

## Prof Philipp Kukura FRSC

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Professor of Chemistry and Fellow of Exeter College  
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<b>Employment</b>	<i>Professor of Chemistry</i> Physical and Theoretical Chemistry Laboratory, University of Oxford	2016 - Present
	<i>Official Fellow for Physical Chemistry</i> Exeter College, Oxford	2011 - Present
<b>Experience</b>	<i>Associate Professor of Physical Chemistry</i> Physical and Theoretical Chemistry Laboratory, University of Oxford	2014 - 2016
	<i>University Lecturer</i> Physical and Theoretical Chemistry Laboratory, University of Oxford	2011 - 2013
	<i>EPSRC Career Acceleration Fellow</i> Physical and Theoretical Chemistry Laboratory, University of Oxford	2010 - 2015
	<i>Research Fellow</i> St Hugh's College, Oxford	2010 - 2011
	<i>Postdoctoral Fellow</i> ETH Zurich. Supervisor: Prof Vahid Sandoghdar	2006 - 2010
<b>Education</b>	<i>PhD Chemistry</i> Department of Chemistry, University of California at Berkeley.	2002 - 2006
	<i>Masters in Chemistry</i> Department of Chemistry, University of Oxford. First class.	1998 - 2002
<b>Distinctions</b>	Royal Society of Chemistry Marlow Award	2015
	Visiting Professor Sapienze University of Rome	2015
	ERC Starting Investigator Award	2014
	Visiting Professor University of Erlangen	2014
	Elected Fellow of the Royal Society of Chemistry	2011
	Royal Society of Chemistry Harrison-Meldola Award	2011
	EPSRC Career Acceleration Fellowship	2010
	Society of Applied Spectroscopy: Graduate Student Award	2002
Thesis Prize, Oxford University	2002	
<b>Teaching</b>	Photochemistry (3rd year Chemistry course), Symmetry (2nd Year), Biophysical Chemistry (Advanced Option). Tutorials: Full Physical Chemistry Colloquium.	

<b>Invited talks</b>	More than 60 in national and international institutions and conferences.
<b>Supervision</b>	I am currently supervising 7 graduate students and 6 postdoctoral scholars.
<b>Collaborators</b>	Mark Wallace, Stephen Fletcher, Christian Eggeling (University of Oxford); James Sellers (NIH); William Hancock (Penn State); Akshay Rao (Cambridge).
<b>Funding</b>	Total funding since 2010 >GBP 5M.
<b>Contributions</b>	Refereeing for all major journals, EPSRC research grant panel, NSF Young Investigator Awards Referee, Member of the Faraday Division of the Royal Society, Member of the Steering Committee of the Conference of Colleges.
<b>Publications</b>	<p>59 since 2003 including Nature (2), Science, Nature Chemistry, Nature Methods, Nature Photonics, Nature Physics, PNAS (3), PRL (3), eLife. &gt;3500 citations, h-index 27, 13 papers with more than 100 citations.</p> <p>59. Liebel M, Kukura P. Lack of evidence for phase-only control of retinal photoisomerization in the strict one-photon limit. <i>Nature Chemistry</i> <b>2017</b> 9: 45-49.</p> <p>58. Nayak PK, Moore DT, Wenger B, Nayak S, Haghighirad AA, Fineberg A, Noel NK, Reid OG, Rumbles G, Kukura P, Vincent KA, Snaith HJ. Mechanism for rapid growth of organicinorganic halide perovskite crystals. <i>Nature Communications</i> <b>2016</b> 7: 13303.</p> <p>57. Schnedermann C, Lim JM, Wende T, Duarte AS, Ni L, Gu O, Sadhanala A, Rao A, Kukura P. Sub-10 femtosecond time-resolved vibronic microscopy. <i>Journal of Physical Chemistry Letters</i> <b>2016</b> 7:48544859.</p> <p>56. Duarte AS, Schnedermann C, Kukura P. Wide-field detected Fourier transform CARS microscopy. <i>Scientific Reports</i> <b>2016</b> 6: 37516.</p> <p>55. Andrecka J, Takagi Y, Mickolajczyk KJ, Lippert LG, Sellers JR, Hancock WO, Goldman YE, Kukura P. Interferometric scattering microscopy for the study of molecular motors. <i>Methods in Enzymology</i> <b>2016</b> in press.</p> <p>54. Ortega-Arroyo JO, Bissette AJ, Kukura P, Fletcher SP. Visualization of the spontaneous emergence of a complex, dynamic, and autocatalytic system. <i>Proceedings of the National Academy of Sciences USA</i> <b>2016</b> doi:10.1073/pnas.1602363113.</p> <p>53. Schnedermann C, Muders M, Ehrenberg D, Schlesinger R, Kukura P, Heberle, J. Vibronic dynamics of the ultrafast all-trans to 13-cis photoisomerization of retinal in channelrhodopsin-1. <i>Journal of the American Chemical Society</i> <b>2016</b> 138:4757-4762.</p> <p>52. Ortega-Arroyo JO, Cole D, Kukura P. Interferometric scattering microscopy and its combination with single molecule fluorescence imaging. <i>Nature Protocols</i> <b>2016</b> 11:617-633.</p> <p>51. Ortega-Arroyo JO, Kukura P. Optical detection, imaging and spectroscopy of single molecules beyond fluorescence. <i>Nature Photonics</i> <b>2016</b> 10:11-17.</p> <p>50. Andrecka J, Ortega-Arroyo J, Lewis K, Cross RA, Kukura P Label-free imaging of microtubules with subnanometer precision using interferometric scattering microscopy. <i>Biophysical Journal</i> <b>2016</b> 110:214-217.</p>

49. Mickolajczyk K, Ortega-Arroyo JO, Andrecka J, Kukura P and Hancock WO Kinetics of nucleotide-dependent structural transitions in the kinesin-1 hydrolysis cycle. *Proceedings of the National Academy of Sciences USA* **2015** 112: E7186-E7193.
48. Weigel A, Sebesta A, Kukura P. Shaped and feedback controlled excitation of a single molecule in the weak-field limit. *Journal of Physical Chemistry Letters* **2015** 6:4031-4037.
47. de Wit G, Danial J, Kukura P\*, Wallace M\*. Dynamic label-free imaging of lipid nanodomains. *Proceedings of the National Academy of Sciences USA* **2015** 112:12299-12303.
46. Bassolino G, Sovdat T, Soares Duarte A, Min Lim J, Schnedermann C, Liebel M, Odell B, Claridge T, Fletcher SP, Kukura P. Barrierless Photoisomerization of 11-cis Retinal Protonated Schiff Base in Solution *Journal of the American Chemical Society* **2015** 137:12434-12437.
45. Liebel M, Schnedermann C, Wende T, Kukura P. Principles and applications of Broadband Impulsive Vibrational Spectroscopy. *Journal of Physical Chemistry A* **2015** 119:9506-9517.
44. Musser AJ, Liebel M, Schnedermann C, Wende T, Kehoe TB, Rao A, Kukura P. Evidence for conical intersection dynamics mediating ultrafast singlet exciton fission. *Nature Physics* **2015** 11:352-357. (Featured in: Nature Physics News and Views)
43. Andrecka J, Ortega-Arroyo J, Takagi Y, de Wit G, Fineberg A, MacKinnon L, Young G, Sellers JR, Kukura P Structural dynamics of myosin 5 during processive motion revealed by interferometric scattering microscopy. *eLife* **2015** 4:e05413.
42. Schnedermann C, Liebel M, Kukura P. Mode-Specificity of Vibrationally Coherent Internal Conversion in Rhodopsin during the Primary Visual Event. *Journal of the American Chemical Society* **2015** 137:2886-2891.
41. Weigel A, Kukura P. Raman extraordinaire. *Nature Photonics* **2015** 9:11-12. (News and Views)
40. Spillane KM, Ortega-Arroyo J, de Wit G, Eggeling C, Ewers H, Wallace MI, Kukura P. High-Speed Single-Particle Tracking of GM1 in Model Membranes Reveals Anomalous Diffusion due to Interleaflet Coupling and Molecular Pinning. *Nano Letters* **2014** 14:5390-5397.
39. Weigel A, Sebesta A, Kukura P. Dark Field Microspectroscopy with Single Molecule Fluorescence Sensitivity. *ACS Photonics* **2014** 1:848-856. (Selected as Editors choice)
38. Ortega-Arroyo J, Andrecka J, Spillane KM, Billington N, Takagi Y, Sellers JR, Kukura P. Label-Free, All-Optical Detection, Imaging, and Tracking of a Single Protein. *Nano Letters* **2014** 14:2065-2070.
37. Liebel M, Schnedermann C, Bassolino G, Taylor G, Watts A, Kukura P. Direct Observation of the Coherent Nuclear Response after the Absorption of a Photon. *Physical Review Letters* **2014** 112:238301.
36. Parker AW, Bisby RH, Greetham GM, Kukura P, Scherer KM, Towrie M. Ultrafast Vibrational Spectroscopic Studies on the Photoionization of the alpha-Tocopherol Analogue Trolox C. *Journal of Physical Chemistry B* **2014** 118:12087-12097.

35. Liebel M, Schnedermann C, Kukura P. Sub-10-fs pulses tunable from 480 to 980 nm from a NOPA pumped by an Yb:KGW source. *Optics Letters* **2014** 39:4112-4115.
34. Bassolino G, Sovdat T, Liebel M, Schnedermann C, Odell B, Claridge TDW, Kukura P, Fetcher SP. Synthetic Control of Retinal Photochemistry and Photo-physics in Solution. *Journal of the American Chemical Society* **2014** 136:2650-2658.
33. Liebel M, Schnedermann C, Kukura P. Vibrationally Coherent Crossing and Coupling of Electronic States during Internal Conversion in beta-Carotene. *Physical Review Letters* **2014** 112:198302.
32. Polli D, Weingart O, Brida D, Poli E, Maiuri M, Spillane KM, Bottoni A, Kukura P, Mathies RA, Cerullo G, Garavelli M. Wavepacket Splitting and Two-Pathway Deactivation in the Photoexcited Visual Pigment Isorhodopsin. *Angewandte Chemie-International Edition* **2014** 53:2504-2507. (Selected as VIP paper)
31. Wende T, Liebel M, Schnedermann C, Pethick RJ, Kukura P. Population-Controlled Impulsive Vibrational Spectroscopy: Background- and Baseline-Free Raman Spectroscopy of Excited Electronic States. *Journal of Physical Chemistry A* **2014** 118:9976-9984.
30. Andrecka J, Spillane KM, Ortega-Arroyo J, Kukura P. Direct Observation and Control of Supported Lipid Bilayer Formation with Interferometric Scattering Microscopy. *ACS Nano* **2013** 7:10662-10670.
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28. Liebel M, Kukura P. Broad-Band Impulsive Vibrational Spectroscopy of Excited Electronic States in the Time Domain. *Journal of Physical Chemistry Letters* **2013** 4:1358-1364.
27. Kumar V, Casella M, Molotokaite E, Gatti D, Kukura P, Manzoni C, Polli D, Marangoni M, Cerullo G. Balanced-detection Raman-induced Kerr-effect spectroscopy. *Physical Review A* **2012** 86:053810.
26. Sovdat T, Bassolino G, Liebel M, Schnedermann C, Fletcher SP, Kukura P. Backbone Modification of Retinal Induces Protein-like Excited State Dynamics in Solution. *Journal of the American Chemical Society* **2012** 134:8318-8320.
25. Ortega-Arroyo J, Kukura P. Interferometric scattering microscopy (iSCAT): new frontiers in ultrafast and ultrasensitive optical microscopy. *Physical Chemistry Chemical Physics* **2012** 14:15625-15636. (Cover article)
24. Lee KG, Chen XW, Eghlidi H, Kukura P, Lettow R, Renn A, Sandoghdar V, Goetzinger S. A planar dielectric antenna for directional single-photon emission and near-unity collection efficiency. *Nature Photonics* **2011** 5:166-169.
23. Celebrano M, Kukura P, Renn A, Sandoghdar V. Single-molecule imaging by optical absorption. *Nature Photonics* **2011** 5:95-98. (Featured in: Nature Photonics News and Views)
22. Celebrano M, Lettow R, Kukura P, Agio M, Renn A, Goetzinger S, Sandoghdar V. Efficient coupling of single photons to single plasmons. *Optics Express* **2010** 18:13829-13835.

21. Kukura P, Celebrano M, Renn A, Sandoghdar V. Single-molecular Absorption Sensitivity at Room Temperature. *Journal of Physical Chemistry Letters* **2010** 1:3323-3327. (Featured in: Physics Today, CEN News, Nature Methods Highlights)
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19. Krishnan M, Mojarad N, Kukura P, Sandoghdar V. Geometry-induced electrostatic trapping of nanometric objects in a fluid. *Nature* **2010** 467:692-695. (Featured in: Physics World, Nature News and Views)
18. Kukura P, Ewers H, Mueller C, Renn A, Helenius A, Sandoghdar V. High-speed nanoscopic tracking of the position and orientation of a single virus. *Nature Methods* **2009** 6:923-935.
17. Kukura P, Celebrano M, Renn A, Sandoghdar V. Imaging a Single Quantum Dot When It Is Dark. *Nano Letters* **2009** 9:926-929. (Cover article, Nature Photonics Highlights, Nature Physics Highlights)
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15. Kukura P, McCamant DW, Mathies RA. Femtosecond stimulated Raman spectroscopy. *Annual Review of Physical Chemistry* **2007** 58:461-488.
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13. Yoon S, Kukura P, Stuart CM, Mathies RA. Direct observation of the ultrafast intersystem crossing in tris(2,2'-bipyridine) ruthenium(II) using femtosecond stimulated Raman spectroscopy. *Molecular Physics* **2006** 104:1275-1282.
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7. McCamant DW, Kukura P, Yoon S, Mathies RA. Femtosecond broadband stimulated Raman spectroscopy: Apparatus and methods. *Review of Scientific Instruments* **2004** 75:4971-4980.

6. Henbest KB, Kukura P, Rodgers CT, Hore PJ, Timmel CR. Radio frequency magnetic field effects on a radical recombination reaction: A diagnostic test for the radical pair mechanism. *Journal of the American Chemical Society* **2004** 126:8102-8103.
5. Lee SY, Zhang DH, McCamant DW, Kukura P, Mathies RA. Theory of femtosecond stimulated Raman spectroscopy. *Journal of Chemical Physics* **2004** 121:3632-3642.
4. Kukura P, McCamant DW, Mathies RA. Femtosecond time-resolved stimulated Raman spectroscopy of the S-2 (1B(u)(+)) excited state of beta-carotene. *Journal of Physical Chemistry A* **2004** 108:5921-5925. (Cover article)
3. McCamant DW, Kukura P, Mathies RA. Femtosecond broadband stimulated Raman: A new approach for high-performance vibrational spectroscopy. *Applied Spectroscopy* **2003** 57:1317-1323.
2. McCamant DW, Kukura P, Mathies RA. Femtosecond time-resolved stimulated Raman spectroscopy: Application to the ultrafast internal conversion in beta-carotene. *Journal of Physical Chemistry A* **2003** 107:8208-8214.
1. Kukura P, McCamant DW, Davis PH, Mathies RA. Vibrational structure of the S-2 (1B(u)) excited state of diphenyloctatetraene observed by femtosecond stimulated Raman spectroscopy. *Chemical Physics Letters* **2003** 382:81-86.