**Curriculum Vitae – Dr Christopher James Rowlands MSci ARCS**

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|  | Department of Bioengineering  Imperial College London  South Kensington, SW7 2AZ  UK | | | | | Email: [c.rowlands@imperial.ac.uk](mailto:c.rowlands@imperial.ac.uk)  Tel: +44 (0)20 7594 1331 | | | |
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| **Teaching and Work Experience** | | | | | | | | | |
|  | **Lecturer in Bioengineering** | | | *Imperial College London* | | | | | 2017-Present |
|  | I run my own research group, which is currently focussed on neurophotonics and optical engineering. Also I teach a course in Analytical Chemistry, provide pastoral care to undergraduate students, teach PhD students and assist in departmental administration. | | | | | | | | |
|  | **Post-Doctoral Research Fellow** | | | *Cambridge University* | | | | | 2016-2017 |
|  | I designed and built a photoactivated localization microscope that was 100x faster than conventional instruments, and I also supervised PhD students. | | | | | | | | |
|  | **Post-Doctoral Research Associate** | | | *Massachusetts Institute of Technology* | | | | | 2014-2016 |
|  | I continued my previous work on connectomics, and developed wide-field three-photon instrumentation, methods for imaging neural activity in 10,000 synapses simultaneously, a high-resolution light-sheet microscope and instruments to map blood flow in a mouse brain. | | | | | | | | |
|  | **Post-Doctoral Research Fellow** | | | *Massachusetts Institute of Technology* | | | | | 2011-2014 |
|  | I worked on high-throughput multiphoton imaging for the treatment of cancer using photodynamic therapy, monitoring neural activity, as well as optical nanoscopy for connectomics. | | | | | | | | |
|  | **Laboratory Instructor, GEM4** | | | *Massachusetts Institute of Technology* | | | | | Summer 2012 |
|  | I supervised summer-school attendees as they constructed a fluorescence microscope and used it to image biological samples. | | | | | | | | |
|  | **Post-Doctoral Researcher** | | | *University of Nottingham* | | | | | 2010-2011 |
|  | I developed an automated Raman microscopy system to diagnose skin cancer, using multivariate statistics and fluorescence-based pre-screening to minimise sampling time. | | | | | | | | |
|  | **Hourly-Paid Lecturer** | | | *Nottingham Trent University* | | | | | 2010-2011 |
|  | I was responsible for writing and delivering 8 lectures on glass, supervising the accompanying laboratory classes, and assessing students on both course components. | | | | | | | | |
|  | **Undergraduate Teaching** | | | *Cambridge University* | | | | | 2005-2010 |
|  | I supervised both 1A Physics and 1B Electronic Properties of Solids for several groups of undergraduate students with a diverse range of abilities and class sizes from one to four people. | | | | | | | | |
|  | **Laboratory Demonstration** | | | *Cambridge University* | | | | | 2005-2010 |
|  | I supported the Physical Chemistry and Synthetic Chemistry courses, assisting undergraduates in performing many different synthetic and analytical techniques. | | | | | | | | |
|  | **Industrial Internship** | | | *Proctor & Gamble, Newcastle Technical Centre* | | | | | Summer 2004 |
|  | This involved working in the Automatic Dishwashing team to reformulate an existing product to be both legislatively compliant and have superior performance to the existing competition. | | | | | | | | |
|  | **UROP Placement – Fuel Cells** | | | *Imperial College London* | | | | | Summer 2003 |
|  | The project was to investigate nanoelectrodes and their unique electrochemical properties; in particular on how these properties could be exploited in fuel cells. | | | | | | | | |
| **Education** | | | | | | | | | |
|  | *Cambridge University* | | | | | | | | 2005-2010 |
| PhD in the chemistry, physics and engineering of chalcogenide glasses, supervised by Professor Stephen Elliott, and funded by a studentship from the Ernest Oppenheimer Fund. | | | | | | | | |
|  | *Imperial College London* | | | | | | | | 2001-2005 |
| MSci in Chemistry, First-class honours, specializing in Physical Chemistry | | | | | | | | |
|  | *Vandyke Upper School & Community College* | | | | | | | | 1996-2001 |
| A-levels: | Chemistry: A | Physics: A | | Maths: A | | | Economics: A | |
| **Achievements, Grants and Awards** | | | | | | | | | |
|  | **BBSRC Tools and Resources Development Fund, 2017** | | | | | | | **£150,836** | |
|  | A grant, written by me, to support a collaborative project between myself, Prof. Nigel Emptage and Prof. Martin Booth, developing techniques for imaging deep within the mouse brain. | | | | | | | | |
|  | **MIT Postdoctoral Association Travel Grant, 2015** | | | | | | | **$500** | |
|  | A competitive grant given to enable outstanding research to be presented at a conference. | | | | | | | | |
|  | **Wellcome Trust-MIT Postdoctoral Research Fellowship, 2011** | | | | | | | **$173,846 + £79,046** | |
|  | This fellowship is awarded to exceptional researchers aiming to study outside their normal field. | | | | | | | | |
|  | **Nottingham Research Staff Travel Prize, 2010** | | | | | | | **£600** | |
|  | A competitive grant to present outstanding work at an international conference | | | | | | | | |
|  | **Best Physical Chemistry PhD presentation, Easter Term 2008** | | | | | | | | |
|  | This prize is awarded to the best presentation of a PhD candidate's work in the Physical Chemistry Sector at the Department of Chemistry, Cambridge University. | | | | | | | | |
|  | **Oppenheimer Fund PhD Studentship, 2005** | | | | | | | **£51,900** | |
|  | Awarded to a promising PhD candidate for research into colloid or surface science | | | | | | | | |
|  | **Unilever Prize in Physical Chemistry, 2005** | | | | | | | | |
|  | This prize is given for the best final year project in physical chemistry at Imperial College London. | | | | | | | | |
|  | **Finalist, NESTA FameLab, 2005** | | | | | | | | |
|  | FameLab is a search for the science communicators of tomorrow. 12 regional finalists perform a five-minute presentation at the Cheltenham Science Festival. | | | | | | | | |
|  | **Best Physical Chemistry Presentation, Class of 2005** | | | | | | | | |
|  | This is given for the best final-year presentation in physical chemistry at Imperial College London. | | | | | | | | |
|  | **P&G Scholarship, 2004** | | | | | | | **£1,500** | |
|  | This scholarship is awarded in conjunction with an internship at a P&G Research Centre. | | | | | | | | |
|  | **Goldman Sachs Global Leader, class of 2003** | | | | | | | **$3,000** | |
|  | Awarded by the Institute of International Education to the top one-hundred second-year undergraduates worldwide, for their potential to become future leaders in their respective fields. | | | | | | | | |
|  | **Top 5 A-level Mathematician, 2001** | | | | | | | | |
|  | I was in the top five highest results for A-level Mathematics in the UK for the AQA exam board. | | | | | | | | |

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| **Research Statement** | | | | |
| My research focuses on creating the next generation of optical imaging tools for biological research. I have experience with a large number of different designs and contrast mechanisms, and am particularly interested in high-throughput techniques, extending the applicability of Raman, super-resolution, multiphoton and hyperspectral microscopes to applications such as neurobiology, where imaging speed and pixel throughput are paramount. | | | | |
| **Major Collaborations** | | | | |
|  | Prof. Edward S. Boyden, *Massachusetts Institute of Technology* | | 2012-2016 | |
|  | Construction of a high-throughput super-resolution imaging platform for mapping the mouse connectome, performing the first three-photon optogenetics experiments. | | | |
|  | Prof. Moungi G. Bawendi, *Massachusetts Institute of Technology*  Dr Oliver T. Bruns, *Massachusetts Institute of Technology*  Prof. Rakesh K. Jain, *Harvard University* | | 2012-2016 | |
|  | Several projects, with a focus on the use of temporal focusing microscopy to live animal imaging and the use of quantum dots in fluorescence microscopy. | | | |
|  | Prof. Jacquin Niles, Massachusetts Institute of Technology | | 2012-2016 | |
|  | Development of a heme sensor based on Fluorescence Resonance Energy Transfer (FRET), for application to malaria research | | | |
|  | Prof. Conor L. Evans, Harvard University | | 2011-2014 | |
|  | Development of high-throughput multiphoton photodynamic therapy instrumentation and treatment protocols. | | | |
|  | Dr Sandeep Varma, *Queen’s Medical Center, Nottingham*  Prof. Hywel Williams, *University of Nottingham Medical School*  Dr William Perkins, *Queen’s Medical Center, Nottingham*  Dr Iain Leach, *Queen’s Medical Center, Nottingham* | | 2010-2011 | |
|  | Investigating the use of Raman microscopy combined with tissue autofluorescence in the treatment of basal cell carcinoma. | | | |
| **Refereed Full Papers** | | | |
| **21** | | **Rowlands C.J.**, Park D., Bruns O.T., Piatkevich K.D., Fukumura D., Jain R.K., Bawendi M.G., Boyden E.S. and So P.T.C.: ‘Wide-field Three-Photon Excitation in Biological Samples’, *Light: Science and Applications*, 6:e16255, **2017** | |
| **20** | | Abshire J.R., **Rowlands C.J.**, Ganesan S.M., So P.T.C., Niles J.C.: ‘Quantification of labile heme in live malaria parasites using a genetically-encoded biosensor’, *Proceedings of the National Academy of Sciences*, 114(11):E2068-E2076, **2017** | |
| **19** | | Bruns O.T., Bischof T.S., Harris D.K., Shi Y., Riedemann L., Bartelt A., Jaworski F.B., Franke D., Carr J.A., **Rowlands C.J.**, Wilson M.W.B., Chen O., Wei H., Hwang G.W., Montana D., Coropceanu I., Kloepper J., Heeren J., So P.T.C., Fukumura D., Jensen K.F., Jain R.K. and Bawendi M.G.: ‘Next generation *in vivo* optical imaging with short-wave infrared quantum dots’, *Nature Biomedical Engineering*, 1:0056, **2017** | |
| **18** | | Park J.K., **Rowlands C.J.** and So P.T.C.: ‘Enhanced Axial Resolution of Wide-Field Two-Photon Excitation Microscopy by Line Scanning Using a Digital Micromirror Device’, *Micromachines*, 8(3):85, **2017** | |
| **17** | | Uzel S.G.M., Platt R.J., Subramanian V., Pearl T.M., **Rowlands C.J.**, Chan V., Boyer L., So P.T.C. and Kamm R.D.: ‘Microfluidic platform for the formation of optically excitable, three-dimensional, compartmentalized motor units’, *Science Advances*, 2(8):e1501429, **2016** | |
| **16** | | **Rowlands C.J.**, Bruns O.T., Bawendi M.G and So P.T.C.: ‘Objective, comparative assessment of the penetration depth of temporal-focusing microscopy for imaging various organs’, *Journal of Biomedical Optics*, 20(6):061107, **2015** | |
| **15** | | **Rowlands C.J.**, Wu J., Uzel S.G.M., Klein O., Evans C.L. and So P.T.C.: ‘3D-resolved targeting of photodynamic therapy using temporal focusing', *Laser Physics Letters*, 11:115605, **2014** | |
| **14** | | Yew E.Y.S., **Rowlands C.J.** and So, P.T.C.: ‘Application of multiphoton microscopy in dermatological studies: A mini-review’, *Journal of Innovative Optical Health Sciences*, 7(5):1330010, **2014. Featured article.** | |
| **13** | | Kong K., **Rowlands C.J.**, Varma S., Perkins W., Leach I.H., Koloydenko A.A., Pitiot A., Williams H.C. and Notingher I.: ‘Increasing the speed of tumour diagnosis during surgery with selective scanning Raman microscopy’, *Journal of Molecular Structure*, 1073:58-65, **2014** | |
| **12** | | **Rowlands C.J.** and So P.T.C.: 'On the correction of errors in some multiple particle tracking experiments', *Applied Physics Letters*, 102(2):021913-4, **2013** | |
| **11** | | Kong K., **Rowlands C.J.**, Varma S., Perkins W., Leach I.H., Koloydenko A.A., Williams H.C. and Notingher I.: 'Diagnosis of tumours during tissue conserving surgery with integrated auto-fluorescence and Raman scattering microscopy', *Proceedings of the National Academy of Sciences*, 110(38):15189-15194, **2013** | |
| **10** | | So P.T.C., Yew E.Y.S. and **Rowlands C.J.**: 'High Throughput Nonlinear Optical Microscopy', *Biophysical Journal*, 10:709-710, 105(12):2641-2654, **2013** | |
| **9** | | **Rowlands C.J.**, Varma S., Perkins W., Leach I.H., Williams H. and Notingher I.: 'Rapid acquisition of Raman spectral maps through minimal sampling: applications in tissue imaging', *Journal of Biophotonics*, 5(3):220-229, **2012** | |
| **8** | | Kong. K, **Rowlands C.J.**, Elsheikha H. and Notingher I.: 'Label-free molecular analysis of live Neospora caninum tachyzoites in host cells by selective scanning Raman micro-spectroscopy', *Analyst*, 137(18):4119-4122, **2012** | |
| **7** | | **Rowlands C.J.** and Elliott S.R.: 'Improved Blind-Source Separation for Spectra', *Journal of Raman Spectroscopy*, 42(9):1761-1768, **2011** | |
| **6** | | **Rowlands C.J.** and Elliott S.R.: 'Denoising of Spectra With No User Input: A Spline-Smoothing Algorithm', *Journal of Raman Spectroscopy,* 42(3):370-376, **2011** | |
| **5** | | **Rowlands C.J.** and Elliott S.R.: 'Robust Automated Algorithm for Baseline Subtraction in Spectra ', *Journal of Raman Spectroscopy,* 42(3):363-369, **2011** | |
| **4** | | **Rowlands C.J.**, Su L. and Elliott S.R.: 'Rapid prototyping of low-loss IR chalcogenide-glass waveguides by controlled remelting', *ChemPhysChem,* 11(11):2393-2398, **2010** | |
| **3** | | **Rowlands C.J.**, Su L. and Elliott S.R.: 'Investigating the response of As2S3-based SERS substrates', *Optical Materials,* 32(11):1413-1416,**2010** | |
| **2** | | Su L., **Rowlands C.J.** and Elliott S.R.: 'Nanostructures Fabricated in Chalcogenide Glass for Use as Surface-Enhanced Raman Scattering Substrates', *Optics Letters*, 34:1645-1647, **2009** | |
| **1** | | Su L., **Rowlands C.J.**, Lee T.H. and Elliott S.R.: 'Fabrication of photonic waveguides in sulfide chalcogenide glasses by selective wet-etching ', *Electronic Letters*, 44(7):472-473, **2008** | |

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| **Refereed Conference Publications** | |
| **1** | Xue Y., **Rowlands C.J.** and So P.T.C.: ‘Parallel and flexible imaging using two-photon RESOLFT microscopy with spatial light modulator control’, *Proceedings of SPIE*, 9329:932927, **2015** |

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| **Conference Abstracts** | |
| **16** | **Rowlands C.J.**, Bruns O.T., Franke D., Bawendi M.G., So P.T.C.: *Near-Infrared Temporal Focusing Microscopy*, Oral presentation, OSA Biomedical Optics Congress, **2016** |
| **15** | **Rowlands C.J.**, Park D., Piatkevich K., Bruns O.T., Bawendi M.G., Boyden E.S., and So P.T.C.: *Widefield three-photon excitation*, Oral presentation, SPIE Photonics West, **2016** |
| **14** | **Rowlands C.J.**: *Development of a super-resolution microscope to map the mouse connectome*, Invited oral presentation, Wellcome Trust Fellows Meeting, **2015** |
| **13** | **Rowlands C.J.**, Xue Y., Boyden E.S. and So P.T.C.: *High-Throughput Super-Resolution Imaging for Mapping the Whole Mouse Brain*, Oral presentation, European Conference on Biomedical Optics, **2015** |
| **12** | **Rowlands C.J.**, Xue Y., Boyden E.S. and So P.T.C.: *Mapping the mouse connectome: progress towards a high-throughput super-resolution nanoscope*, Oral presentation, SPIE Photonics West, **2015** |
| **11** | **Rowlands C.J.**: *Big Lasers and Biology – treating cancer and mapping the connectome with light*, Invited oral presentation, Modern Optics and Seminar Series, MIT, **2014** |
| **10** | **Rowlands C.J.**, Xue Y., Boyden E.S. and So P.T.C.: *Mapping the Mouse Brain in Less Than a Year Using Super-Resolution Microscopy*, Poster, Gordon Conference on Lasers in Medicine and Biology, **2014** |
| **9** | **Rowlands C.J.**, Uzel S.G.M., Klein O.J., Evans C.L. and So P.T.C.: *3D-resolved optical targeting for photodynamic therapy*, Oral presentation, SPIE Photonics West, **2014** |
| **8** | **Rowlands C.J.**, Uzel S.G.M., Klein O.J., Evans C.L. and So P.T.C.: *Temporal Focusing for Photodynamic Therapy*, Oral presentation, SPIE Photonics West, **2013** |
| **7** | **Rowlands C.J.** and So P.T.C.: *On the Dangers of De-Drifting When Applied to Particle Tracking*, Poster, Gordon Conference on Lasers in Medicine and Biology, **2012** |
| **6** | **Rowlands C.J.** and Notingher I.: *Selective Sampling in Hyperspectral Raman Micro-Spectroscopy: Obtaining Maximum Data With Minimal Sampling Time*, Poster, OSA Biomedical Optics, **2012** |
| **5** | **Rowlands C.J.**, Varma S., Perkins W., Leach I., Williams H. and Notingher I.: *A New Algorithm for the Rapid Acquisition of Hyperspectral Maps*, Poster, International Conference on Applied Vibrational Spectroscopy, **2011** |
| **4** | **Rowlands C.J.** and Elliott S.R.: *Rapid Prototyping of Planar Infrared Waveguides*, Poster, European Conference on Integrated Optics, **2010** |
| **3** | **Rowlands C.J.** and Elliott S.R.: *Rapid Prototyping of Chalcogenide Glass Waveguides for Transmission in the Near Infra-Red*, Poster, Winter School on the Physics and Chemistry of Materials, **2009** |
| **2** | **Rowlands C.J.**, Winkle R., Wootton R. and de Mello A.: *Microfluidic reaction optimisation using intelligent feedback*, Poster, MicroTAS, **2007** |
| **1** | **Rowlands C.J.**, Simdyankin S. and Elliott S.R.: *Evanescent Waveguide Chemical Sensors*, Poster, 8th ESG Conference, **2006** |

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| **Books and/or Book Chapters** | |
| **2** | So P.T.C., Yew E. and **Rowlands C.J.**; ‘Applications of Multiphoton Microscopy in Dermatology’, in *Imaging in Dermatology*; Elsevier; **2016** |
| **1** | So P.T.C., Choi H., **Rowlands C.J.** and Singh V.R.: 'Optical Instrumentation Design for Fluorescence Lifetime Spectroscopy and Imaging', in *Fluorescence Lifetime Spectroscopy and Imaging*, CRC Press, **2014** |

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| **Patents** | |
| **1** | Notingher I., Kong K., **Rowlands C.J.**, Williams H., Leach I., Varma S.; Perkins W. and Koloydenko A.; ‘Measurement of tissue structures’; WO/2014/147416, filed 25th Sept **2014** |

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| **Other** | |
| **1** | **Rowlands C.J.**, Yew E.Y.S. and So P.T.C.: 'Parallel super-resolution imaging', *Nature Methods: News and Views*, 10:709-710, **2013** |