Dr Deepak Venkateshvaran

Optoelectronics Group, Cavendish Laboratory
University of Cambridge
JJ Thomson Avenue, Cambridge, CB3 0HE
Phone: +44 7505 992242, E-mail: dv246@cam.ac.uk

Profile

Dr Deepak Venkateshvaran is a University Research Fellow of the Royal Society, the UK's National Academy of Sciences. He is based at the Cavendish Laboratory of the University of Cambridge and leads a pan-European research group working on novel energy harvesting technologies and nanoscale measurement techniques. Dr Venkateshvaran holds a joint appointment at Selwyn College Cambridge, where he is a Fellow, College Lecturer and Director of Studies in Physics. He has published in high profile scientific journals such as Nature, Nature Communications and Nature Electronics, and has delivered over 25 invited and contributed talks at prominent international scientific conferences and at leading research institutes in Europe, Japan, and North America. Dr Venkateshvaran holds a PhD degree in Physics from the University of Cambridge and a Master degree from the Indian Institute of Technology Madras. In 2024, he will begin a secondment on Science Policy at the UK Government.

Employment

01/2021 –	**Principal Investigator** (**Royal Society University Research Fellow)** Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom
10/2018 –	**College Lecturer in Physics** Selwyn College, Cambridge, United Kingdom
10/2017 –	**Director of Studies in Physics** Selwyn College, Cambridge, United Kingdom
10/2015 – 09/2018	**Isaac Newton Trust Teaching Fellow** Fitzwilliam College, Cambridge, United Kingdom
07/2014 – 12/2020	**Research Associate (Funded through a European Research Council Synergy Grant 2014-2020)** Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom
10/2008 – 10/2010	**Staff Scientist** (Wissenschaftlicher Mitarbeiter) Walther-Meissner-Institute, Bavarian Academy of Sciences and Humanities, Garching, Germany

Education

10/2010 – 05/2014	**PhD in Physics**, Cavendish Laboratory, University of Cambridge [fully funded through a scholarship] Cambridge, United Kingdom
08/2006 – 08/2008	**Master of Technology in Solid State Technology**, Indian Institute of Technology (IIT) Madras, India CGPA: 9.17/10.00; graduated top of class
06/2004 – 06/2006	**Master of Science in Physics,** Sri Sathya Sai Institute of Higher Learning Prasanthi Nilayam, India CGPA: 5.00/5.00; graduated top of class

Top 5 Peer-Reviewed Publications + Publishing Summary Statement

1. Illia Dobryden, V. V. Korolkov… & Deepak Venkateshvaran*****, **Nature Communications 13**, 3076 (2022)
2. Shu-Jen Wang, Deepak Venkateshvaran***** *et al.*, **Nature Electronics 2**, 98-107 (2019)
3. Deepak Venkateshvaran *et al.*, **Nature 515**, 384–388 (2014)
4. Deepak Venkateshvaran *et al.*, **APL Materials 2**, 032102 (2014)
5. Deepak Venkateshvaran *et al.*, **Physical Review B 79**, 134405 (2009)

*****Corresponding author

Over 30 impactful publications with over 2000 citations including 5 papers in Nature Publishing Group Journals. Reviewer for manuscripts submitted to AAAS, Nature Publishing Group, AIP, Elsevier, MDPI and RSC.

Grants for Academic Research

1.	Royal Society University Research Fellowship (URF) 2021-2026:	£ 722,621
2.	Royal Society Enhancement Expenses 2023, 2024 and 2025:	£ 297,758
3.	Wiener-Anspach Foundation Research Grant 2024/2025:	€ 30,000
4.	Royal Society Enhancement Expenses 2021/2022 and 2022/2023:	£ 243,828
5.	Royal Society Additional Research Expenses 2021, 2022, 2023:	£ 17,000
6.	Park Systems Special Subsidy on Equipment in 2021:	£ 47,000
7.	Royal Society Research Grant 2021:	£ 24,948
8.	Selwyn College Academic Grants:	£ 5000+
9.	Isaac Newton Trust Teaching Fellowship:	£ 15,000
10.	Microsoft grant to attend the Lindau Nobel Laureates Meeting 2012:	£ 5000
11.	Fitzwilliam College Travel Grants:	£ 1000
12.	Overseas PhD Scholarship from Cambridge Commonwealth Trusts 2010-2013:	£ 75,000+
13.	IIT-DAAD Scholarship 2007/2008:	€ 10,000
14.	IIT Madras Teaching Fellowship 2006/2007:	₹ 60,000

Major Fellowships and Awards

United Kingdom

2018 –	Fellowship, Selwyn College, Cambridge
2017 – 2018	Bye Fellowship, Selwyn College, Cambridge
2016 – 2018	Isaac Newton Trust Teaching Fellowship, Fitzwilliam College, Cambridge
2015 – 2018	Bye Fellowship, Fitzwilliam College, Cambridge
2013	Lundgren Research Award, University of Cambridge
2012	UK/India representative at the 62nd Lindau Nobel Laureate Meeting for Physics [1of 4 students from the UK]
2012	Fitzwilliam College Senior Scholarship
2010 – 2013	Cambridge International Student Scholarship [Fully funded international PhD scholarship at Cambridge Uni]

Germany

2008	Wilhelm und Heraeus-Stiftung Fellowship [travel grant to attend the DPG Tagungen 2008]
2007 – 2008	Deutscher Akademischer Austausch Dienst (DAAD) Fellowship

India

2008	Institute Merit Prize and Medal, Indian Institute of Technology Madras [class first in MTech degree]
2006	Council of Scientific and Industrial Research Fellowship (CSIR-UGC JRF NET) - Qualified
2006 – 2007	Indian Institute of Technology Half Time Teaching Assistantship
2006	Rank 56/4904 in all India Graduate Admission Test in Engineering (GATE) for Physics
2006	Dr. G Venkataraman Gold Medal, Sri Sathya Sai Institute of Higher Learning [class first in MSc degree]
2005	Indian Academy of Sciences Summer Research Fellowship

Talks

Delivered over 15 contributed and invited talks at major global conferences such at MRS Boston, SPIE San Diego, Spintech 5 Krakow, JPS Osaka and SpinOS Halle.

Delivered over 10 invited seminars at world class institutions such as KTH Stockholm, University of Tokyo, TU Delft, TU Munich, Durham University, Queen Mary University, and the Jozef Stefan Institute.

Teaching

I've taught parts of the undergraduate courses within the Part 1B, Part II and Part III NST Physical Sciences at Cambridge University. I've also supervised master thesis projects, doctoral projects, and postdoctoral projects within the Physics department.

From 2024, I will teach MPhil and Part III Physics courses in Cambridge on the theme of Energy Harvesting.

Management Training – Innovation and the Business of Science

02/2023 – Introduction to Management* – Imperial College Business School Executive Education
03/2023 – Leadership Effectiveness* – Imperial College Business School Executive Education
03/2023 – Royal Society Science Policy Primer* – Introduction to Government Policy and Science based Decision Making
*Course fully funded by the Royal Society

Leadership: Impact, Management, Service in Academia

Impact

1. My PhD work at the Cavendish Laboratory (2010 – 2014) spun out multiple new projects that were completed or are ongoing. Over 10 PhDs and Postdocs were hired at the Cavendish Laboratory based on the outcomes of my PhD in thermoelectrics. The intellectual property generated over 10 million pounds for research at Cambridge University.

Laboratory Startups

2. Setup a new Nanomechanics Laboratory at the University of Cambridge (2021 – 2022)
3. Setup a new Spintronics Laboratory together with scientists at Hitachi Cambridge Laboratories (2014 – 2015)

People Management

4. Trained and supervised multiple Master and PhD projects at the University of Cambridge (2014 – present)
5. Organised and lead research activity between Cambridge University, ULB Belgium, and KTH Stockholm (2021 – present)
6. Trustee, Selwyn College, Cambridge (2018 – present)
7. Organised and conducted interviews for scientific staff at the Cavendish Laboratory (2017 – present)
8. Organised regular meetings between academic partners working on a 10-million-euro ERC Synergy Grant (2014 – 2021)
9. Delivered outreach talks on organic electronics to the public of all age groups (2014 – present)

Service

10. Panel Member – Cavendish Laboratory Graduate Funding Committee that decides funding for PhD applicants (2023 –)
11. Selection Committee Member – Henslow Research Fellowship at Cambridge University (2022)
12. Selection Committee Member – Trevelyan Research Associates at Selwyn College at Cambridge University (2019)
13. Selection Committee Member – Gavin Boyle Fellowship in Cosmology and Exoplanetary Research (2019)
14. Selection Committee Member – Henslow Research Fellowship at Cambridge University (2018)
15. Selection Committee Member – Master of Advanced Study (MAST) in Physics at Cambridge University (2018 – now)
16. Referee – Welsh Government's Ser Cymru II Rising Stars Fellowship for projects worth over £1 million (2017)
17. Assessor – Undergraduate, Masters, and PhD theses at Cambridge University (2014 – now)

Neuromorphic Computing

Artificial Synapse - Patent with Hitachi Cambridge Laboratories (published in March 2021)

Antiferromagnetic memristor based synapses for neuromorphic computing – John Armitage, Deepak Venkateshvaran, Joerg Wunderlich (European Patent Application EP19199322A)

ML Certification

DeepLearning.AI TensorFlow Developer Professional Certificate on Coursera. Certificate earned in June 2020.
Using Python for Research by Harvard University on edX. Certificate earned in January 2020.
Machine Learning by Stanford University on Coursera. Certificate earned in July 2016.

Noteworthy Extracurricular Interest

Music

I have played the Indian Tabla for over 30 years and have made contributions to three studio-recorded music CDs. I've also composed scores for modern art films that premiered in the UK, performed with a Celtic Harpist, a Japanese Tsugaru Shamisen player, and a Flamenco Guitarist. I routinely deliver outreach talks that showcase the physics and the language of the Tabla to broad spectrum audiences.

Longer Publications List

Below are my top 20 peer-reviewed journal publications on the themes of thermoelectric energy harvesting, flexible electronics, spintronics, and novel nanoscale mechanics.
These are publications in which I was a major contributor.
The complete list of my publications can be found on Google Scholar.

1. **Deepak Venkateshvaran**, Wolfgang Kaiser, Andrea Boger, Matthias Althammer, M. S. Ramachandra Rao, Sebastian T. B. Goennenwein, Matthias Opel, Rudolf Gross
   Universal scaling behavior of the anomalous Hall effect in $Fe_{3-x}Zn_xO_4$
   Physical Review B 78, 092405 (2008)

2. **Deepak Venkateshvaran**, Matthias Althammer, Andrea Nielson, Stephan Gepraegs, M. S. Ramachandra Rao, Sebastian T. B. Goennenwein, Matthias Opel, Rudolf Gross
   Epitaxial $Fe_{3-x}Zn_xO_4$ thin flms: A spintronic material with tunable electrical and magnetic properties
   Physical Review B 79, 134405 (2009)

3. Auke Jisk Kronemeijer, Vincenzo Pecunia, **Deepak Venkateshvaran**, Aditya Sadhanala, John Moriarty, Monika Szumilo, Henning Sirringhaus
   Two-dimensional carrier distribution in top gate polymer field-effect transistors: Correlation between width of density of states and Urbach energy
   Advanced Materials 26, 728 (2014)

4. **Deepak Venkateshvaran**, Auke Jisk Kronemeijer, John Moriarty, David Emin, Henning Sirringhaus
   Field-effect modulated Seebeck coefficient in organic polymers using a microfabricated on-chip architecture
   APL Materials 2, 032102 (2014)

5. **Deepak Venkateshvaran**, Mark Nikolka, Aditya Sadhanala, Vincent Lemaur, Mateusz Zelazny, Michal Kepa, Michael Hurhangee, Auke Jisk Kronemeijer, Vincenzo Pecunia, Iyad Nasrallah, Igor Romanov, Katharina Broch, Ian McCulloch, David Emin, Yoann Olivier, Jerome Cornil, David Beljonne, Henning Sirringhaus
   Approaching disorder-free transport in high mobility conjugated polymers
   Nature 515, 384 (2014)

6. Mathias Gruber, Seok-Heon Jung, Sam Schott, **Deepak Venkateshvaran**, Auke Jisk Kronemeijer, Jens Wenzel Andreasen, Christopher R McNeill, Wallace W. H. Wong, Munazza Shahid, Martin Heeney, Jin-Kyun Lee, Henning Sirringhaus
   Enabling high-mobility, ambipolar charge-transport in a DPP-Benzotriazole copolymer by side-chain engineering
   Chemical Science 6, 6949 (2015)

7. C. N. Warwick, **Deepak Venkateshvaran**, Henning Sirringhaus
   Accurate on-chip measurement of the Seebeck coefficient of high mobility small molecule organic semiconductors
   APL Materials 3, 096104 (2015)

8. Gueorgui O. Nikiforov, **Deepak Venkateshvaran**, Sebastian Mooser, Aurelie Meneau, Thomas Strobel, Auke Kronemeijer, Lang Jiang, Mi Jung Lee, Henning Sirringhaus
   Current-induced Joule heating and electrical field effects in low temperature measurements on TIPS pentacene thin film transistors
   Advanced Electronic Materials 2, 1600163 (2016)

9. Riccardo Di Pietro, Iyad Nasrallah, Joshua Carpenter, Eliot Gann, Lisa Sophie Kölln, Lars Thomsen, **Deepak Venkateshvaran**, Kathryn O'Hara, Aditya Sadhanala, Michael Chabinyc, Christopher R. McNeill, Antonio Facchetti, Harald Ade, Henning Sirringhaus, Dieter Neher
   Coulomb enhanced charge transport in semicrystalline polymer semiconductors
   Advanced Functional Materials 26, 8011 (2016)

10. Katharina Broch*†, **Deepak Venkateshvaran***†, Vincent Lemaur, Yoann Olivier, David Beljonne, Mateusz Zelazny, Iyad Nasrallah, David J Harkin, Martin Statz, Riccardo Di Pietro, Auke Jisk Kronemeijer, Henning Sirringhaus
    Measurements of Ambipolar Seebeck Coefficients in High-Mobility Diketopyrrolopyrrole Donor–Acceptor Copolymers
    Advanced Electronic Materials 3, 1700225 (2017)
    *joint first authors, †corresponding authors

11. M Statz, **D Venkateshvaran**, X Jiao, S Schott, CR McNeill, D Emin, H Sirringhaus, R Di Pietro
    On the manifestation of electron-electron interactions in the thermoelectric response of semicrystalline conjugated polymers with low energetic disorder
    Communications Physics 1, 16 (2018)

12. E. Pfitzner, X. Hu, H. W. Schumacher, A. Hoehl, **D. Venkateshvaran**, M. Cubukcu, J.-W. Liao, S. Auffret, J. Heberle, J. Wunderlich, B. Kästner
    Near-field magneto-caloritronic nanoscopy on ferromagnetic nanostructures
    AIP Advances 8, 125329 (2018)

13. Keehoon Kang, Sam Schott, **Deepak Venkateshvaran**, Katharina Broch, Guillaume Schweicher, David Harkin, Cameron Jellett, Christian Nielsen, Iain McCulloch, Henning Sirringhaus
    Investigation of the Thermoelectric Response in Conducting Polymers Doped by Solid-State Diffusion
    Materials Today Physics 8, 112 (2019)

14. Shu-Jen Wang*, **Deepak Venkateshvaran***†, M. R. Mahani, Uday Chopra, Erik R. McNellis, Riccardo Di Pietro, Sam Schott, Angela Wittmann, Guillaume Schweicher, Murat Cubukcu, Keehoon Kang, Remington Carey, Thomas J. Wagner, Janis N. M. Siebrecht, Daniel P. G. H. Wong, Ian E. Jacobs, Razan O. Aboljadayel, Adrian Ionescu, Sergei A. Egorov, Sebasitan Mueller, Olga Zadvorna, Piotr Skalski, Cameron Jellett, Mark Little, Adam Marks, Iain McCulloch, Joerg Wunderlich, Jairo Sinova, Henning Sirringhaus†
    Long spin diffusion lengths in doped conjugated polymers due to enhanced exchange coupling
    Nature Electronics 2, 98 (2019)
    *joint first authors, †corresponding authors

15. Mark Nikolka, Katharina Broch, John Armitage, David Hanifi, Peer J. Nowack, **Deepak Venkateshvaran**, Aditya Sadhanala, Jan Saska, Mark Mascal, SeokHeon Jung, Jin-Kyun Lee, Iain McCulloch, Alberto Salleo, Henning Sirringhaus
    High-mobility, trap-free space charge limited currents in low-disorder conjugated polymers enabled by small molecular additives
    Nature Communications 10, 2122 (2019)

16. Guillaume Schweicher, Michael T. Ruggiero, Gabriele D'Avino, David J. Harkin, Katharina Broch, **Deepak Venkateshvaran**, Guoming Liu, Audrey Richard, Christian Ruzié, Jeff Armstrong, Alan R. Kennedy, Kenneth Shankland, Kazuo Takimiya, Yves H. Geerts, J. Axel Zeitler, Simone Fratini, Henning Sirringhaus
    Accurate, mode-resolved mapping of electron-phonon coupling for the rational design of high mobility molecular semiconductors
    Advanced Materials 31, 1902407 (2019)

17. Georg Ulrich, Emanuel Pfitzner, Arne Hoehl, Jung-Wei Liao, Olga Zadvorna, Guillaume Schweicher, Henning Sirringhaus, Joachim Heberle, Bernd Kästner, Jörg Wunderlich, **Deepak Venkateshvaran**
    Thermoelectric nanospectroscopy for the imaging of molecular fingerprints
    Nanophotonics 9(14), 4347 (2020)

18. Piotr Skalski, Olga Zadvorna, **Deepak Venkateshvaran**, Henning Sirringhaus
    Distinguishing spin pumping from spin rectification in lateral spin pumping device architectures based on doped organic semiconductors
    Physical Review Materials 6, 024601 (2022)

19. Vishal Panchal, Illia Dobryden, Ude D. Hangen, Dimitrios Simatos, Leszek J. Spalek, Ian E. Jacobs, Guillaume Schweicher, Per M. Claesson, **Deepak Venkateshvaran**†
    Mechanical Properties of Organic Electronic Polymers on the Nanoscale
    Advanced Electronic Materials 8, 2101019 (2022)
    †corresponding author

20. Illia Dobryden, Vladimir V. Korolkov, Vincent Lemaur, Matthew Waldrip, Hio-Ieng Un, Dimitrios Simatos, Leszek J. Spalek, Oana D. Jurchescu, Yoann Olivier, Per M. Claesson, **Deepak Venkateshvaran**†
    Dynamic self-stabilization in the electronic and nanomechanical properties of an organic polymer semiconductor
    Nature Communications 13, 3076 (2022)
    †corresponding author