# Lindsay Robert Wilson, B.Sc., Ph.D.

Born: 18th April 1988

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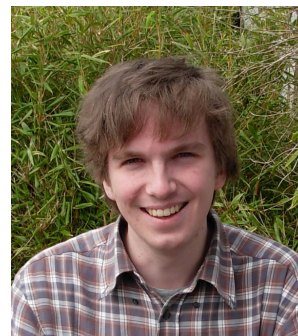
*(May 2010)*

## Education

Pre-2005: I was educated at home prior to university and sat both GSCE and A-level exams in Mathematics, Physics and Chemistry from ages 8-13, gaining an "A" grade in each.

2002-2005: University of Strathclyde. Undergraduate degree (Physics). Entered 2nd year and graduated in 2005 with 1st-class B.Sc. Honours.

2006-2010: Heriot-Watt University. Postgraduate research on luminescent solar concentrators. Graduated 2010.

## Awards/Prizes

1996: Guinness Book of Records world record holder for youngest person to achieve an "A" grade in GCSE Mathematics at age 8.

2002-2003: 2nd-year Dean's List, University of Strathclyde. Awarded to students who have achieved a meritorious standard in their 2nd year.

2002-2003: A.S. McLaren Prize in Physics, University of Strathclyde. Awarded to the student who achieves the best performance in the second-year Physics laboratory.

2003-2004: Runner-up prize in laboratory work.

2003-2004: 3rd-year Dean's List, University of Strathclyde. Awarded to students who have achieved a meritorious standard in their 3rd year.

2005: Astronomical Society of Glasgow Prize, University of Strathclyde. Awarded to the most distinguished student in the final examinations for a B.Sc. Honours or M.Sci. degree in Mathematics or Physics.

2007: 1st-year Postgraduate Research Prize, Heriot-Watt University. Award based on poster presentation and abstract.

2008: 2nd-year Postgraduate Research Prize, Heriot-Watt University.

## Publications

*Journal*

B.C. Rowan, L.R. Wilson, and B.S. Richards. Advanced material concepts for luminescent solar concentrators. *IEEE J. Selected Topics in Quantum Electronics*, 14(5):1312-1322, 2008.

L.R. Wilson and B.S. Richards. Measurement method for photoluminescent quantum yields of fluorescent organic dyes in polymethyl methacrylate for luminescent solar concentrators. *Appl. Opt.*, 48(2):212-220, 2009.

L.R. Wilson, B.C. Rowan, N. Robertson, O. Moudam, A.C. Jones, and B.S. Richards. Characterization and reduction of reabsorption losses in luminescent solar concentrators. *Appl. Opt.*, 49(9):1651-1661, 2010.

*Conference*

L.R. Wilson, B.S. Richards, A.C. Jones, P.R. Richardson, A. Cole, I. Fraser, N. Kirtley, and L. Minto. Quantum yield measurements of high-efficiency dyes for luminescent solar concentrators. In *Proceedings of PVSAT-4*, Bath, UK, pages 101-104, 2008.

E. Klampaftis, B.S. Richards, L.R. Wilson, K.R. McIntosh, A. Cole, and K. Heasman. Improving spectral response of mc-Si cells via luminescent down-shifting of the incident spectrum. In *Proceedings of PVSAT-4*, Bath, UK, pages 59-62, 2008.

L.R. Wilson and B.S. Richards. High-efficiency dyes for luminescent solar concentrators - photostability, modelling and results. In *Proceedings of the 22nd European Photovoltaic Solar Energy Conference and Exhibition*, Valencia, Spain, pages 510-512, 2008.

B.C. Rowan, L.R. Wilson, and B.S. Richards. Visible and near-infrared emitting Lanthanide complexes for luminescent solar concentrators. In *Proceedings of the 23rd European Photovoltaic Solar Energy Conference and Exhibition*, Hamburg, Germany, pages 346-349, 2009.

## Recent and current work

I play an active part in my parents' jewellery design and retail business. I also design and manage the website for the business.

In Sept. 2010 I designed and built a prototype double-layer luminescent solar concentrator module for the Technical University of Eindhoven.

Since late 2010 I have been a technical copyeditor for Imperial College Press. I have so far (May 2011) completed one project for them – a 250-page book on Log-optimal Portfolios, *"Machine Learning for Financial Engineering"*, L. Gyorfi, Gy. Ottucsak and H. Walk.

## Skills

*Ph.D. research*

The main area of research in my Ph.D. was the measurement of the optical properties of a wide range of different fluorophores, including organic dyes and rare-earth complexes. I have had experience of measuring the absorption, emission, quantum yield and re-absorption losses of fluorophores using spectrophotmeters and spectrofluorometers, including the Edinburgh Instruments FS920. A large fraction of samples were in PMMA hosts and I have experience of doping fluorophores into optical-quality flat sheets of PMMA. In addition to optical measurements, I also performed measurements of the solar-to-electric efficiency of luminescent solar concentrators based on the fluorophores. This required the use of solar simulators (both steady-state and flash) and I-V sourcemeters.

*Engineering*

From an early age I have been keenly interested in the design and construction of scientific equipment and devices. I have a small workshop with a range of machine tools which has been invaluable for both my Ph.D. research and hobby work. In addition to basic machine tools such as a lathe, drill and grinder, I have several computer-controlled machines – two small 4-axis milling machines, a 40W $CO_2$ laser cutter/engraver and a flatbed router. I can also do TIG, MIG and arc/stick welding to some degree. Some projects I have completed include a $CO_2$ laser, steam engine, Stirling engine and a diffusion-pumped vacuum coating system. In January 2011, I completed the construction of a dual-spindle glass lathe, allowing for the production of small electronic vacuum tubes.

*Computer*

I use a combination of McNeel Rhinoceros 3D and Adobe Illustrator for CAD design and FlashCut CNC or RhinoCAM for toolpath/G-code generation. I use Adobe Fireworks and Photoshop for image editing and I also have experience of Dreamweaver for HTML editing (I currently manage my parents' jewellery website). For display and analysis of data, I have used Microcal Origin extensively. I have some experience of LaTeX document editing (this was learned for writing my Ph.D. thesis).

Programming – I prefer BASIC-based languages and mainly use Visual Basic 6.0. I have written in console-based C++, most notably in my Ph.D. where I wrote a Monte-Carlo raytracing program to simulate trapped fluorescence inside a luminescent concentrator. I have used SDL graphics with console-based C++. I have some knowledge of PHP web programming.

*Electronics*

I have never formally studied electronics, but have a keen interest in the area. My main area of interest is power electronics (DC converters, motor drives, inverters), in particular resonant systems for induction heating. I have experience in DC converter design & resonant inverters and have built several induction heating systems over the past five years which involved the use of PLL oscillators. As part of this, I developed several high-speed MOSFET gate-drive circuits.

I use Cadsoft EAGLE for PCB design/layout. I am able to produce PCBs (artwork preparation, UV exposure, etching, CNC drilling, tin plating) and I have succeeded in building double-sided surface-mount PCBs with track pitches <0.5mm. I can also do basic PIC programming.


**Other interests and hobbies**

Generally, I enjoy building things, either arts/crafts (for example, jewellery and sculpture) or mechanical and electronic devices. I love knowing the internal operation of machines/equipment and I often collect discarded or antique equipment and dismantle them to learn their operation.

Sports - I enjoy both running & cycling and go regularly to either the Trossachs or Loch Lomond.

Music – I play several instruments (guitar, piano, banjo) but primarily the guitar and I enjoy mostly folk & classical music.