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# Alessandro Esposito

## Curriculum Vitae

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 [ae275@cam.ac.uk](mailto:ae275@cam.ac.uk)


 +44(0)1223 330605 (office)

 +44(0)795 4383731 (mobile)


 @alesposito75

 [www.quantitative-biology.org](http://www.quantitative-biology.org)

 [www.oncolive.online](http://www.oncolive.online)

 MRC Cancer Unit  
University of Cambridge  
Box 197, Biomedical Campus  
Cambridge, CB2 0XZ (UK)

 [publons.com/researcher/A-8536-2008](https://publons.com/researcher/A-8536-2008)

 [orcid.org/0000-0002-5051-091X](https://orcid.org/0000-0002-5051-091X)

### Education and posts held

**2021- Honorary Senior Lecturer**

Department of Life Sciences, and Centre of Genome Engineering and Maintenance  
Brunel University London

**2019- MRC investigator (group leader)**

**2012-2019 Senior Investigator Scientist**

MRC Cancer Unit at the University of Cambridge (UK)

**2009-2011 EPSRC LSI Postdoctoral Fellow**

Department of Chemical Engineering and Biotechnology (2009)  
then transferred to the MRC Cancer Unit

**2007-2008 Postdoctoral Research Associate**

Department of Chemical Engineering and Biotechnology  
Department of Physiology, Development and Neuroscience  
University of Cambridge (UK)

**2003-2006 PhD in Physics**

Molecular Biophysics Group, Department of Physics, Utrecht University (NL)  
Cell Biophysics Group, European Neuroscience Institute – Göttingen (DL)

**1994-2002 Physics Degree**

Department of Physics, University of Genoa (IT)  
National Institute for the Physics of Matter and the Italian National Research  
Council, Genoa (IT)

## Awards, grants and studentships

- 2021-2022 **MRC Cancer Unit core grant** (PI, MC\_UU\_12022/8) “Programme 7, Oncogenic signalling and heterogeneity in cancer evolution” .
- 2020-2021 **CRUK Cancer Centre pump-priming** (Co-PI, ~50k) “KRAS-dependent reprogramming of tumour-stromal heterogeneity in pancreatic ductal adenocarcinoma” with G Biffi (CRUK CI).
- 2020-2022 Zhejiang University Global Partnership Fund (*collaborator*) “Dynamic ERK signaling and early embryonic stem cell fate determination” with H Liang (Zhejiang University).
- 2019-2022 **CRUK Multi-Disciplinary Project Award** (PI, C54674/A27487, ~£490k) “OncoLive | Optogenetic control and measurement of oncogenic mutations and signalling in organoid cultures for the biophysical modelling of early oncogenesis”.
- 2016-2020 **MRC Cancer Unit core grant** (named scientist<sup>1</sup>, MC\_UU\_12022/8) “Therapeutic target discovery and validation programme & the systems microscopy initiative”.
- 2013 **MRC Foundation, Mid-Career Equipment Grant** (PI, £200k) Microscopy & Optogenetics
- 2012 MRC Centennial Award, "Inducible acute oncogene activation in the living cell by optogenetics" Project and training awards (~£10k).
- 2009 CamBridgeSens Innovation Competition Award (£5k) "Super-resolution fluorescence imaging of biological polymers relevant to disease" with S Schalchter and C Bertocini.
- 2009-2011 **EPSRC fellowship life science interface** (EP/F044011, ~£410k) “Multiplexed measurement of molecular interactions using hyper-spectral imaging and multi-parametric detection”.
- 2006, “Sergio Ciani” Award for the doctoral dissertation in biophysics “Molecular and Cellular Quantitative Microscopy” assigned by the Italian Society of Pure and Applied Biophysics .

### Competitively awarded PhD scholarships sponsored by and hosted in my group

- 2017-2020, MRC (1944491, with Dr B Hall at MRC CU, student: K Patel), “Mapping changes in cellular information transfer underlying cell-fate decisions triggered by oncogenes”.
- 2013-2017, CRUK Cambridge Centre, “Oncogene-induced remodelling of cellular networks: a systems approach using optogenetics and next-generation microscopy”, with A Venkitaraman, awarded to C Campbell.
- 2013-2017, Gates Cambridge Scholarship, “Mapping oncogene-driven cell signalling with quantitative biochemical imaging and Optogenetics” with A Venkitaraman, awarded to M Fries.

### Department-awarded PhD scholarships hosted in my group

- 2020-2024, MRC DTA “Oncogene-induced reprogramming of heterotypic cellular interactions” with J Shields (student: A Clay).

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<sup>1</sup>Award initially given to Prof. Ashok Venkitaraman to fund his target discovery programme and the Systems Microscopy Initiative under my leadership. I took over as PI in 2019 after his resignations to lead a fully independent research programme I listed separately.

- 2018-2022, MRC DTA, “Investigating the metabolic heterogeneity in cancer” with C Frezza (student: A Howitt).
- 2018-2019, Cantab Capital Institute for the Mathematics of Information “Mathematical approaches for analysing dynamic imaging data” with Prof. CB Schönlieb and S Reichelt (student: X Wang).
- 2016-2020, MRC DTA, “Oncogene-induced remodelling of cellular networks: a systems biology approach using optogenetics and next-generation microscopy” (student: P Oriol Valls).

## Teaching

- Since 2005, I have **assisted in the supervision of undergraduate students**, starting with the Neurosciences Program - Göttingen at International Max Planck Research School, and continuing at the University of Cambridge.
- Since 2012, I have **directly supervised numerous undergraduate and postgraduate students**, assisting them in securing funding and successfully graduating MPhil and PhD students. I also participate in the activities of the Sensor CDT at the University of Cambridge.
- Since 2005, I deliver **lectures at international workshops** (e.g., the IVSLA International School on Nanoscale Optical Microscopy – Venice, Italy in 2018) and Universities, and lead **outreach projects** (e.g., the 2019 Cambridge Science Festival).
- I have carried out several **PhD vivas both as internal and external examiner**, for example, for King’s College London, the University of Edinburgh, and the University of Cambridge.
- I am familiar with UKPSF and Advanced HE, and I have already prepared my APP.
- I am proficient with software and platform used for online teaching and content creation.

## Administration and management

I am passionate about contributing to the **orderly and efficient organisation** of my host institution and establishing a **positive and safe environment for everyone**. For example:

- **Extensive experience and training in managing** post-doctoral scientists, students, HR and finance. I have led a research team since 2013, first within the MRC CU Director’s laboratory, then with complete operational and financial independence since late 2016, and eventually also with formal recognition as a group leader since 2019.
- Between 2017-2021, I was a member of the **Equality Diversity and Inclusiveness Governance Group** of the School of Clinical Medicine where I mined employment information, supported policies to improve the representation of women and minorities at conferences, secondment schemes for the professional development of professional staff and lead EDI campaigns.
- Between 2011-2021, **I directed the Imaging Facilities** by advising the imaging facility manager, leading the bidding and procurement of large equipment, and major infrastructural refurbishments.

- Since 2009, I am the **Laser Safety Officer** and rolled-out major overhaul of policies. I contribute to the overall H&S decisional process at the Research Centre. During the coronavirus pandemic, I coordinated the writing of a green paper for COVID-proofing facilities across Schools in Cambridge, activities covered also by a Nature podcast.
- Between 2014-2018, I **chaired the IT committee** proactively advising the IT department during major infrastructural upgrades.
- During the transition of the MRC Cancer Unit from the MRC to the University of Cambridge (2013-2014), I volunteered as a member of the **Local Trade Union Side**, to help in the transition from a worker right perspective.

### Service to profession

I am similarly committed to contributing to the academic environment beyond the walls of my host organisation. For example:

- from 2013 to 2017 I was a member of the **Light Microscopy Section Committee at the Royal Microscopical Society**, where I campaigned to establish official **gender equality** policies and guidelines for speakers invited at RMS endorsed events and to establish a task force for **reproducibility** in bioimaging.
- I am passionate about the principles underlying the San Francisco Declaration on Research Assessment (**DORA**), of which I am a signatory, and I act as a **referee for several peer-reviewed journals** (e.g., Biophysical Journal, Nature Communications, Nature Methods, Cancer Research, Optics Express, Current Biology, Neurobiology of Disease, Journal of Microscopy, Journal of Biomedical Optics, Microscopy Research and Technique and others), for **funding agencies** (e.g., BBSRC UK, EPSRC UK, MRC UK, the Dutch Technology Foundation, the Wellcome Trust UK, and the Vienna Science and Technology Fund) and I have contributed as an **academic or guest editor** to PLOS Computational Biology.

### Organisational Experience

- I am actively engaged in **outreach activities**, including lectures and organising open days with dedicated team activities, either within the Cancer Unit or at the Cambridge Science Festival.
- I have **chaired sessions at conferences**, including the “Pharmaceutical/Clinical session” at IBIN (2020), sessions at Focus on Microscopy (2011, 2018, 2021), and the “*FRET, fluorophores and novel techniques for biochemical imaging*” session at the MMC (2015) (Manchester).
- In 2008, I co-organised the “**Theodor Förster international lecture series on quantitative fluorescence microscopy**”.
- Since 2020 I co-host the lecture series “**Imaging ONE WORLD**”, now a popular Royal Microscopical Society event.
- Since October 2021, I am a member of the **inclusivity committee** for the international conference Focus on Microscopy.

## Full List of publications

I authored<sup>2</sup> 47 papers in peer-reviewed international journals and 4 book chapters on topics spanning a wide range of disciplines, including information theory, molecular biology, optics, biophysics and biochemistry, and biology of disease, as a testimony of my multi-disciplinary skills. I also have a patent that enabled the production of an innovative camera system (PCO.FLIM). By October 2021, I have accrued ~1,600 citations and an h-index of 26, according to Publons.

### Pre-prints and upcoming contributions<sup>3</sup>

- Oriol Vall P and **Esposito A**<sup>✉</sup>, “Signalling dynamics, cell decisions, and homeostatic control in health and disease”, *submitted* (invited review for Current Opinion in Cell Biology; eds: Prof. Kenneth Cadigan and Prof. Fumiyo Ikeda)
- Trinh A, Ameer-Beg S, and **Esposito A**<sup>✉</sup>, “The renaissance of fluorescence lifetime imaging and its transformative impact on single-cell biochemistry” *in preparation* (invited review for Nature Methods; ed: Dr Rita Strack)
- Fries MW, Haas KT, Ber S, Saganty J, Richardson EL, Venkitaraman AR<sup>†</sup>, and **Esposito A**<sup>†,✉</sup>, “Multiplexed biochemical imaging reveals caspase activation patterns underlying single cell fate”, *bioRxiv* (doi.org/10.1101/427237)
- Campbell CJ, Venkitaraman AR, and **Esposito A**<sup>✉</sup>, “Checkpoint non-fidelity induces a complex landscape of lineage fitness after DNA damage”, *bioRxiv* (doi.org/10.1101/431486)

### Articles

- Trinh A and **Esposito A** (2021), “The biochemical resolving power of fluorescence lifetime imaging: untangling the roles of the instrument response function and photon-statistics” *Biomedical Optics Express* 12(7):3775
- Haas KT, Fries MW, Venkitaranam AR, and **Esposito A** (2021), “Single-cell biochemical multiplexing by multi-dimensional phasor unmixing” *Frontiers in Physics* 9:291
- Scott DE, Francis-Newton NF, Marsh ME, Coyne AG, Fischer G, Moschetti T, Bayly AR, Sharpe TD, Haas K, Barber L, Valenzano C, Srinivasan R, Huggins DJ, Ehebauer M, **Esposito A**, Pellegrini L, Perrior T, McKenzie G, Blundell TL, Hyvonen M, Skidmore J, Venkitaraman AR, Abell C (2021), “A small-molecule inhibitor of the BRCA2-RAD51 interaction modulates RAD51 assembly and potentiates DNA damage-induced cell death” *Cell Chem Biol* 28:1-13
- **Esposito A**<sup>✉</sup> (2021). “Cooperation of partially-transformed clones: an invisible force behind the early stages of carcinogenesis”, *Royal Society Open Science* 8:201532
- De S, Campbell CJ, Venkitaraman AR<sup>†</sup>, **Esposito A**<sup>†,✉</sup> (2020), “Pulsatile MAPK signalling modulates p53 activity to control cell fate decisions at the G2 checkpoint for DNA damage”, *Cell Reports* 30(7):2083-2093
- **Esposito A**<sup>✉</sup> (2020) “How many photons are needed for FRET imaging?”. *Biomed Opt Exp* 11(2): 1186-1202

<sup>2</sup> <sup>†</sup>Shared first or senior authorship; <sup>✉</sup>correspondent author

<sup>3</sup> Drafts and a complete list of upcoming papers are available upon request

- Trinh AL, Ber S, Howitt A, Valls PO, Fries MW, Venkitaraman AR, **Esposito A** <sup>✉</sup> (2019), "Fast single-cell biochemistry: theory, open-source microscopy and applications". *Methods Appl Fluoresc*, 7:044001
- **Esposito A** <sup>✉</sup> and Venkitaraman AR (2019), "Enhancing biochemical resolution by hyper-dimensional imaging microscopy", *Biophys J* 116(10):1815
- Haas KT, Lee M, **Esposito A** <sup>†</sup> and Venkitaraman AR <sup>†</sup> (2018), "Single-molecule localisation microscopy reveals molecular transactions during RAD51 filament assembly at cellular DNA damage sites", *Nucleic Acids Research*, 46(5):2398–2416
- Popleteeva A, Haas KT, Stoppa D, Pancheri L, Gasparini L, Kaminski CF, Cassidy LD, Venkitaraman AR, **Esposito A** <sup>✉</sup> (2015), "Fast and simple spectral FLIM for biochemical and medical imaging", *Opt Express* 23(18):23511
- Liang H, **Esposito A**, De S, Ber S, Collin P, Surana U, Venkitaraman AR (2014), "Homeostatic control of the G2 checkpoint via polo-like kinase 1 engenders non-genetic heterogeneity in its fidelity and timing", *Nat Comms.* 5, 4048
- **Esposito A** <sup>✉</sup>, Popleteeva M, Venkitaraman AR (2013), "Maximising the biochemical resolving power in fluorescence microscopy", *PLOS ONE*, 8(10):e77392
- Kiwanuka S, Laurila T, Jonathan F, **Esposito A**, Blomberg von der Geest K, Pancheri L, Stoppa D, Kaminski C (2012), "Development of broadband cavity ring-down spectroscopy for biomedical diagnostics of liquid analytes", *Analytical Chemistry*, 84 (13):5489–5493
- **Esposito A** <sup>✉</sup> (2012), "Beyond range: innovating fluorescence microscopy", *Remote Sens.* 4(1):111-119
- Fereidouni F, **Esposito A**, Blab GA, Gerritsen HC (2011), "A modified phasor approach for analysing time-gated fluorescence lifetime images", *J. Microsc.* 244(3):248-258
- **Esposito A** <sup>✉</sup>, Bader AN, Schlachter SC, van den Heuvel DJ, Kaminski Schierle GS, Venkitaraman AR, Kaminski CF, Gerritsen HC (2011), "Design and application of a confocal microscope for spectrally resolved anisotropy imaging", *Opt. Express*, 19(3):2546–2555
- Kaminski Schierle GS, Bertocini CW, Chan FTS, van der Goot AT, Schwedler S, Skepper J, Schlachter S, van Ham T, **Esposito A**, Kumita JR, Nollen EAA, Dobson CM, Kaminski CF (2011), "A FRET sensor for non-invasive imaging of amyloid formation *in vivo*", *ChemPhysChem*, 12(3):673-680
- Mauritz JMA, Seear R, **Esposito A**, Kaminski CF, Skepper J, Warley A, Lew VL, Tiffert T (2011), "X-ray Microanalysis Investigation of the Stage-Related Changes in Na, K and Hemoglobin Concentration in *Plasmodium Falciparum*-Infected Red Blood Cells", *Biophys. J.*, 100(6):1438-1445
- Jeyasekharan AD, Ayoub N, Mahen R, Ries J, **Esposito A**, Rajendra E, Hattori H, Kulkarni RP, Venkitaraman AR (2010), "DNA damage regulates the mobility of Brca2 within the nucleoplasm of living cells", *Proc. Natl. Acad. Sci. USA*, 107(50): 21937–21942.
- Swietach P, Tiffert T, Mauritz JM, Seear R, **Esposito A**, Kaminski C, Lew VL, Vaughan-Jones RD (2010), "Hydrogen ion dynamics in human red blood cells", *J Physiol.*, 588(24):4995-5014

- Mauritz J, **Esposito A**, Tiffert T, Skepper JN, Warley A, Yoon YZ, Cicuta P, Lew VL, Guck JR, Kaminski CF (2010), "Biophotonic techniques for the study of malaria-infected red blood cells", *Med Biol Eng Comput.*, 48(10):1055-63
- Mauritz J, Tiffert T, Seear R, Lautenschlaeger F, **Esposito A**, Lew V, Guck J, Kaminski CF (2010), "Detection of *Plasmodium falciparum*-infected red blood cells by optical stretching", *J. Biomed. Opt.*, 15(3):030517
- **Esposito A**<sup>✉</sup>, Choimet JB, Skepper JN, Mauritz JMA, Lew VL, Kaminski CF, Tiffert T (2010), "Quantitative imaging of human red blood cells infected with *Plasmodium falciparum*", *Biophys. J.*, 99(3):953-960
- Cheung W, Gill M, **Esposito A**, Kaminski CF, Courousse N, Chwetzoff S, Trugnan G, Keshavan N, Lever A and Desselberger U (2010), "Rotaviruses associate with cellular lipid droplet components to replicate in viroplasms, and compounds disrupting or blocking lipid droplets inhibit viroplasm formation and viral replication", *J. Virol.* 84(13): 6782-6798
- Schlachter S, Schwedler S, **Esposito A**, Moggridge GD, Kaminski GS and Kaminski CF (2009), "A method to unmix multiple fluorophores in microscopy images with minimal a priori information", *Opt. Express*, 17(25):22747-22760
- Cueff A, Dyrda A, Bouyer G, Egée S, Seers R, **Esposito A**, Tiffert T, Lew VL and Thomas SLY (2009), "Effects of elevated intracellular calcium on the osmotic fragility of human red blood cells", *Cell Calcium*, 47(1):29-36
- Wagner OI, **Esposito A**, Shen K, Wenzel D, Koehler B, Wouters FS and Klopfenstein DR (2009), "Synaptic scaffolding protein SYD-2 clusters and activates kinesin-3 UNC-104 in *C. elegans*", *Proc. Natl. Acad. Sci. USA*, 106(46):19605-10
- van Ham TJ, **Esposito A**, Kumita JR, Hsu SD, Kaminski-Schierle GS, Kaminski CF, Dobson CM, Nollen EAA and Bertoncini CW (2009), "Towards multiparametric fluorescent imaging of amyloid formation: Studies on a YFP model of alpha-synuclein aggregation", *J Mol Biol* 395(3):627-642
- Mauritz J, **Esposito A**<sup>✉</sup>, Ginsburg H, Kaminski CF, Tiffert T and Lew VL (2009), "The Homeostasis of *Plasmodium falciparum* Infected Red Blood Cells", *PLoS Comp Biol* 5(4):e1000339.doi:10.1371/journal.pcbi.1000339
- Schlachter S, Elder AD, **Esposito A**, Kaminski GS, Frank GH, van Geest LK, and Kaminski CF (2009), "mhFLIM: Resolution of heterogeneous fluorescence decays in widefield lifetime microscopy", *Opt Express* 17(3):1557-1570
- Elder AD, Domin A, Kaminski Schierle GS, Lindon C, Pine J, **Esposito A**, and Kaminski CF (2009), "A quantitative protocol for dynamic measurements of protein interactions by FRET-sensitized fluorescence emission". *Journal of the Royal Society Interface. J R Soc Interface* 6(S1):S59-S81
- Babuke T, Ruonala M, Meister M, Amaddii M, Genzler C, **Esposito A**, Tikkanen R (2009), "Hetero-oligomerization of reggie-1/flotillin-2 and reggie-2/flotillin-1 is required for their endocytosis". *Cell Signal*, 21(8):1287-97
- Papusheva E, Mello de Queiroz F, Dalous J, Han Y, **Esposito A**, Jares-Erijman E, Jovin TM, and Bunt G (2009), "Dynamic conformational changes in the FERM domain of FAK are involved in focal adhesion behavior during cell spreading and motility". *J Cell Sci* 122, 656-666

- **Esposito A**<sup>✉</sup>, Tiffert T, Mauritz J, Schlachter S, Bannister LH, Kaminski CF, Lew VL (2008), "FRET Imaging of Haemoglobin Concentration in *Plasmodium Falciparum* Infected Erythrocytes", PLoS ONE, 3(11): e3780. doi:10.1371/journal.pone.0003780
- **Esposito A**<sup>✉</sup>, Gralle M, Dani MAC, Lange D, Wouters FS (2008), "pHlameleons: a family of FRET-based protein sensors for quantitative pH imaging", Biochemistry, Biochemistry, 47(49):13115–13126
- Wouters FS and **Esposito A** (2008), "Quantitative analysis of fluorescence lifetime imaging made easy". HFSP Journal 2(1):7-11 (commentary paper)
- **Esposito A**<sup>✉</sup>, Gerritsen HC, Wouters FS (2007), "Optimising frequency-domain fluorescence lifetime sensing for high throughput applications: photon-economy and acquisition speed". J. Opt. Soc. Am. A 24(10):3261-3273
- **Esposito A**<sup>✉</sup>, Dohm CP, Bähr M and Wouters FS (2007), "Unsupervised Fluorescence Lifetime Imaging Microscopy for High-Content and High-Throughput Screening". Mol. Cell. Proteomics 6:1446-1454
- **Esposito A**<sup>✉</sup>, Dohm CP, Kermer P, Bähr M, Wouters FS (2007), "α-synuclein and its disease-related mutants interact differentially with the microtubule protein tau and associate with the actin cytoskeleton". Neurobiol. Dis. 26(3): 521-531
- Dohm CP, Siedenberg S, Liman J, **Esposito A**, Wouters FS, Reed JC, Bähr M, and Kermer P (2006), "Bax inhibitor-1 protects neurons from oxygen-glucose deprivation". J. Mol Neurosci. 29(1):1-8
- **Esposito A**<sup>✉</sup>, Gerritsen HC, Oggier T, Lustenberger F, Wouters FS (2006), "Innovating lifetime microscopy: a compact and simple tool for the life sciences, screening and diagnostics". J. Biomed. Opt. 11(3):34016-34024
- **Esposito A**<sup>✉</sup>, Oggier T, Gerritsen HC, Lustenberger F, Wouters FS (2005), "All-solid-state lock-in imaging for wide-field fluorescence lifetime sensing". Opt. Express 13(24):9812-9821
- **Esposito A**<sup>✉</sup>, Gerritsen HC, Wouters FS (2005), "Fluorescence lifetime heterogeneity resolution in the frequency domain by lifetime moments analysis". Biophys. J. 89(6):1-14
- **Esposito A**<sup>✉</sup>, Cupello A, Pellistri F, Marchetti C, Robello M (2005), "Two-photon analysis of lead accumulation in cerebellar granule cells". Neurochem. Res. 30(8):949-54
- Cupello A, **Esposito A**, Marchetti C, Pellistri F, Robello M (2005), "Calcium accumulation in neurites and cell bodies of rat cerebellar granule cells in culture: effects on GABA(A) receptor function". Amino Acids 28(2):177-182
- Pellistri F, Cupello A, **Esposito A**, Marchetti C, Robello M (2004), "Two-photon imaging of calcium accumulation in rat cerebellar granule cells.". Neuroreport 15(1):83-87
- **Esposito A**, Federici F, Usai C, Cannone F, Chirico G, Collini M, Diaspro A (2004), "Notes On Theory And Experimental Conditions Behind Two-Photon Excitation Microscopy". Microsc. Res. Tech. 63(1):12-17



### Book Chapters

- **Esposito A**<sup>✉</sup>, Schlachter S, Kaminski Schierle GS, Elder AD, Diaspro A, Wouters FS, Kaminski CF, Iliev AI (2009), "Quantitative fluorescence microscopy techniques" in Cytoskeleton Methods and Protocols Ed.: Ray H. Gavin, Humana Press Series Methods in Molecular Biology).
- Gerritsen HC, Agronskaia S, Bader A, **Esposito A** (2008), "Time Domain FLIM: theory and Instrumentation" in FRET & FLIM Imaging Techniques, Gadella TWG ed.; Series Laboratory techniques in biochemistry & molecular biology, van der Vliet PC and Pillai S eds.
- **Esposito A**, Gerritsen HC, Wouters FS (2008), "Fluorescence lifetime imaging microscopy: quality assessment and standards", in Standardisation in Fluorometry: State-of-the Art and Future Challenges Ed.: Resch-Genger U (Springer Series Methods and Applications of Fluorescence, Ed.: Wolfbeis O)
- **Esposito A**, Wouters FS (2004), "Fluorescence Lifetime Imaging Microscopy", in Current Protocols in Cell Biology. Eds.: Bonifacino JS, Dasso M, Harford JB, Lippincott-Schwartz J, and Yamada KM, John Wiley & Sons, New York, NY.

### Patents

- Esposito A, Wouters FS, Lustenberger F, Oggier T, "Apparatus and method for fluorescence lifetime imaging" EP1746410 and US 2007/0018116 A1 (bought by Carl Zeiss GmbH)

### Thesis

- PhD thesis: "Molecular and Cellular Quantitative Microscopy", Cuvillier Verlag (Goettingen, Germany) ISBN-10: 3865378293; Prof. H.Gerritsen (supervisor) and Prof. F.Wouters (co-supervisor)
- Degree thesis: "Two-photon analysis of intracellular divalent ions in rat cerebellar granules culture" Prof. M. Robello (supervisor) and Dr. C. Marchetti (co-supervisor)

### Other relevant outputs

- Nature Podcast interview. URL: [www.nature.com/articles/d41586-020-01790-y](http://www.nature.com/articles/d41586-020-01790-y)
- Women in STEM campaign leaflet. DOI: 10.5281/zenodo.3698109
- Inclusiveness in STEM campaign leaflet. DOI: 10.5281/zenodo.3698132
- GitHub Repositories: URL: [github.com/alesposito](https://github.com/alesposito) and [github.com/Esposito-Lab](https://github.com/Esposito-Lab)

### Oral communications at international events

- (invited) 02.03.21, "Fast multiplexed single-cell biochemistry", 13<sup>th</sup> Time-resolved microscopy international course organised by PicoQuant, Germany
- (invited) 23.11.20, Symposium "Application of fluorescence lifetime imaging (FLIM) in life sciences" organised by Center for Advanced Imaging HHU Düsseldorf, Imaging Network at

WWU Münster and Light Microscopy Facility of Center for Molecular and Cellular Bioengineering (CMCB) in Dresden

- (invited) 9.10.2019 “Probing biochemical networks with multiplexed FLIM”, Photonex Europe 2019, Biophotonics & Biomedical Microscopy, Coventry, UK.
- (invited) 17.11.2018 “Live cell biochemistry by light: a single-cell biochemistry of cell fate”, International Meeting on Optical Biosensors, Ghent, Belgium.
- 28.03.2018 “Understanding cellular decisions: ‘old’ and ‘novel’ microscopy tools”, Focus on Microscopy, Singapore.
- 26.03.2018 “Multi-colour FLIM for a single-cell systems biology of cell fate”, Focus on Microscopy, Singapore.
- (invited) 13.06.2018 “Optical microscopy for systems biology”, IVSLA International School on Nanoscale Optical Microscopy – Venice, Italy
- 11.04.2017 “Multi-colour FLIM for a single-cell systems biology of cell fate”, Focus on Microscopy, Bordeaux
- (invited) 17.10.2016 “A ‘systems biology’ of cell fate: insights into the biochemical determinants of cellular decisions and cell-to-cell variability”, Discussion Meeting on Conflict and Cooperation in Cellular Populations, Bangalore (IN)
- 14.07.2016 “Frontiers in biochemical imaging: multiplexed FRET sensors and Optogenetics”, Frontiers in BiImaging, London (UK)
- 04.04.2016 “Frontiers in biochemical imaging: multiplexed FRET sensors and Optogenetics”, International Discussion Meeting-Förster Resonance Energy Transfer in life sciences: FRET2, Goettingen (DL)
- 02.07.2015 “FLIM and optogenetics: A systems microscopy approach”, MMC2015, Manchester (UK)
- 30.03.2015 “FLIM and optogenetics: A systems microscopy approach”, Focus on Microscopy, Goettingen (DL)
- (invited) 13.10.2014 “Beyond range: innovating fluorescence microscopy”, CMOS SPAD Applications Workshop, Edinburgh (UK)
- (invited) 04.04.2014 “Multiplexing biochemical reactions within the cell: new approaches and sensors”, Third Workshop on High-speed Imaging Sensors, Oxford (UK)
- 25.03.2013 “Hyperdimensional imaging and biochemical multiplexing”, Focus on Microscopy, Maastricht, (NL)
- (invited) 13.11.2012 "Imaging cell biochemistry: from state-of-the-art to Systems Microscopy", Biomolecular Interactions Analysis 2012 - Instruct Centre Training Course, Porto (PT)
- (invited) 14.09.2012 "Towards system microscopy: new tools to map cell biochemistry", Frontiers in Imaging: Ultrafast Non-linear Microscopy and Biophotonics User Group Meeting and Workshop, London (UK)
- (invited) 26.01.2012 "Nanobiotechnologies meet Systems Biology", ANIS3, Vipiteno (Italy)
- 19.04.2011 "Hyperdimensional imaging microscopy and tumour imaging", FoM2011, Konstanz (Germany)
- (invited) 28.01.2011, "Beyond range: innovating fluorescence microscopy", RISA2011, Trento (Italy)

- 12.09.2010, "Imaging biochemical pathways by hyper-dimensional imaging microscopy", SIBPA 2010, Arcidosso (Italy)
- (invited) 26.04.2010, "High-throughput high-content screening with biophysical imaging techniques: state-of-the-art and prospects", High Throughput Screening conference, London (UK)
- 30.03.2010, "Multiplexed measurement of molecular interactions by hyperdimensional imaging microscopy", FocusOnMicroscopy 2010, Shanghai, China
- 24.02.2010, "Multiplexed measurement of molecular interactions using hyper-spectral imaging and multi-parametric detection", Biophysical Society Meeting, San Francisco (USA)
- (invited) 14.10.2009, "Advanced optical tools for the characterisation of *Plasmodium falciparum* infected red blood cells", Advanced drug delivery and diagnostics, 13-16 October, Trieste (IT)
- (invited) 12.07.2009, "Quantitative imaging and the homeostasis of *Plasmodium falciparum* infected erythrocytes", European Biophysics Congress (EBSA2009), Genoa (IT)
- 14.04.2009, "Photon-statistics and Förster resonance energy transfer", Focus On Microscopy 2009, Krakow (PL)
- 20.09.2008, "Quantitative imaging and the homeostasis of *Plasmodium falciparum* infected erythrocytes", SIBPA 2008, Rome (IT)
- 14.04.2008, "Fluorescence techniques for the investigation of the homeostasis of malaria infected red blood cells", Focus on Microscopy 2008, Osaka (JP)
- 21.09.2006, "Fluorescence lifetime image based screening and quantitative FRET-based biosensors", SIBPA2006, Palermo (IT)
- 10.04.2006, "Image based screening and unsupervised fluorescence lifetime imaging", Focus on Microscopy 2006, Perth (AU)
- 10.10.2005, "Automated Fluorescence Lifetime Imaging Microscopy (FLIM) for (ultra)High-Throughput and High-Content Screening: theoretical and technological developments", Dutch meeting on cellular and molecular biophysics, Lunteren (NL)
- 24.06.2003, "Two-photon analysis of lead accumulation in cerebellar granule cells", INFM Meeting, Genoa (IT)
- 11.09.2002, "Two Photon Fluorescence Microscopy Study Of Calcium Accumulation In Cerebellar Granule Cells", SIBPA2002, Trento (IT)

#### Other invited lectures

- 20.20.21, "Biophotonics meet systems biology: innovating discovery science", Seminar at the Department of Physics and Astronomy, University of Sheffield (online event)
- 28.10.21, "Sensing and manipulating cell biochemistry by light", Lecture at the Sensor CDT
- 18.02.21, "Live cell biochemistry by light: a single-cell biochemistry of cell fate", Seminar at Brunel University (online event, host: Profs. P Vagnarelli and B Tanos)
- 24.09.20, "Cell biochemistry by light: a systems biology of cell fate", Seminar Series at Zhejiang University; host: Dr Hongqing Liang

- 17.09.20, “Cell biochemistry by light: a systems biology of cell fate”, Lecture Series Insights in Signaling Dynamics and Encoding (InSiDE 2020) organised by John Albeck (UC Davis)
- 11.05.20, 'Probing and controlling cell biochemistry by light: FRET/FLIM & Optogenetics', Imaging ONE WORLD lecture series
- 10.03.20, Tech-Know Tuesday Talk: “Live single cell biochemistry by light”, Jeffrey Cheah Biomedical Centre, Cambridge; host: JCBC post-doc society
- 24.02.20, “Genetic and non-genetic heterogeneity in cancer”, CRUK Early Detection Multidisciplinary Networking event, Cambridge; hosts: Prof. R. Fitzgerald and Dr S. Bohndiek
- 09.12.19, “Multiplexed biochemical imaging for cancer detection”, Jeffrey Cheah Biomedical Centre, Cambridge; host: Prof. David Rowitch
- 09.12.19, “The biochemistry of oncogenesis”, Department of Chemistry, Cambridge; host: Prof. David Klenerman
- 24.03.2019, “The cell: a living computer in a droplet of water”, Cambridge Science Festival
- 19.07.2018, “Live cell biochemistry by light: a single-cell systems biology of cellular decisions”, King’s College London, host: Dr. Susan Cox
- 29.03.2018, “Live cell biochemistry by light: single-cell systems biology of cell fate”, Mechanobiology Institute, Singapore, host: Prof. G.V. Shivashankar
- 22.11.2017 “Developing light microscopy to establish a single-cell systems biology of cell fate” University of Leeds, host: Dr Sally Peyman
- 06.10.2017 “Live single-cell biochemistry by light: understanding cellular decisions”, Babraham Institute, Cambridge, host: Dr Simon Cook and Dr Simon Walker
- 17.05.2017 “Multi-colour FLIM and optogenetics for a single-cell systems biology of cell fate”, Leica Technoseum, Mannheim.
- 19.02.2016, “Live cell biochemistry by light”, CI CRUK, Cambridge, host: Dr. Stefanie Reichelt
- 28.10.2015, “Optogenetic tools to understand how biochemical networks determine cell fate decisions”, Research Interfaces Workshop, Cambridge
- 30.10.2013, “Probing biochemical networks to understand cell fate decisions”, Department of Genetics, University of Cambridge, host: Prof. Alfonso Martinez-Arias
- 17.10.2011, “Innovating detection systems: hyper-dimensional imaging microscopy”, Cambridge Leica Workshop
- 03.02.2011, “Towards systems microscopy: new tools to map cell biochemistry”, Center for Applied Photonics, Konstanz (Germany), host: Prof. Elisa Ferrando-May
- 23.07.2010, “Optical sensors and current developments in the healthcare sector”, Lecture for Beijing University of Chemical Technology students, Dept. Chem. Eng and Biotech., Uni. Cambridge (UK), host: Dr. A. Fisher
- 18.06.2010, “Imaging biochemistry inside the cell”, Microscopy and Molecular Imaging in Cambridge Forum, Cambridge (UK), host: Dr. Sumeet Mahajan
- 30.10.2008, “Imaging biochemical pathways in the living cell”, Cluster of Excellence Macromolecular Complexes, Frankfurt (Germany), host: Prof. Jürgen Bereiter-Hahn
- 18.06.2008, “Imaging biochemical pathways in the living cell”, Fondazione Bruno Kessler, Trento (Italy), host: Dr David Stoppa
- Advanced Microscopy Workshop ENI-Göttingen, lecturer and practical courses (years 2004 and 2005)

**Languages and immigration status**

Italian (native) and English (fluent)

Italian and British dual national