

## Lyndsay Williams CV 8<sup>th</sup> April 2010

### Electronic Design Engineer

Hilary Lyndsay Williams

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Email [sensecam@gmail.com](mailto:sensecam@gmail.com)

**Skills in embedded microcontroller hardware and firmware design , analogue, bio medical, audio and sensor applications for wearable computers.**

Jan 2010- April 2010 – contract for Central Saint Martins College of Art, London in computer control of microfluidics pump.

Sept 2009 to Dec 2009 Design of wireless human sensing system for Critical Data Ltd, Cambridge

Current – design of novel hand tracking system . Design of carbon energy wearable data logger

Paper reviewer for HCI 2010.

Currently from 2007 – **Managing Director Girton Labs Ltd, Girton Cambridge** –

Design consultancy for embedded microcontroller products using analogue sensors

More **details and images at [www.girtonlabs.com](http://www.girtonlabs.com)** of below work.

Dec 2009 nominated to be FRSA Fellow of Royal Society of Arts for contributions to Alzheimer's research.

2008-2009, Winner of two East of England of England (EEDA) Development Awards for portable computers for Alzheimer's patients. 2 Patents filed.

Design of working prototype of sensing lightbulb to send text messages of human activity via mobile phone. Applications include care of elderly in the home.

Design of working prototype of wireless 3 Dimension control surfaces added onto graphic LCD display –Sensesurface. Applications include music, video, games controllers, military flight simulators.

Design of working prototype of 2mm thin computer plastic skin including battery – iXp-note. Applications include time sensitive paper and medical applications. The system also has sensing abilities for touch control etc.

Part Time **Consulting Expert for Apple Inc**, Cupertino, on iPhone patent as here <http://tinyurl.com/nfvn2l>

This was due to the sale of my invention of a mobile phone with no visible controls in 1997 with sensing technology to Apple in 2007. I invented this phone and then joined BT Labs Martlesham who financed me to build the prototype.

**Patent filed by Apple Inc in 27<sup>th</sup> August 2009** at US Patent Office of my invention of mobile phone and handheld computer with sensors.

2008-2010 **Consulting Expert on Patent litigation** for several attorneys in the Eastern District of Texas, USA (Details on application).

2009 - Advisor to BBC on large multi £M computer fraud investigations.

Other current skills include 8 and 32 Bit microcontroller hardware and software design (PIC/ARM). PCB layout , GSM mobile phone software, digital audio, analogue circuit and sensor design, 3D CAD design and manufacture of innovative handheld computer enclosures using 3D printing, SMD construction . Patent support on mobile phones.

Presented research for a wireless sensor Assisted Living at BCS Human Computer Interaction HCI2009 <http://www.hci2009.org/> in Sept 2009 as [here](#) sponsored by Microsoft Research and others.

Also appears on the BBC, The Guardian and others re Girton Labs and other work. Interview [here](#) in Business Weekly on my work Nov 2009.

November 2009, Microsoft licensed [my invention](#) of SenseCam technology [as here](#), a new video compression system for aiding people with dementia and Alzheimer's.

1998-2007

### **Computer Hardware Researcher for Microsoft Research Cambridge**

Research of novel human interface devices, including design of embedded microcontroller circuits, software and firmware including analog, digital , biomedical and sensor controlled camera design. This is a camera worn on the body that capture images automatically, called SenseCam.

<http://research.microsoft.com/sendev/projects/sensecam/>

Expertise in novel accelerometer applications for portable computers, e.g. camera design , portable displays, and surface computing. My technology is now used in Microsoft Windows Mobile phones.

15 worldwide patents <http://tinyurl.com/l7v7d4> filed for Microsoft covering medical, sensor and display technologies, aids for disabled people and pen computers. Invention of SenseCam, a camera and data logger for automatically detecting relevant human memory images and capturing them.  
<http://research.microsoft.com/sendev/projects/sensecam/>

This was used very successfully with Addenbrookes hospital to aid severe memory loss patients and initial trials with Alzheimer's patients.

I received a Thought Leadership Award in 2006 from Microsoft Research and my invention of SenseCam was named in Time Magazine as one of Bill Gates' sources of new ideas;

<http://www.time.com/time/business/article/0,8599,1171641,00.html>

I was a hardware researcher in the [Hardware Systems Group](#). I was solely responsible for innovations using accelerometers and sensors for handheld computers. One project was [SenseCam](#), a "Black Box" data and image recorder for the human body . My design is a wearable computer that records up to 2000 images in 12 hours and includes sensor data. I have developed algorithms for image stabilisation and location change detection . The SenseCam goal is to aid memory recall and I was also responsible for initiating

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collaboration with Addenbrookes Hospital Cambridge to aid memory loss patients using the SenseCam. My responsibility for SenseCam was initiating the design, acquiring support from Microsoft to build this project, designing and building hardware and software to test the device. I won a runner up award in Dec 2004, [Wall Street Journal Technology Innovation Award](#). This was the only award to a British company and first time Microsoft had won this type of innovation award.

My other research with Microsoft includes invention of GyroTablet – video here: <http://www.youtube.com/watch?v=mODBSYu0A4A>

(GyroTablet a screen that scrolls according to handheld movement), Xwpen (pen to record handwriting), and SmartMoveX a radio location badge.

**1997-1998 Senior Research Fellow, British Telecom Advanced Research Martlesham, Ipswich.** I received finance from BT Labs for my design of a mobile phone with sensors. It could also record handwriting. This was called [SmartQuill](#) and patented by BT. I was responsible for the system design and pen hardware and firmware and with collaboration (Ben Millner) developed the handwriting recognition algorithm to achieve 95% recognition accuracy. This device also was the computer device/mobile phone to use motion sensing to scroll a screen. This patent sold to Apple Inc in 2007.

**1996-97 ABB Kent Meters Contract Engineer**, Milton Keynes– development of 8051 based microcontroller based water flow monitoring computer.

**1995-1996 Psion Computers, London** – Design engineer – responsible for some hardware audio design for Psion Series 5 handheld computer. I innovated a design for hardware for a stereo music playback system, pre MP3.

**1995 – GEC Marconi Addlestone** contract software engineer responsible for submarine steering embedded microcontroller software

**1993-1998 – started business, LWE design consultancy** for microcontroller designs. Customers included Pace Micro Technology, BT Labs, ABB Kent Meters. Successful business was closed by me in 1998 as offered position at Microsoft Research.

**1992 Peek Traffic Milton Keynes** Project Manager. Responsible for design of traffic counting and classifying computer.

**1991-92 Design Engineer for Aculab**, Leighton Buzzard, Beds Responsible for Z80/8051 embedded hardware and software for audio mixing consoles for StudioMaster Luton.

**1984-1990 Richard Watts Associates Chief Engineer**. I designed many original portable music composing devices for Music Sales, Commodore Computers, Philips, Olivetti, Goldstar. I was the first employee of RWA now called [Evolution](#) which has now been bought by M-Audio.

I designed some of the first digital audio sound samplers for music and games for personal computers in the 1980's (for Commodore, [Datel](#) and [Evolution Electronics](#)) and also the hardware for the [first soundcard for a PC](#) in 1987. I designed the world's

first low cost commercial sound sampler for Personal Computers for Datel in 1984 , this was Datel's first product and Datel now have an annual turnover (2006) of \$200M/year. Designs based on 6502, 68000 microprocessors. My designs later incorporated FM synthesis and the same design and FM file format in used in today personal computers .

**1984 Design Engineer Coin Controls**, Oldham – design of coin and banknote recognition systems , based on 8031 microcontrollers.

**1982-84 –Ferranti Computer Systems , Cheadle** Electronic Engineer. Responsible for hardware and software in “C” for oil and gas monitoring platforms based on Z80 computers .

**1980-82 Avionics Engineer British Aerospace Woodford**. Responsible for patented analogue hardware design of accelerometer based noise reduction computer for 748 Aircraft as used on the Queen's flight. Responsible for Sonar buoy research on Nimrod.

**1977 Baxall Electronics** , Stockport, electronic engineer . This company designed CCTV cameras. I was the first employee and company is now Britain's largest suppliers of CCTV.

**1974-77** After School activities: **Design of analogue and digital music synthesizer**. Writing for Practical Electronics, Electronics Today International. Practical Computing , Electronic and Music Maker and others. Manufacture and sale of music and guitar effects pedals.

## **Selected Publications.**

[The use of a wearable camera, SenseCam, as a pictorial diary to improve autobiographical ...2007](#)

[SenseCam: A retrospective memory aid 2006](#)

SenseCam [Passive capture and ensuing issues for a personal lifetime store](#) Jim Gemmell, Lyndsay Williams, Ken Wood, Roger Lueder, Gordon Bell – Oct 2004  
Microsoft Research

[Location and Activity Tracking Badge SmartMoveX Feb 2002](#) Microsoft Research

Contributing author to ["Real world digital audio"](#) 2006

Practical Electronics Sequencer March 1979

Practical Electronics Waveform Digitiser Sept 1982

Practical Computing Spectrum/Analog digital interface Jan 1983

## Past Committees

[Program Committee Pervasive Computing 2005](#) Munich

## Other Skills

Embedded hardware and software design for microcontrollers , analogue sensors and handheld computers. I have designed hardware and software for Z80, 6502, 8051, 8086, Z8000, 68000, PIC, ARM. I program in Hex, Assembler, C, Fortran, Compiled BASIC. Digital audio design up to 16 bits. Interfacing to GPS and GSM modems for SMS text messages. Public speaking.

Other – engineering work including research lectures in Hong Kong, Beijing, Seattle, New York, San Francisco, Germany, Sweden, Italy, Switzerland, Holland, Ireland

**Education** 1967-1977 Manchester High School for Girls 11 O Levels (one GCSE 1990)  
2 A Levels, Physics, Chemistry

1977-1980 University of Salford, UK - BSc Biomedical Electronics 2:2 Hons

Personal: Good Health, Full UK Driving License and UK Passport. Car owner. Non Smoker. Home Owner in Cambridge.

References available on application.