Colm

Reader in Nanoscale Engineering, Department of Engineering, the University of Cambridge
Deputy Head of Department (Teaching)

Dr. Colm is a Reader in Nanoscale Engineering at the University of Cambridge. He obtained his degree and PhD in Physics from Trinity College Dublin during which time he designed and constructed the first scanning near-field optical microscope (SNOM) in the country, and made significant advances in our understanding of the mechanisms behind image formation in such systems. He then spent a year in Konstanz, Germany working in collaboration with ZEISS on the construction of a commercial microscope system.

In 1997 he moved to the University of Cambridge, initially as a research associate in the Nanoscale Science group, and since 2000, as a faculty member. During this time he has led a research group consisting of around 10 members, been head of the Nanoscience centre for two years (2009-2010), published over 100 papers, given over 100 talks, written a successful textbook on Nanoelectronics, and developed several scanning-probe microscopes and new measurement techniques. He has also written a popular science book on Nanotechnology "Size really does matter - the nanotechnology revolution" that appeared in press in March 2019.

RESEARCH INTERESTS
Nano-ferroelectrics, Scanning Probe Microscopy, Electronic Structure of Nanomaterials

ACADEMIC BACKGROUND
Trinity College Dublin
PhD in Physics, 1996
Primary degree in Physics, 1992

ACADEMIC APPOINTMENT
University of Cambridge
Reader, Nanoscale Engineering, October 2010 – Present
Lecturer, Nanoscale Engineering, July 2000 – October 2010
Founder and head of the Scanning Probe Microscopy and Nano electronics group at the Nanoscience Centre, 2009 - 2010
Postdoc jointly between Engineering & Chemistry, Aug 1997

COURSES TAUGHT
1A Linear Analysis of Circuits & Devices
4B5 IIB Nanotechnology

SELECTED PUBLICATIONS
Books
C. Durkan, "Nanotechnology - what's all the fuss about?" In preparation, due for completion Autumn 2014.

C. Durkan, "Current at the nanoscale - an introduction to nanoelectronics" published in January

2008, Imperial College Press. Second Edition in print, available for purchase since November 2013.

C. Durkan, "Electricity without the tears", Kindle e-book on secondary school electricity, as an introduction to basic electrical principles, aimed at GCSE & A-level.

Book Chapters

Y. Ivry, C. Durkan, D. P. Chu & J. F. Scott, "How do Ferroic domains scale down? The crystal story". In press, Springer (2014)

Journal Articles

C. Durkan, J. A. Garcia-Melendrez & L. Ding, "On the manipulation of ferroelectric and ferroelastic domains at the nanoscale", Journal of electronic materials, In Press (2015)

C. Durkan, N. Wang "Nanometre-scale investigations by atomic force microscopy into the effect of different treatments on the surface structure of hair ", International Journal of Cosmetic Science, 36, 598 (2014)

C. Durkan & Q. Zhang, "Towards reproducible, scalable molecular electronic devices", Applied Physics Letters, 105, 083504 (2014)

Y. Ivry, N. Wang & C. Durkan, "High-frequency programmable acoustic wave device realized through ferroelectric domain engineering", Applied Physics Letters 104 133505 (2014)

Y. Ivry, C. Durkan, D. Chu & J. F. Scott, "Nano-domain pinning in ferroelastic-ferroelectrics by extended structural defects", Advanced Functional Materials (2014)

L. Ding & C. Durkan, "Controllable nanodomain defects in ferroeelctric/ferroelastic biferroic thin films", Proceedings of IEEE-Nano conference, 110-113 (2013)

A. Garcia-Melendrez & C. Durkan, "Reversible nanoscale switching of polytwin orientation in a ferroelectric thin film induced by a local electric field" Appl. Phys. Lett, 103 092904 (2013)

C. Rawlings & C. Durkan, "The Inverse Problem in Magnetic Force Microscopy-inferring sample magnetization from MFM images", Nanotechnology, 24 305705 (2013) Cover image & featured article in print magazine, 2 August 2013

C. J. Forman, N. Wang, Z-Y. Yang, C. Durkan & P. D. Barker, "Probing the location of displayed cytochrome b562 on Amyloid by Scanning Tunneling Microscopy" Nanotechnology 24 175102 (2013)

Y. Ivry, J. F. Scott, E. K. H. Salje & C. Durkan, "Nucleation, growth & control of ferroelectric-ferroelastic domains in thin polycrystalline films", Physical Review B, 86, 205428 (2012)

C. Rawlings & C. Durkan, "Calibration of cantilevers of arbitrary shape using the phase signal in an atomic force microscope", Nanotechnology, 23, 485708 (2012)