

Professor Punniamoorthy Ravirajan

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<https://www.mendeley.com/profiles/punniamoorthy-ravirajan/>,
<http://www.researcherid.com/rid/B-5847-2008>,
<http://scholar.google.com/citations?hl=en&user=l1wPmm8AAAAJ>



Educational Qualifications

- **BSc Hons (Physics)**

1991-1994, Special Degree in Physics, University Jaffna, Sri Lanka.

- **MSc in Material Physics**

1997-1999, MSc in Material Physics, University of Peradeniya, Sri Lanka.

- **DIC, PhD in Physics**

2001-2004, Imperial College London, University of London, UK.

Title of the thesis: Fabrication and Characterisation of **Hybrid Metal oxide / Polymer Solar Cells**

Supervisors: Prof. Jenny Nelson & Prof. Donal D.C. Bradley.

Awards, Scholarships & Fellowship

- **National Awards:**

- (i) **CVCD Excellence Award for the most Outstanding Young Researcher** in Physical Sciences for the Year 2006 by the Committee of Vice Chancellors and Directors (CVCD), Sri Lanka.
- (ii) **Young Scientist Award for the Year 2008** by SCOPUS, Elsevier Publisher, The Netherlands and National Science Foundation, Sri Lanka. (Awarded to four talented scientists who attain a high level of excellence in research work in the any four fields from Biological Sciences, Chemistry, Engineering, Medicine, Physics, and Mathematics).
- (iii) **Presidential Award for Excellence in Research** by the President of the Democratic Socialist Republic of Sri Lanka. Years of Award – **2004, 2006, 2007, 2008 & 2017.**

- **General Commonwealth Scholarship (Open)**, Imperial College London, 2001-2004.
- **Imperial College Fellowship – 2006 for three months collaborative research work at Imperial College London**
- **Royal Society Visiting Fellowship – 2008 for three months collaborative research work at Imperial College London**
- **Commonwealth Fellowship – 2014 for three months collaborative research work at Imperial College London**

Academic experience

- October 2022 – to-date – **Chair and Senior Professor of Physics**, University of Jaffna.
- October 2017 – October 2022, **Senior Professor in Physics**, University of Jaffna.
- October 2009 – October 2017, **Professor in Physics**, University of Jaffna.
- July 2008 - September 2008, **Visiting Academic Fellow**, Dept. of Physics, Imperial College London.
- November 2008 - October 2009, **Associate Professor in Physics**, University of Jaffna.
- May 2006 – July 2006, **Visiting Academic Fellow**, Dept. of Physics, Imperial College London
- March 2005- November 2008, **Senior Lecturer in Physics**, University of Jaffna.
- October 2004 - March 2005, **Research Associates**, Dept. of Physics, Imperial College London.
- December 1996- March 2005, **Lecturer in Physics**, University of Jaffna.
- December 1994- October 1995, **Assistant Lecturer in Physics**, University of Jaffna.

Research Grants

Won grants from National Funding agencies for purchasing research equipment and recruiting Research Assistance under the following research projects. *Six projects were successfully completed.*

Title of the Project	Investigator(s)	Period From - To	Funding Agency	Amount LKR (mn)
Optoelectronic properties of hybrid Metal oxide / Polymer Nanocomposite (Served as PI since May 2005)	Dr.L.Jeyanathan(PI) Dr.S.Sivaraya Dr.P.Ravirajan	2000-2004 2000-2005 2005-2008	NRC	11.0
Fabrication and characterization of organic/metal oxides Nanostructured PV devices	Prof.P.Ravirajan(PI)	2006 - 2009	NRC	8.4
Characterization of Nanostructured polymer / Fullerene solar cells	Prof.P.Ravirajan(PI)	2007 - 2011	NSF	1.9
Improving the performance of Hybrid TiO ₂ / Polymer solar cell using interface modifiers	Prof.P.Ravirajan(PI)	2011–2015	NRC	8.0
Gel-Polymer Electrolytes for Sodium Batteries	Prof.P.Ravirajan(PI) Dr.K.Vignarooban Mr.S.Senthuran	2015-2019	NRC	5.0
Thin film Solar Cells towards manufacturing of Proto type Solar Panels	Prof. M.A.K.L Dissanayake (NIFS) Prof. P. Ravirajan Prof. S. de Silva (UoK) Dr. B. Dissanayake (UoP)	2017-2023	Ministry of Science, Technology and Research	240

Won grants from International Funding agencies for purchasing research equipment and recruiting Research Assistance under the following research projects.

Title of the Project	Deputy Director / Coordinators	Period	Funding Agency	Amount LKR (mn)
Low-cost solar cells based on Nanocrystalline titanium dioxide and vegetable dyes	Prof. P. Ravirajan (PI)	2006 -2009	International Foundation for Science (IFS), Sweden	2
'Higher Education and Research collaboration on Nanomaterials for Clean Energy Technologies' – HRNCET 1.0	Prof. Dhayalan Velauthapillai* Prof. P. Ravirajan	2017-2021	Norwegian Centre for International Cooperation in Education	97 [#]
'Higher Education and Research collaboration on Nanomaterials for Clean Energy Technologies' – HRNCET 2.0	Prof. Dhayalan Velauthapillai* Prof. P. Ravirajan	2022-2027	Norwegian Agency for Inter. Cooperation and Quality Enhancement in Higher Education	200 [#]
'Capacity Building and Establishment of a Research Consortium in Nanomaterials for Clean Energy Technologies' - CBERC	Prof. Dhayalan Velauthapillai* Prof. P. Ravirajan	2018 -2022	Royal Norwegian Embassy	129

[#]Bulk of the funds for collaborative research work of the MPhil/PhD students at the *Western Norway University of Applied Sciences, University of Bergen and University of Oslo, <http://project.ifn.ac.lk>

Grants for human and physical resource development at the university of Jaffna

Won three independent UGC grants of **11.5** (5.0, 4.5 & 2.0) **million rupees** for proposals submitted by me to UGC for strengthening the staff development activities at the University in 2011, 2012 and 2013. Under this grant, two lecture halls with bathrooms and other audio-visual facilities were established as well as conducted more than **fifty** Continuous Professional Development (CPD) programmes.

National Development

- Member/Research Council, National Institute of Fundamental Studies, Kandy since 24.06.2020.
- Member/National Research Council, since February 2019 – February 2020.
- National coordinator / Annual Solar Eclipse outreach program on 26.12.2019
(<http://event.jfn.ac.lk/eclipse/index.php/organizing-committee/>, <http://project.jfn.ac.lk/hrncet/index.php/outreachties/>).
- Member/Expert Panel to advice on provision of points for research dissemination in the scheme of recruitment / promotion for the post of Associate Professorship / Professorship to UGC, 2018-2019.
- Member/Institutional Review Team, University of Moratuwa, 2019.
- Chairman/Member, Programme Review Teams, Univ. of Colombo, Kelaniya, Wayamba and Peradeniya 2018-2020.
- Member/Working Committee of the National Science Foundation on Basic Sciences since June 2016 – June 2019.
- Member/Standing Committee on Staff Develop., University Grants Council, since June 2011 to August 2018.
- Member/Task force for establishing a centre for Nanoscience and Nanotechnology.
- Member/Official ministerial delegation to the European Organization for Nuclear Research (CERN), Geneva, Switzerland for promoting collaborative research and higher education in the field of particle physics in Sri Lanka.
- Chief Examiner, Advanced Level National Examination in Physics, 2006–to date.

University Development

- Dean, Faculty of science University of Jaffna, since June 2020
- Elected Council Member from the Senate, University of Jaffna, from November 2015 – June 2020.
- Director, Staff Development Centre, University of Jaffna from August 2011 to June 2018.
- Director/International Collaboration Unit, University of Jaffna, since July 2018.
- Head/Dept. of Physics, University of Jaffna, 2010 - 2016
- Chairman/University Research Committee, University of Jaffna, Sept. 2016 to Dece. 2018.
- Upgraded infrastructure facilities for SDC by winning special grants from UGC from 2011-2018
- Member/Board of Studies, University College Jaffna since September 2015.
- One of two Coordinators of international collaborative Mega-project titled Higher Education and Research collaboration on Nanomaterials for Clean Energy Technologies, since March 2017
- One of four Deputy Directors/Solar PV project funded by Ministry of Science, Technology and Research since December 2017.
- Chairman, University Research Committee, University of Jaffna, September 2016 to December 2018.
- Member of Board of Study, University College Jaffna since September 2015.
- Established two research laboratories by winning National and International grants
- Alumni Officer, University of Jaffna, Jaffna, February 2007-2009.
- Person in charge for the curriculum revision activity in the physical science study programme for the IRQUE World Bank project, Faculty of Science since July 2006.
- Member of the library team for acquiring an overall understanding of the present automated library systems available in libraries in the Southern region of Sri Lanka in 2000.

Reviewer for Journal papers/ Programme and Institutional review

Served as one of the reviewers for

- the research paper(s) appeared in Journal of Appl. Physics (American institute of Physics), Langmuir (American Chemical Society), Journal of Applied Physics D, Nanotechnology Europhysics Letter, (Institute of Physics, London), IEEE Transactions on Nanotechnology –USA
- the programme reviews at the Universities of Colombo, Kelaniya, Wayamba and Moratuwa.
- the Institutional Review, University of Moratuwa.
- the proposals submitted to commence the Bachelor of Education programmes at the regional centre of a few private institutions in Jaffna

Memberships

- Alumni member of Commonwealth Scholarship commission in the UK.
- Alumni member of Imperial College, University of London.
- Life member, Sri Lankan Association for Advancement of Science (SLASS).
- Life member, Jaffna Science Association (JSA).
- General Secretary of Jaffna Science Association from April 2009 – April 2010.
- General Secretary of the University Science Teachers Association from June, 2005 – May 2007.
- Chairman of the Section A of Jaffna Science Association since April 28, 2006.
- Acting Treasurer, University Science Teachers Association, University of Jaffna, 2000-2001.
- President, Physical Society, University of Jaffna, 1992-1993.
- Executive member, Sport Advisory board, University of Jaffna, 1993-1994.

Resource persons & Organising committee member

Served as

- (i) a resource person in workshop on research methodology for junior staff of the University in 2008.
- (ii) a resource person in the induction course for probationary staff of the University since 2007.
- (iii) a resource person in the research methodology course to research students of the University.
- (iv) a co-organiser of five day-workshop on curriculum revision in physical sciences held at Janaki Hotel, Colombo on September 3-7, 2007.
- (v) an organiser of two-day workshop on Thin Film Solar cells: Their Technology and Business potentials, University of Jaffna in collaboration with UIC, USA, April 16-17, 2014
- (vi) an organiser of training workshop on Fabrication and Characterisation of Solar cells, University of Jaffna, April 18, 2014

Extra-curricular activities

- Captain of a cricket team which won the runners-up in a tournament conducted by Sports Council, University of Jaffna in 1994.
- Vice-Captain, University Carrom team 1994, University of Jaffna.
- Won runner up award in Carrom tournament conducted by Rotary club of Jaffna district in 1993.
- Member of the Commonwealth Scholars' Cricket team in 2004, 2006 and 2008 London, UK.
- Won prizes for best orator in the school level competitions.

Supervision of MSc projects

- Mr. S. Kugan, Electrical and optical properties of TiO₂ film, University of Jaffna, 2006
- Mr. N. Muhunthan, Optical properties of natural organic materials, University of Jaffna, 2006
- Mr. V. Mathivannan, Characterisation of TiO₂ / polymer solar cells, University of Jaffna, 2006
- Mr. V. Manivarman, Thermal, optical and electrical properties of paints, University of Jaffna, 2006
- Mr. T. Jaseetharan, Interface Modification of dye sensitised solar cells, University of Peradeniya 2014

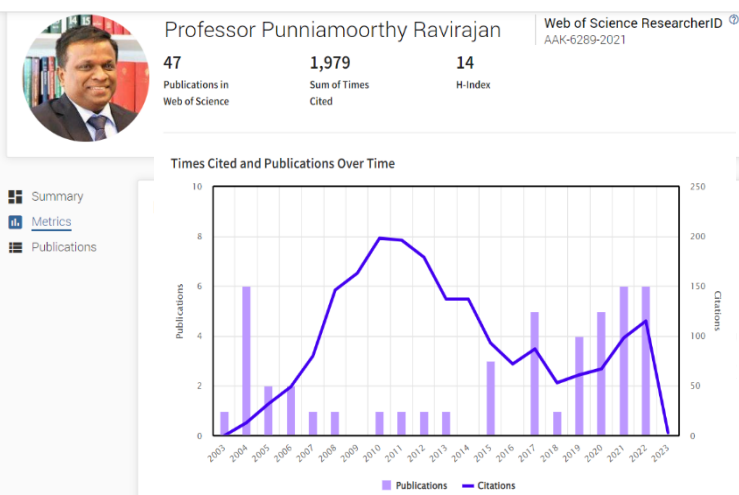
Supervision of MPhil/PhD projects

- Mr.S.Sarathchandran, Fabrication and Characterisation of Titanium based Solar Cells, MPhil in Physics, University of Jaffna, completed December 17, 2011.
- Mr.S.Loheswaran, Improving the performance of nanocrystalline titanium dioxide / polymer solar cell using interface modifier, MPhil in Physics, University of Jaffna, completed on July 31, 2014.
- Mr.K.Balashangar, Carbon nanotube for enhancing the performance of Titanium Dioxide based solar cells, MPhil in Physics, University of Jaffna, completed on November 12, 2015.
- Ms.P.Kohila, Optimization of the growth process of cadmium sulphide (CdS) semiconductor thin films for efficiency enhancement in CdS/CdTe solar cells, University of Peradeniya, MPhil in Physics, completed in 2020.
- Mr.S.Uthayaraj, Enhancement in perovskite solar cells by incorporation of Carbon nanotubes, UOJ, MPhil in Physics, completed in July 2020
- Mr. T. Rajaramanan, Ruthenium doped and Nickel/Nitrogen co-doped titanium oxide electrode for Dye Sensitized Solar Cells, MPhil in Chemistry, to be completed in June 2021.
- Mr. Asitha Udayanga, Photon Up conversion as a Tool to Harvest Infrared Radiation for Direct Illumination in the Dark and to Fabricate Dye-sensitized Solar Cells to Generate Electricity Under Illumination as well as in the dark, UOP, MPhil in Chemistry, to be completed in June 2021.
- Mr. A. Pirashanthan, Enhancing the performance of hybrid TiO₂ / Polymer and dye sensitised Solar Cells using thiophene dyes, UOJ, MPhil in physics, to be completed in August 2021.
- Ms. T. Kajana, Storage of solar energy by heterostructured Silver-Metal oxides-SnS₂ photocapacitors, UOJ, MPhil in Chemistry, to be completed in August 2021.
- Ms. S. Sivagowri, Water Splitting Transition metal chalcogenide [MS₂; M = Co, Ni, Mo, Sn and W] embedded TiO₂ nanocomposites for hydrogen production over extended solar irradiation, UOJ, MPhil in Chemistry, to be completed in August 2021
- Mr.T.Thivakasarma, optimizing the performance of CdS/CdTe Thin Film Solar Cell with selected Copper Compounds, UOJ, MPhil in Physics, to be completed in December 2021.
- Miss. W.C.P. Wanniarachchi, Modelling and simulation for mixed anion perovskite for photovoltaic application, UOJ, MPhil in Physics, to be completed in 2022.
- Mr. Abiram Gnanasampanthan, Optical and electrical engineering of perovskite Thin-film field-effect Transistor, MPhil in Physics (in progress)
- V. Aeneas Jerron Computational Modelling and Simulation Study on Degradation of Scaffolds in Bone Tissue Engineering, MPhil in Physics (in progress)

Publications

Total no. of citations:

- **1,914 - Publons (Web of Science)**
(<https://publons.com/wos-op/researcher/4363282/professor-punnamoorthy-ravirajan/>)
- **2073 - Scopus (Elsevier)**
(<https://www.scopus.com/authid/detail.uri?authorid=8161457500>)
- **2668 - Google scholar**
(<https://scholar.google.com/citationuser=1lwPmm8AAAAJ&hl=en>)



List of journal papers:

1. Thivakarasarma T, Isuru L, Buddhika S D, **Ravirajan P.**, Thermally Evaporated Copper Iodide Hole-Transporter for Stable CdS/CdTe Thin-Film Solar Cells: *Nanomaterials* 2022, 12, 2507, DOI: <https://doi.org/10.3390/nano12142507>.
2. Abiram G, Thanihaichelvan M, **Ravirajan P**, Velauthapillai D., Review on Perovskite Semiconductor Field-Effect Transistors and Their Applications. *Nanomaterials* 2022, 12, 2396.
3. Chapa Pamodani Wanniarachchi W A, Eidsvåg H, Arunasalam T, **Ravirajan P**, Velauthapillai D, Vajeeston P., Cs₂AgBiBr₆ as a mixed anion perovskites for photovoltaic applications: A first-principle study. *Materials Today: Proceedings* 2022.
4. Kajana T, Pirashanthan A, Velauthapillai D, Yuvapragasam A, Yohi S, **Ravirajan P**, Senthilnathanan M., Potential transition and post-transition metal sulfides as efficient electrodes for energy storage applications: review. *RSC Advances* 2022, 12, 18041-18062.
5. Pirashanthan A, Kajana T, Velauthapillai D, Shivatharsiny Y, Bentouba S, **Ravirajan P.**, Roles of Interfacial Modifiers in Inorganic Titania/Organic Poly(3-hexylthiophene) Heterojunction Hybrid Solar Cells. *Nanomaterials* 2022, 12.
6. Abiram G, Gourji F H, Pitchaiya S, **Ravirajan P**, Murugathas T, Velauthapillai D., Air processed Cs₂AgBiBr₆ lead-free double perovskite high-mobility thin-film field-effect transistors. *Scientific Reports* 2022, 12, 2455.
7. Kajana T, Pirashanthan A, Yuvapragasam A, Velauthapillai D, **Ravirajan P**, Senthilnathanan M., Bimetallic AC/Ag₂CrO₄/SnS heterostructure photoanode for energy conversion and storage: A self-powered Photocapacitor. *J. Power Sources* 2022, 520, 230883.
8. Shanmugaratnam S, Yogenthiran E, Koodali R, **Ravirajan P**, Velauthapillai D, Shivatharsiny Y., Recent Progress and Approaches on Transition Metal Chalcogenides for Hydrogen Production. *Energies* 2021, 14, 8265.
9. Pirashanthan A, Velauthapillai D, Robertson N, **Ravirajan P.**, Lithium doped poly (3-hexylthiophene) for efficient hole transporter and sensitizer in metal free quaterthiophene dye treated hybrid solar cells. *Sci. Rep.* 2021, 11, 1–8.
10. Pirashanthan A, Thanihaichelvan M, Mariappan K, Dhayalan V, **Ravirajan P**, Yohi S., Synthesis of a carboxylic acid-based ruthenium sensitizer and its applicability towards Dye-Sensitized Solar Cells. *Sol. Energy* 2021, 225, 399–406.
11. Rajaramanan T, Kumara G R A, Velauthapillai D, **Ravirajan P**, Senthilnathanan M., Materials Science in Semiconductor Processing Ni / N co-doped P25 TiO₂ photoelectrodes for efficient Dye-Sensitized Solar Cells. *Mater. Sci. Semicond. Process.* 2021, 135, 106062.
12. Rajaramanan T, Shanmugaratnam S, Gurunathanan V, Yohi S, Velauthapillai D, **Ravirajan P**, Senthilnathanan M., Cost Effective Solvothermal Method to Synthesize Zn-Doped TiO₂ Nanomaterials for Photovoltaic and Photocatalytic Degradation Applications. *Catalysts* 2021, 11, 690.
13. Shanmugaratnam S, Selvaratnam B, Baride A, Koodali R, **Ravirajan P**, Velauthapillai P, Shivatharsiny Y., SnS₂/TiO₂ Nanocomposites for Hydrogen Production and Photodegradation under Extended Solar Irradiation; *Catalysts* 2021, 11, 589.
14. Kajana T, Velauthapillai D, Shivatharsiny Y, **Ravirajan P**, Yuvapragasam A, Senthilnathanan M., Structural and photoelectrochemical characterization of heterostructured carbon sheet/Ag₂MoO₄-SnS/Pt photocapacitor. *J Photochem Photobiol A Chem*, 2020; 401, 112784, DOI: 10.1016/j.jphotochem.2020.112784
15. Siva U, Murugathas T, Yohi S, Natarajan M, Velauthapillai D, **Ravirajan P.**, Single walled carbon nanotube incorporated Titanium dioxide and Poly(3-hexylthiophene) as electron and hole transport materials for perovskite solar cells. *Mater Lett*, 2020, 276, 128174. DOI: 10.1016/j.matlet.2020.128174
16. A.Pirashanthan, M.Thanihaichelvan, K.Mariappan, **P.Ravirajan**, D.Velauthapillai, S.Yohi ; A multifunctional ruthenium based dye for hybrid nanocrystalline titanium dioxide/poly (3-hexylthiophene) solar cells; *Materials Letters*, 2020, 274, 127997
17. Pitchaiya S, Eswaramoorthy N, Natarajan M, Santhanam A, Asokan V, Madurai Ramakrishnan V, Rangasamy B, Sundaram S, **Ravirajan P**, Dhayalan V. Perovskite Solar Cells: A Porous Graphitic Carbon based Hole Transporter/Counter Electrode Material Extracted from an Invasive Plant Species Eichhornia Crassipes. *Sci Rep.* 2020, 10(1), 1–16.

18. Rajaramanan T, Natarajan M, **Ravirajan P**, Senthilnathanan M, Velauthapillai D. Ruthenium (Ru) Doped Titanium Dioxide (P25) electrode for dye sensitized solar cells. *Energies*. 2020, 13(7), 1–13.
19. A.Pirashanthan, M.Thanihaichelvan, N.Robertson, **P.Ravirajan**, D.Velauthapillai; Quarterthiophene-Based Dye as an Efficient Interface Modifier for Hybrid Titanium Dioxide/Poly (3-hexylthiophene)(P3HT) Solar Cells, *Polymers*, 2019, 11(11), 1752.
20. M. Thanihaichelvan, S. Loheeswaran, K. Balashangar, D. Velauthapillai, **P. Ravirajan**; Polymer/fullerene blend solar cells with cadmium sulfide thin film as an alternative hole-blocking layer. *Polymers*, 2019, 11(3), 460.
21. Shanmugaratnam S, Velauthapillai D, **Ravirajan P**, Christy AA, Shivatharsiny Y. CoS₂/TiO₂ nanocomposites for hydrogen production under UV irradiation. *Materials*, 2019, 12(23), 1–9.
22. Uthayaraj S, Karunarathne DGBC, Kumara GRA, Murugathas T, Rasalingam S, Rajapakse RMG, **Ravirajan P**, Dhayalan V. Powder pressed cuprous iodide (CuI) as a hole transporting material for perovskite solar cells. *Materials*, 2019, 12(13), 1–9.
23. K Balashangar, S Paranthaman, M Thanihaichelvan, PA Amalraj, D Velauthapillai, **P Ravirajan**; Multi-walled carbon nanotube incorporated nanoporous titanium dioxide electrodes for hybrid polymer solar cells. *Material Letters*, 2018, 219, 265-268.
24. Thanihaichelvan, M., Sri Kodikara, M.M.P., **Ravirajan, P.**, Velauthapillai, D., Enhanced performance of nanoporous titanium dioxide solar cells using cadmium sulfide and poly(3-hexylthiophene) co-sensitizers, *Polymers*, 9 (10) (2017) 467.
25. K Vignarooban, P Badami, MAKL Dissanayake, **P Ravirajan**, Arunachala Mada Kannan; Polyacrylonitrile-based gel-polymer electrolytes for sodium-ion batteries. *Ionics*, 2017, 23(10), 2817-2822.
26. Loheeswaran, S., Thanihaichelvan, M., **Ravirajan, P.**, Nelson, J. Controlling recombination kinetics of hybrid poly-3-hexylthiophene (P3HT)/titanium dioxide solar cells by self-assembled monolayers, *Journal of Materials Science: Materials in Electronics*, 28 (6), (2017) 4732-4737.
27. K. Prashanthan, T. Thivakarasarma, **P. Ravirajan**, M. Planells, N. Robertson and J. Nelson, Enhancement of hole-mobility in Hybrid Titanium Dioxide / Poly(3-hexylthiophene) Nanocomposites by Employing an Oligothiophene dye as Interface Modifier, *Journal of Materials Chemistry C*, 2017, DOI: 10.1039/C7TC02225E
28. K Balashangar, M Thanihaichelvan, **P Ravirajan**, GDK Mahanama, MAKL Dissanayake, E Colegrove, RG Dhere, S Sivananthan, Effect of Surface roughness of the substrate on the Performance of Polycrystalline CdS/CdTe Solar Cells, *Journal of Nanoelectronics and Optoelectronics* 10 (4), (2015) 435-439.
29. M Thanihaichelvan, K Sockiah, K Balashangar, **P Ravirajan**, Cadmium sulfide interface layer for improving the performance of titanium dioxide/poly (3-hexylthiophene) solar cells by extending the spectral response, *Journal of Materials Science: Materials in Electronics* 26 (6) (2015) 3558-3563.
30. S. Loheeswaran, K. Balashangar, J. Jevirshan, and **P. Ravirajan**, Controlling Recombination Kinetics of Hybrid Nanocrystalline Titanium Dioxide/Polymer Solar Cells by Inserting an Alumina Layer at the Interface, *Journal of Nanoelectronics and Optoelectronics*, 8 (2013), 484-88.
31. **P Ravirajan**, P Atienzar, J Nelson, Post-Processing Treatments in Hybrid Polymer/Titanium Dioxide Multilayer Solar Cells, *Journal of Nanoelectronics and Optoelectronics* 7 (5), 2012, 498-502.
32. Sarathchandran, S.; Prashanthan, K.; **Ravirajan, P.**, Role of Poly(Ethylenedioxythiophene)-Poly(Styrene Sulphonate) on the Performance of Nanocrystalline Titanium Dioxide-Poly(3-Hexylthiophene) Polymer Solar Cells, *Journal of Nanoelectronics and Optoelectronics* 6 (3), 2011, 272-276.
33. Sarathchandran, S., Haridas, K., Kim, Y., **Ravirajan, P.** Effect of temperature and light intensity on the performance of polymer/fullerene solar cells with titanium dioxide nanolayers, *Journal of Nanoelectronics and Optoelectronics*, 5 (2), (2010) pp. 243-246.
34. T Ishwara, DDC Bradley, J Nelson, **P Ravirajan**, I Vanseveren, T Cleij, D Vanderzande, L Lutsen, S Tierney, M Heeney, I McCulloch, Influence of polymer ionization potential on the open-circuit voltage of hybrid polymer/TiO₂ solar cells, *Appl. Phys. Lett.* 92 (5), (2008) 053308.
35. J. A. Boucle, **P. Ravirajan** and J. Nelson, Hybrid polymer / metal oxide thin films for photovoltaic applications, *J. Mater. Chem.*, 2007, 17, 3141–3153.
36. **P. Ravirajan**, A. M. Peiró, M. K. Nazeeruddin, M. Graetzel, D. D. C. Bradley, J. R. Durrant and J. Nelson, Hybrid polymer / zinc oxide photovoltaic devices using vertically oriented ZnO nanorods

and an ambiphilic molecular interface layer, Journal of Physical Chemistry B 110 (2006), 7635-7639.

37. A. M. Peiró, **P. Ravirajan**, K. Govender, D. Smyth-Boyle, P. O'Brien, D.D.C. Bradley, J. Nelson J. R. Durrant, Hybrid polymer/metal oxide solar cells based on ZnO columnar structures, J. Material Chemistry 16 (2006) 2088-2096.
38. **P. Ravirajan**, S. A. Haque, J. R. Durrant, D. D. C. Bradley and J. Nelson, The effect of polymer optoelectronic properties on the performance of multilayer hybrid polymer/TiO₂ solar cell, Advanced Functional Materials, 15 (2005) 609 - 618.
39. **P. Ravirajan**, S. A. Haque, J. R. Durrant, S. J. P. Smith, J. M. Kroon, D. D. C. Bradley and J. Nelson, Efficient Charge Collection in Hybrid Polymer / TiO₂ Solar Cell using PEDOT:PSS as a Hole Collector, Applied Physics Letter 86, (2005) 143101.
40. **P. Ravirajan**, S. A. Haque, J. R. Durrant, D. Poplavskyy, D. D. C. Bradley, and J. Nelson, Hybrid nanocrystalline TiO₂ solar cells with a fluorene—thiophene copolymer as a sensitizer and hole conductor, Journal of Applied Physics 95 (2004) 1473 - 1480.
41. **P. Ravirajan**, S. A. Haque, D. Poplavskyy, J. R. Durrant, D. D. C. Bradley, and J. Nelson, Nanoporous TiO₂ solar cells sensitized with a fluorene-thiophene copolymer, Thin Solid Film 451-452 (2004) 624 - 629.
42. J. Nelson, J. Kirkpatrick, and **P. Ravirajan**, Factors limiting the efficiency of molecular photovoltaic devices, Physical Review B 69 (2004) 035337.
43. B. O. Aduda, **P. Ravirajan**, K. L. Choy, and J. Nelson, Effect of morphology on electron drift mobility in porous TiO₂, International Journal of Photoenergy 6 (2004) 141-147.
44. B.S.B. Karunaratne and **P. Ravirajan**, Positive Temperature Coefficient Resistance (PTCR) effect of Barium Titanate based Ceramics, Ceylon Journal of Science: Physical Sciences, 6(1), 47-56 (1999).
45. T Thivakarasarma, P Sumanthiran, K Prashanthan and **P Ravirajan**, Optimizing multiwall carbon nanotube weight ratio for efficient charge transport in hybrid TiO₂/polymer solar cells, IEEE, 12th Nanotechnology Materials and Devices Conference (NMDC), Singapore (2017), 200-201. (ISBN: 1-5386-2772-8)
46. K Prashanthan, T Thivakarasarma, K Balashankar and **P Ravirajan**, Effect of interface modifiers on hole mobility in Hybrid Nanoporous Titanium dioxide (TiO₂)/Poly (3-hexylthiophene)(P3HT) solar cells, 15th International Conference on Nanotechnology (IEEE-NANO), Italy (2015), 736-738. (ISBN: 9781467381550)
47. A.M Peiró, **P. Ravirajan**, K. Govender, D.S. Boyle, P.O'Brien, D.D.C. Bradley, J. Nelson and J.R. Durrant, The effect of zinc oxide nanostructure on the performance of hybrid polymer/zinc oxide solar cells, Proc. of SPIE - International Society for Optical Engineering (USA) 5938, 593819 (2005).
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135. Rajaramanan, T.; Dhayalan, V.; **Ravirajan, P.**; Senthilnathanan, M. "Facile synthesis of Ni-doped, N-doped and Ni/N co-doped TiO₂ nanomaterials for DSSC application", Functional materials for energy, environment, And biomedical applications, 2022 (FARAON – 2022), Madurai Kamaraj University, India, Virtual, 2-4, February 2022.

Books:

- Basic Electronics [for G.C.E (A/L) students], S. R. Jeyakumar, S. Nimalan, P. Ravirajan, Tamil Physics Series, Pages 184, 1999.
- An investigation of electrical properties of Barium Titanate based ceramics, M.Sc. Dissertation, University of Peradeniya, Sri Lanka, 1999.
- Characterisation and optimisation of hybrid polymer / metal oxide photovoltaic device, PhD Thesis, University of London, UK, 2004.
- Introduction to Clean Energy Technologies, Jaffna Science Association – 2018

International Collaborators

- **Prof.V.Dhayalan**, Western Norway University of Applied Sciences since March 2017
- **Prof.S.Sivananthan**, University of Illinois at Chicago, USA since February 2010.
- **Prof. Neil Robertson**, University of Edinburgh, UK since March 2014.
- **Prof.Youngkyoo Kim**, Kyungpook National University, South Korea since January 2008.
- **Prof. J. Nelson and Prof. D.D.C.Bradely**, Dept. of Physics, Imperial College, London, **UK**, since 2001.
- **Prof. James Durrant**, Department of Chemistry, Imperial College London, **UK**, since 2001.

The collaborations resulted over 40 research articles in SCI journals.

Participation of Training, Workshops, Winter college and School

- 'Exploring leadership through experience and practice', London, UK, January 27, 2003.
- 'Publicizing Your Ideas', Cardiff, UK, March 15-16, 2003.
- 'Presentation Skills', Imperial College London, UK, May 20, 2003.
- 'Information Retrieval', Imperial College London, UK, June 04, 2003.
- 'Technical Presentation' - Fishbowl, Imperial College London, UK, June 05, 2003.
- 'Obtaining and Managing External Research Funding', London, UK on February 10, 2004.
- 'Accessing Information in Developing Countries', Oxford, UK on 27th of March 2004.
- Discussion meeting on supramolecular nanotechnology for organic electronics, at Royal Society, London on 5-6, June, 2006.
- ICTP Regional School on Physics at the Nanoscale, 14-25, December 2009, Vietnam.
- ICTP Winter College on Optics and Energy, 8 - 19 February 2010, Trieste, Italy.

Invited / Plenary Talks / Chairperson address

- (Invited talk) Nanoporous TiO₂ solar cells sensitised with a fluorene-thiophene copolymer at the spring meeting of *European Materials Research Society* in Strasbourg, **France** on 11th of June, 2003.
- (Invited talk) Optimizing Hybrid Polymer/TiO₂ Solar Cells using Multilayer Structure at the *Department of Materials Science, University of Oxford, UK* on 26th of March 2004.
- (Invited talk) Efficient Charge Collection in Hybrid Polymer/TiO₂ Solar Cells using PEDOT as Hole Collector, at the *MOLYCELL meeting, EPFL, Lausanne, Switzerland* on 18th of May 2004.
- (Invited talk) Controlling charge recombination kinetics in TiO₂/polymer by using insulating layer, at the *MOLYCELL meeting, IMEC Leuven, Belgium* on 13 & 14 of December 2004.
- (Invited talk) Controlling recombination kinetics of hybrid polymer / metal oxide solar cells using ZnO nanorods or self-assembly monolayer, *European Conference on Hybrid and Organic Solar Cells*, Paris, **France**, 28-30 June, 2006
- (Chairperson Address) Nanotechnology and its application at the *14th Annual meeting of Jaffna Science Association, Jaffna, Sri Lanka* on 05.04.2008.
- (Invited talk) Origin of open-circuit voltage of hybrid metal oxide / polymer solar cells, International Conference on Electronic Materials 2008, **Sydney, Australia** on 29.08.2008
- (Invited talk) Nanostructured Metal Oxide: Polymer Photovoltaic Devices, Regional School of Physics at Nanoscale - ICTP School in Hanoi, Vietnam, December 14-25, 2009, <http://iop.vast.ac.vn/theor/conferences/smr2081/files/Ravi.pdf>.
- (Invited talk) Strategies for Improving the Performance of Hybrid Titanium Dioxides/polymer Solar Cells, The 4th International Conference New & Renewable Energy 2013, Daegu, South Korea March 29, 2013. (<http://icnre.org/>)

- (Plenary Talk) Improving the Photovoltaic properties of hybrid Polymer/ Titanium Dioxide Solar cells by self-assembled monolayers at the interface, 2nd International Conference of the Solar energy materials, Solar cells and Solar energy applications (Solar Asia 2013), University of Malaya, Kuala Lumpur, Malaysia, August 22-24, 2013.
- (Plenary Talk) Strategies to improve the performance of Hybrid nanocrystalline Titanium dioxide/ polymer solar cell using interface modifiers, The international Conference on Nanoscience and Nanotechnology (ICNST 2014), 12th & 13th August 2014, Colombo, Sri Lanka
- (Plenary Talk) A Novel Robust Ruthenium Dye (RuC) for Nanocrystalline TiO₂ Solar Cells, The 7th Annual World Congress of Nanoscience and Technology-2017, Japan, October 24-26, 2017, pp 497.

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Date



Professor P Ravirajan