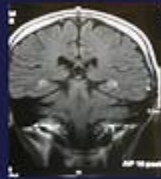


Patent Application Publication Jun. 4, 2007 Sheet 2 of 5 US 2007/0003612 A1

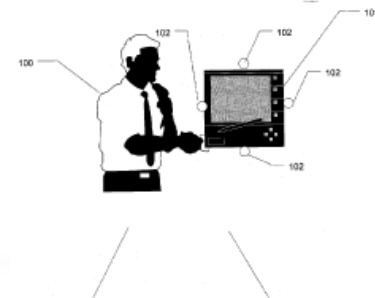
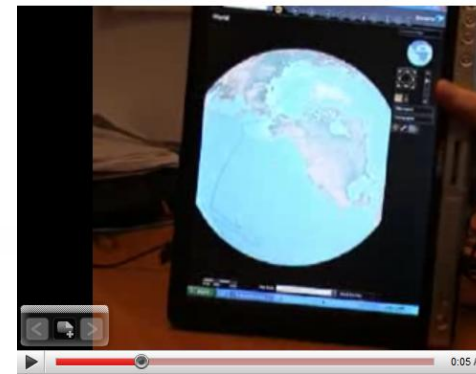


## SenseCam trial with amnesia patient

- Cambridge Memory Clinic, Addenbrooke's Hospital
- 63 year old, well-educated, married woman 'Mrs B'
- Diagnosed with limbic encephalitis in 2002
- Now has marked amnesia
  - usually no memory a few days after an event

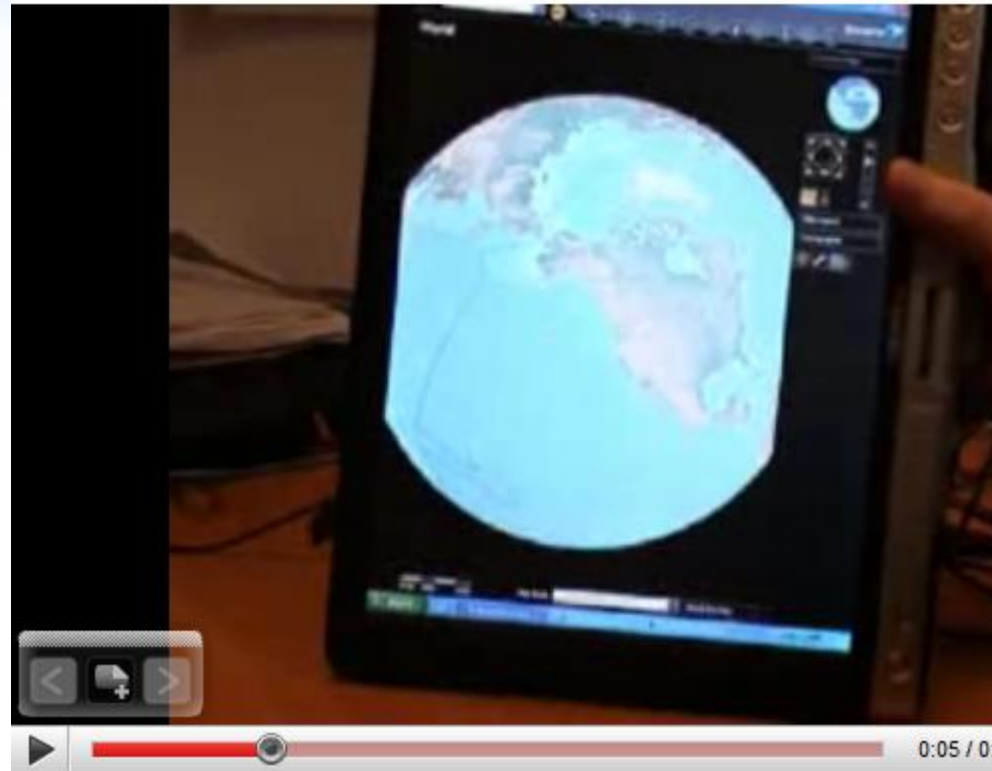


## Microsoft GyroTablet handheld computer with motion detection

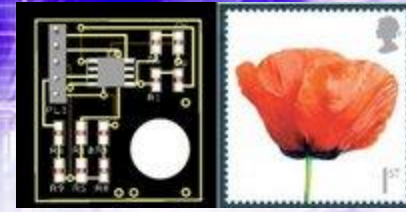


# Video

Microsoft GyroTablet handheld computer with motion detection







# Our Technologies

- SenseBooks

- SenseBooks is a new type of interactive printed book using sensors to determine activity of the reader.

## SenseSurface

- 3 Dimensional touch control surface for PCs, music synthesisers, printed books

- SenseBulb

- A novel non-contact sensor to detect incidents in the home, e.g, a door left open or a person falling in the home



# Our Technologies

- Sense Direct
  - A wireless GSM sensing network technology
- SensePaper (ipx notes)
  - Ipx-Note is a new form of intelligent sticky note that allows the user to create time sensitive paper



# SenseSurface

- A 3 Dimensional touch control surface for PCs, music synthesisers, printed books, etc.
- A control surface with real knobs, sliders, real switches
- The sensing knobs have a custom designed movement sensor to determine position within a range of 180 degrees with a 10 bit digital output
- The magnetic knobs can be removed and repositioned immediately by picking them up and moving to a different part of screen



# SenseSurface

- A unique sensing x/y matrix is attached to the rear of the laptop screen to detect the control's position
- The distance of the sensor from the screen can also be detected.

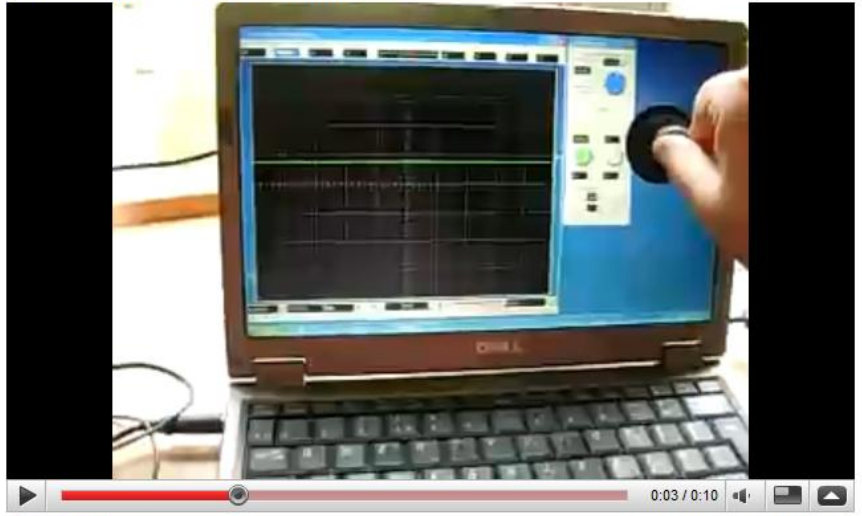


SenseSurface video – control knobs  
click on large image for video

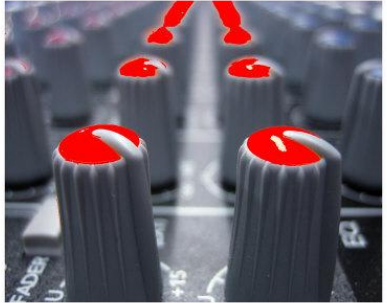
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**SenseSurface 3D potentiometer**



★★★★★ 12 ratings 43,218 views



# SenseBulb

- A new design of very low power LED light bulb and wireless sensor computer
- The SenseBulb has novel non-contact sensors to detect incidents in the home e.g, a door left open or a person falling
- SenseBulb is also useful for security systems in the home and office
- Sensebulb can recognise gestures, e.g. waving a hand at a bulb can indicate "help" and the bulb will respond with a message to a mobile phone



# SenseBulb

- A text message can be sent to a mobile phone
- Alerts takes typically only 15 seconds to be detected and then be received by a remote mobile phone under experimental conditions
- Any mobile phone can be used to receive messages.
- SenseDirect's wireless sensor technology is used to enable the texting feature of SenseBulb.



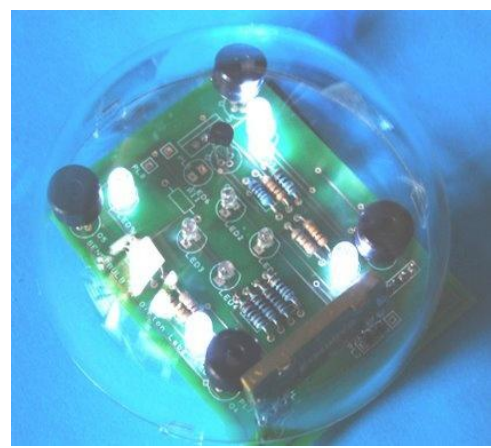
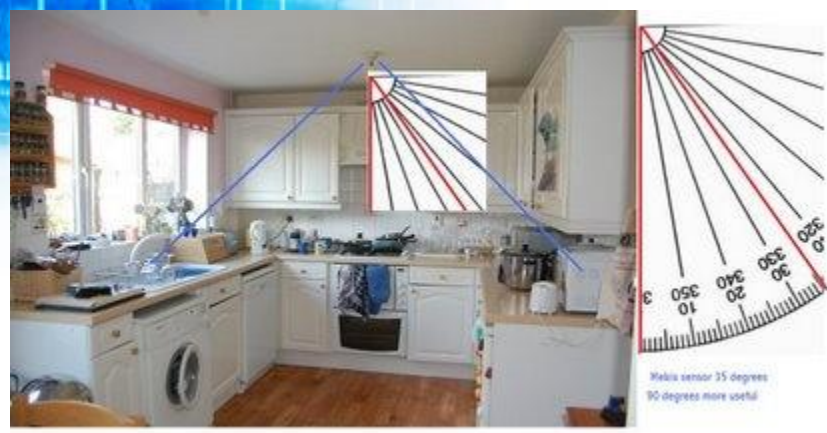


# SenseBulb

- Setup of each SenseBulb is achieved by sending a SMS message from a mobile phone and no PC connection is required
- SMS messages can also be sent to landline phones, using text to speech conversion to provide a voicemail message
- Typical application could include aiding dementia care and Alzheimer's patients, monitoring of doorways and corridors etc.

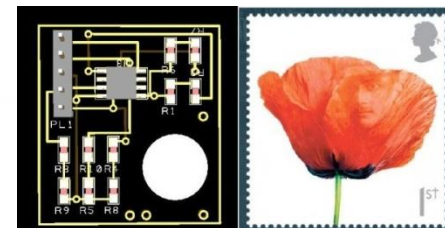


# SenseBulb



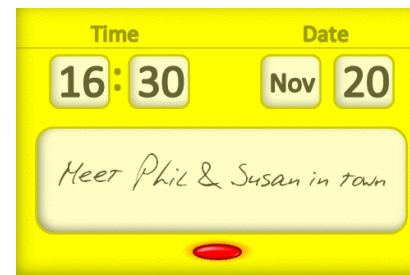
# SensePaper (ipx notes)

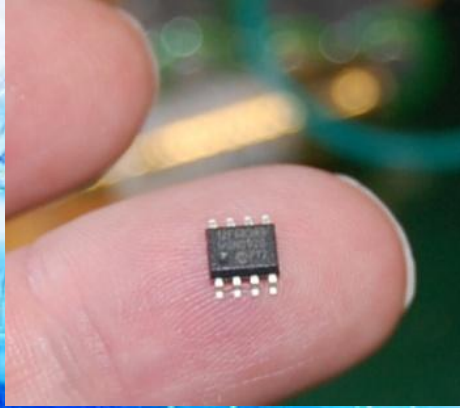
- Ixp-Note is a new form of intelligent sticky note that allows the user to create time sensitive paper.
- Time and date is selected via a novel paper touch sensitive sensesurface. The card will light up and chime at the chosen time.
- The Ixp-Note sensing platform starts at coin size and can be attached to paper surfaces
- It is designed to be used like a normal sticky note and also to be re-usable.



# SensePaper (ipx notes)

- The user can write a note on a reusable writing strip.
- The idea was originally designed for people with memory loss, e.g. Alzheimer's, but can be used all around the home and office.
- The multi-touch technology is designed to be very simple and intuitive to use without the challenges of conventional reminder systems.
- The notes are credit card sized and designed to use like normal sticky notes.





# SensePaper technology

- Nanopower 8 bit PIC microcontroller - 2Volts
- Thin Sensors such as temperature, vibration, touch, sound, light
- Output, LEDs, audio, serial, wireless
- Graphics combined with sensors e.g. drink mat
- No PCB, laminated within 2mm thin card inc battery and paper
- Waterproof, flexible, robust,
- Battery life up to one year 1:100 clock controlled by environmental sensors
- Bi-directional sensors
- Applications, Alzheimer's, appointment cards, asset tracking, medical applications – smart plasters



# SensePaper (ipx notes)

- A novel design of power management which works like the human heart is used to achieve very low power. Battery life approx 1 year
- The technology that enables this utilises low cost electronic circuit printing.
- The platform including hardware and firmware costs around \$1.
- Low cost achieved due to novel connection technology. This replaces a conventional printed circuit board (PCB) and costs < 1 cent per card.

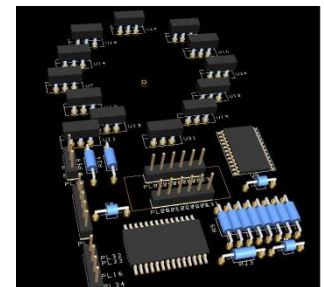
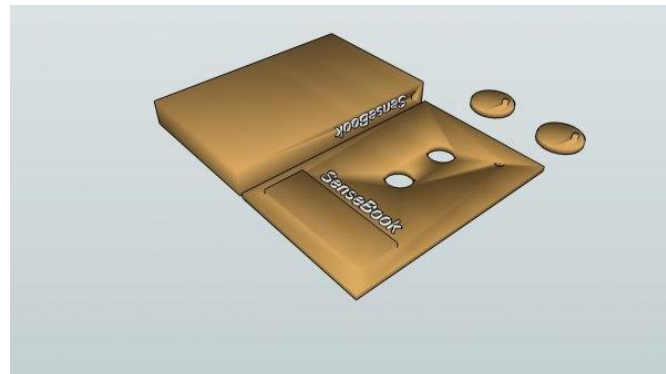
# Ice-Pen

- Peltier Heat Exchanger - pain management
- Used on headaches
- Reduce skin surface temperature by approx 15-20C
- 2 x AA cells
- 3D CAD enclosure and computer designed by Girton Labs, 3D printed case manufactured by Philips, Shapeways



# Girton Labs Technology

- Innovative portable computer designs
- Embedded analogue and microcontroller hardware and software design
- Very low power microcontroller system designer
- 3D CAD design and manufacture



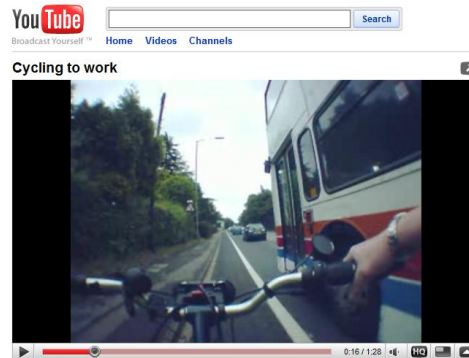
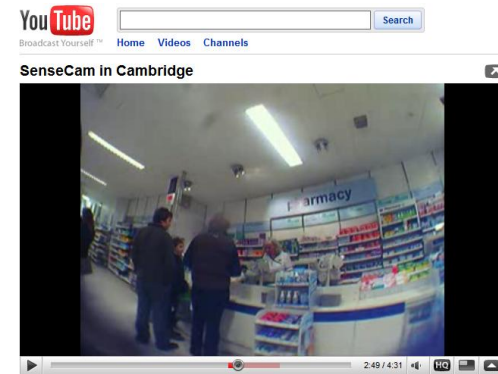
# Girton Labs

- Design Consultancy available
- Contact Lyndsay Williams, Managing Director of Girton Labs, [sensecam@gmail.com](mailto:sensecam@gmail.com)
- Tel +44 (0) 7970 101578
- More details [www.girtonlabs.com](http://www.girtonlabs.com)
- Sense Knobs video  
<http://www.youtube.com/watch?v=26hBXbNsGY>
- Some of Williams academic publications  
<http://scholar.google.com/scholar?start=0&q=williams+microsoft+lyndsay&hl=en>

Any Questions?  
Some videos after this slide....



# SenseCam Videos – click to view Best “viewed” with headphones on...



# SenseBooks

- SenseBooks are a new type of interactive printed book using sensors to determine activity of the reader
- These sensors are similar to those used on the Apple iPhone. e.g. light, motion, sound and touch
- The SenseBook will be able to automatically indicate to your computer via wireless what page it is on which could then take the user to further content on the web etc.





# SenseBooks

- A Sensebook will also know the book has been picked up and that the reader is looking at a page.
- Very low cost magnetic motion sensors allow movement to be detected. These novel motion sensors are a replacement for accelerometers and much lower cost.
- We plan to use printed electronics on paper for part of the SenseBook and the sensing system should add no more than about 20% to cost of any printed book.



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## Computerising the body: Microsoft wins patent to exploit network potential of skin

Fact or fiction - carrying a keyboard on your arm

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**David Adam**, science correspondent  
The Guardian, Tuesday 6 July 2004  
[Article history](#)

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Call it the ultimate wireless network. From the ends of your fingers to the tips of your toes, the human body is a moving, throbbing collection of tubes and tunnels, filled with salty water and all capable of transmitting the lifeblood of the 21st century: information.

In what may seem a move too far to some, the computer software giant Microsoft has been granted exclusive rights to this ability of the body to act as a computer network. Two weeks ago the company was awarded US Patent 6,754,472, which bears the title: Method and apparatus for transmitting power and data using the human body.

Microsoft envisages using the human skin's conductive properties to link a host of electronic devices around the body, from pagers and personal data assistants (PDA) to mobile phones and microphones, although the company is uncharacteristically coy about exactly what it may have in mind.

- Williams patent