

Dr Dragan Indjin

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Research Experience

I am a member of the Institute of Microwaves and Photonics (IMP), which has an international reputation in the field of microwave engineering, terahertz technology, semiconductor and quantum device simulation, and is a part of the School of Electronic and Electrical Engineering (EEE), University of Leeds. The School of EEE in Leeds achieved outstanding results in the UK's 2008 Research Assessment Exercise (RAE2008) being rated as Number 1 between all Schools of Electrical Engineering in UK with an outstanding grade-point average and 80% of activity rated as internationally excellent or world leading.

I have been working on the theory and design of semiconductor heterostructures for more than 15 years. I had been an Assistant and Associate Professor at the University of Belgrade before I joined University of Leeds in 2001 to work on the EPSRC funded project on mid-infrared and THz quantum-cascade lasers design (GR/R04485), the final report for which was assessed as 'Outstanding/Internationally leading'. One of my most important achievements was setting up the GaAs-and InP-based nanostructure modelling/optimised design strategy. Its computer code implementation has been proved to the original mid-infrared and THz quantum-cascade designs and is now permanently improving and being widely used by young post-docs and PhD students in IMP. My work has contributed to the international recognition of the Quantum Electronics group as a world-leading group in semiconductor quantum devices modelling and design. In 2005 I have been awarded a prestigious RCUK Academic Fellowship to work on the new generation of semiconductor components for photonic applications and nanoscale structures/devices for spintronic and quantum information processing. In 2010 I have been promoted to Reader¹ in Optoelectronics and Nanoscale Electronics at University of Leeds.

I have published more than 100 international journal papers, participated in numerous international/national conferences and delivered several invited talks and research seminars. My work has been instrumental in developing substantive international collaborations with world leading experimental and theoretical group of researchers in Bari, Wurzburg, Berlin, Paris, Belgrade, Manchester and Sheffield which have led to a number of journal publications and joint research grant applications. My track record in attracting scholarships and supervising high quality research students is outstanding; they have regularly achieved excellent research performances being awarded the most prestigious national and international research student awards/fellowships. I have been very proactive in initiating and authoring/co-authoring grant proposals many of which have already attracted funding for research from the EPSRC, NATO, British Council, US Army, Naval Research Global. As a principal investigator, Co-investigator or recogniser researcher I have had an opportunity to lead/participate in grant management, to supervise postdoctoral staff and visiting researchers and prepare interim and final reports. I have been included in Scholl of EEE successful RAE2008 submission.

Based on the Web of Science publication data base, until end of 2009 I have published 105 international journal papers. Most of them have been published in highly ranked peer reviewed journals. Among them 83 journal papers have been published since 2001 when I joined University of Leeds with 53 journal papers in the last 5 years. My work has also contributed to more than 70 conference presentations, among them 10 as invited talks. There has been a lot of discussion amongst the research community as well as between academics how to measure researcher's impact, the quality of particular journal and published papers themselves. The officially accepted international criteria are based on researcher's *h-index*², Journal Citation Report Impact Factor of the journal and bibliometrics information such as a number of the citations of a particular paper and an average citation per item. Currently, my *h-index* is **14** with average *citation per item* 6.04. The calculation includes the items within the Web of Science alone - books and articles in non-covered journals and conference proceedings are not included (this would improve citation for 20% at least).

¹ *Reader* is a full-time permanent academic position at top ranked UK Universities. There is 5-grades scale of academic positions in UK Universities: Lecture A, Lecture B, Senior Lecturer, Reader and Chair. Comparing it with the 3-grades permanent academic positions scale in the USA or continental Europe (Assistant Professor/Docent, Associate Professor and Full Professor), it can be recognised that Reader position belongs somewhere between Associate and Full Professor posts.

² The *h-index* was developed by J.E. Hirsch and published in *Proceedings of the National Academy of Sciences of the United States of America* 102 (46): 16569-16572 November 15, 2005. The *h-index* is based on a list of publications ranked in descending order by the Times Cited. The value of *h* is equal to the number of papers (N) in the list that have N or more citations. For example, a researcher with *h*= 10 has 10 papers that have 10 or more citations. This metric is useful because it discounts the disproportionate weight of highly cited papers or papers that have not yet been cited, and is nowadays an important factor in assessing international research grant applications.

Grant application experience and track record – development of a portfolio of research funding

Since 2001 I have been actively involved in the process of research grant applications leading to sustainable research activity in the IMP at the School of EEE.

1. *Computational methods for the design optimisation of quantum optoelectronic devices* Royal Society, UK, – (Value: £12,000). **The grant was awarded** in May 2002,

2. *Developing new optimization techniques for design and realization of mid- and far-infrared quantum cascade lasers*. (GR/S45362/01, Value £22,999) **The grant was awarded**

3. *The modelling and optimal design of far-infrared quantum cascade lasers for a new generation of Terahertz sources*, (EP/C002881/1, Value : £216,765) **The grant was awarded** in 2005 with total duration of three years,

4. *Nano- & Micro-Engineering, Fabrication, And Characterisation Of Photonic, Electronic, & Electro-Optic Materials*, (GR/T19889/01, Value: £444,247) **The grant was awarded** in 2005 for 4-year period

5. *'Multiscale materials and molecular machines'*, RCUK/EP SRC Academic Fellowship (Value £125,000) – Awarded in April 2005.

6. *Quantum dot quantum computing in cavity QED*, White Rose Leeds-York-Sheffield Nanoscale quantum information processing network. (Value: £150,000) Awarded in 2007 (October 2007 –January 2011).

7. *Theoretical investigations and experimental feasibility study of GaAs/InAs quantum dot- and p-type GaAs/AlGaAs quantum cascade lasers*, (British-German Academic Research Programme funded jointly by British Council (UK) and German Academic Exchange Service DAAD (Germany) –Value: £2,500.)

8. *Semiconductor components for spintronic and quantum computing applications*, ~ ORSAS PhD studentship application +University of Leeds Tetley Lupton Scholarship + School of EEE student maintenance grant, (Value: ~£60,000) The applications was awarded in March 2007 and post started in October 2007.

9. *Support for the Ninth International Conference on Intersubband Transitions in Quantum Wells*, ~ (EP/E057810/1 Value: £17,078) EPSRC grant, The grant was awarded in June 2007.

10. *Ninth international conference ITQW07*- support research grant, Office of Naval Research Global, (grant N00014-07-1-1102, Value: US\$5,000, September 2007. **Research grant has been awarded** as a support in organising ITQW07 Conference as well as post-conference publicity.

11. *ARL-ERO, sponsorship research grant*, U.S. Army ITC Atlantic, (Value US\$3,000) (W911NF-07-1-0579 USITCA grant) - **The grant was awarded** in October 2007.

12. *High operating temperature intersubband lasers for chemical and security sensing*.

(Value: EURO 18,400) ,NATO Collaborative Linkage Grant with University of Belgrade and University of Bari, Italy **The grant was awarded** in June 2008 with duration of two years.

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Brief Curriculum Vitae

SURNAME : Indjin

FIRST NAME(S) : Dragan

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Date and place of birth: 11 January 1963, Zemun, Serbia **Citizenship/Nationality:** British/Serbian

Education (*degrees, dates, universities*)

PhD Electrical Engineering –Engineering Physics, 26. 10. 1996, Faculty of Electrical Engineering, University of Belgrade,

MSc Electrical Engineering – Physical Electronics, 19. 3. 1993, Faculty of Electrical Engineering, University of Belgrade,

BSc Electrical Engineering , 18. 5. 1988, Faculty of Electrical Engineering, University of Belgrade,

Career/Employment (*employers, positions and dates*)

2010 - Reader/Associate Professor in Optoelectronic and Nanscale Electronics, School of Electronic and Electrical Engineering, University of Leeds, UK

2005 - 2009, RCUK Academic Fellow, School of Electronic and Electrical Engineering, University of Leeds , UK

2003 – 2005, Senior Research Fellow, School of Electronic and Electrical Engineering, University of Leeds, UK

2001 – 2003, Research Fellow, School of Electronic and Electrical Engineering, University of Leeds, UK

2002, Associate Professor, Faculty of Electrical Engineering, University of Belgrade, Serbia

1997-2002, Assistant Professor, Faculty of Electrical Engineering, University of Belgrade, Serbia

1993-1996, Junior Lecturer, Faculty of Electrical Engineering, University of Belgrade, Serbia

1989 – 1993 Teaching and Research Assistant, Faculty of Electrical Engineering, University of Belgrade, Serbia

Specialization

(i) main field

The electronic structure and carrier dynamics in intersubband lasers and photo-detectors. Design and optimization of quantum-cascade lasers for mid- and far-infrared frequency range. Thermal modeling of QCLs.

(ii) other fields:

Semicondutor quantum dots. Quantum dot lasers. Intersubband optical nonlinearities. Semiconductor spintronic devices.

(iii) current research interest

- Design of THz quantum cascade lasers and its applications
- The electronic structure and scattering transport calculation in QCLs and in QCLs in an external magnetic field, with all relevant scattering mechanism included; development of a fully 'bottom up' physical model for calculation of non-equilibrium electron thermalisation in QCLs.
- development of a thermal model of 2D heat diffusion in QCLs to be used in conjunction with self-consistent electron transport model to simulate the temperature profile in both pulsed and cw operation.
- analysis of influence of injector doping density on dynamic working range of QCLs

Honours, Awards, Fellowships, Membership of Professional Societies

- 2010 Readership, University of Leeds, UK

- 2005, Research Councils UK Academic Fellowship

-Member of IoP

-Regular reviewer of Applied Physics Letters, Journal of Applied Physics, Physical Review Letters, Physical Review B, Journal of Physics Condensed Matter, Journal of Physics D, Semiconductor Science and Technology, Electronic Letters