Francois El-Daher (Waharte)
IQB3 - Centre for Engineering Biology
School of Biological Sciences
University of Edinburgh
francois.el-daher@ed.ac.uk
https://orcid.org/0000-0002-6676-3970

EDUCATION

1998 - 2002	Ph.D. in Physics, Laboratory of Prof. Jacques Prost, Institut Curie, France
1994 - 1997	M.Res. Physics, University of Paris XI, Orsay, France

RESEARCH EXPERIENCE

2022 - present **Postdoctoral Research Fellow**, Laboratory of Prof. Peter S. Swain, The University of Edinburgh - *Mechanism of cellular decision-making during stress-response in the budding yeast*

2018 - 2022 **Postdoctoral Research Fellow**, Laboratory of Prof. Catherina and Thomas Becker, The University of Edinburgh - *Biophysical approach of tissue repair after CNS injuries in zebrafish larvae.*

2006 - 2018 **Research Associate/Engineer CNRS (UMR144)** - Cell and Tissue Imaging Facility - Institut Curie, Paris - *Development of FLIM/FRET/FRAP methods, two-photon microscopy, intravital imaging, light-sheet microscopy (hardware, software, data processing and analysis)*

2003 - 2006 **Postdoctoral Research Fellow,** Laboratories of Dr. J. Salamero (Institut Curie) and Dr. L. Heliot (Institut de Biologie de Lille), France - *Interactions between Rab proteins in living cells by two-photon FRET/FLIM.*

1998 - 2002 **Ph.D. thesis**, Laboratory of Prof. Jacques Prost, Institut Curie, Paris, France - *Dynamics of brush border cytoskeletal proteins revealed by two-photon FRAP: experimental results and theoretical tools.* (Supervisors: F. Amblard/E. Coudrier)

1997 **Master project,** Laboratory of Prof. Jacques Prost, Institut Curie, Paris, France **-** *Functional integral formalism of molecular motors motion.* (Supervisors: F.Jülicher and J. Prost)

1996 **Master project,** Istituto Nazionale di Fisica Nucleare, Pisa, Italy - *Characterisation of the properties of the seismic filters on the gravitational waves detector VIRGO.* (Supervisor: R. De Salvo)

RECENT METHODS/TOOLS DEVELOPMENT

2023	Multi-chamber microfluidics system for sequential imaging of 20 yeast strains
2021	Laser-ablation spinal cord lesion protocol for the UK Zebrafish Screening Facility
2020	Observation chamber for long-term in vivo imaging on upright microscopes
2019	Visual stimulation system for zebrafish larvae based on Arduino microcontroller

GRANTS AND AWARDS (as principal investigator)

2021 Moray Endowment Fund - *Development of innovative genetic tools for in vivo molecular analysis of force generation by microglia during brain tissue repair* **£1998**
2020 Wellcome Trust iTPA Translational Innovation prize - *Primary market research for observation chamber for in vivo imaging in biomedical research* **£1000**
2001-2002 French Association for Cancer Research - Ph.D. Fellowship

GRANTS (as co-applicant)

2015 ANR NPC Plastic 2015 (Plasticity of the nuclear pore complex) **627 k€**
2012 CanNoLi - DIM Cancer IdF (Intravital imaging) **2 M€**
2012 ANR - Labex CelTisPhyBio (Light-sheet microscopy project) **128 k€**
2007 FRM - (Multimodal microscopy) **310 k€**

OTHER PROFESSIONAL ACTIVITIES

2017- present **Member of the Health and Biology Peer-Review Committee (PRC5)** for the French National Synchrotron Light Facility SOLEIL
2007 -2013 **Member of the Steering Committee** of the National Technological Network for Optical Microscopy In Biology (RTmfm)
2014 **Member of PhD committee** for Juliana Valle Costa Silva, INRA Rennes
2013 **Ph.D. examiner** for Pauline Loison, Agrosud Dijon
2011 **Expert** for evaluating applications to a public funding call - Region Aquitaine
2010 **Member of jury** for recruiting an engineer for a permanent position at University of Lille 1

Referee for the Journal of the Royal Society Interface, Biophysical Journal, Journal of Dairy Science, Journal of Selected Topics in Signal Processing.

STUDENT SUPERVISION

2019 - 2020 3 **MSc students** - University of Edinburgh
2010 - 2014 **Ph.D. co-supervisor** of Philippe Roudot with Charles Kervrann (INRIA, France)
2001 - 2017 5 students from **Master 2** (5th-year degree), 3 from **Master 1** (4th year) and 1 from **License 3** (3rd year)

MAIN TEACHING EXPERIENCE

2009 - 2017 **ENSEA** (Cergy, France), lectures on optical microscopy in biology
2012 - 2018 **CNRS Formation** (Paris and Gif-sur-Yvette, France), Training on confocal microscopy, F-techniques, and image analysis
2010 - 2018 **Institut Curie** (Paris, France), training on image processing using ImageJ (French and English, workshops on basic image processing and macro programming)
2004 - 2016 **MiFoBio** Summer Schools, practical workshops on advanced F-techniques
2010 - 2014 **ESPCI** (Paris, France), lectures on quantitative fluorescence microscopy in biology
2000 - 2001 **University of Cergy-Pontoise**, biochemistry practical labs

PUBLIC ENGAGEMENT ACTIVITIES

2020 **Neuron Safari**, Leith Labs, Ocean Terminal, Edinburgh. January 18th, 2020. *Educational game based on Minecraft to teach basics facts on the brain*
2016 - 2017 **Apprentis Chercheurs** program (French Ministry for Education, Paris Council), Supervision of 6 high-school and junior school students over several weeks.
2015 - 2016 **Junior school project supervision** (French Ministry for Education) - Supervision of individual projects as an initiation to scientific research (3 students).

BIBLIOGRAPHY

Publications

(H-index 20 - Web Of Science)

1. Clark I., **El-Daher F.**, Swain P.S. Multi-chamber imaging microfluidics device for parallel measurement of responses of Saccharomyces cerevisiae to environmental changes (in preparation)
2. **El-Daher F.** and Swain P.S. Theory of chemoreception in a transient environment (in preparation)
3. **El-Daher F,** et al. Microglia are essential to repair the brain tissue after injury by exerting local mechanical forces. *Cell Dev.* (in revision)
4. Kyumurkov A., Bouin AP, Boissan M, Manet S, Baschieri F, Proponnet-Guerault M, Balland M, Destaing O, Régent-Kloeckner M, Calmel C, **Waharte F**, Chavrier P, Montagnac G, Planus E and Albiges-Rizo C. (**2023**) Force tuning through regulation of clathrin-dependent integrin endocytosis. *J. Cell Biol.* Jan 2;222(1)
5. **El-Daher F**, Early JJ, Richmond CE, Jamieson R, Becker T, Becker CG. (**2021**) Controlled Semi-Automated Lased-Induced Injuries for Studying Spinal Cord Regeneration in Zebrafish Larvae. *J Vis Exp.* Nov 22;(177).
6. **El-Daher F**, Becker CG: Neural circuit reorganisation after spinal cord injury in zebrafish. *Curr Opin Genet & Dev* **2020**, 64:44–51.
7. Folz H, Nino CA, Taranum S, Caesar S, Latta L, **Waharte F**, Salamero J, Schlenstedt G, Dargemont C: SUMOylation of the nuclear pore complex basket is involved in sensing cellular stresses. *J Cell Sci* **2019**, 132.
8. Röper J-C, Mitrossilis D, Stirnemann G, **Waharte F**, Brito I, Fernandez-Sanchez M-E, Baaden M, Salamero J, Farge E: The major β-catenin/E-cadherin junctional binding site is a primary molecular mechano-transductor of differentiation in vivo. *Elife* **2018**, 7.
9. Chen C, Paul-Gilloteaux P, Vignaud T, Salamero J, **Waharte F**. Development of methods for image correlation analysis of molecular mobility in a spatially and temporally complex biological system. *arXiv* **2017** 1710.08186
10. Basset A, Bouthemy P, Boulanger J, **Waharte F**, Salamero J, Kervrann C: An extended model of vesicle fusion at the plasma membrane to estimate protein lateral diffusion from TIRF microscopy images. *BMC Bioinformatics* **2017**, 18.
11. Biondini M, Sadou-Dubourgnoux A, Paul-Gilloteaux P, Zago G, Arslanhan MD, **Waharte F**, Formstecher E, Hertzog M, Yu J, Guerois R, et al.: Direct interaction between exocyst and Wave complexes promotes cell protrusions and motility. *J Cell Sci* **2016**, 129.
12. Roudot P, Kervrann C, Blouin CM, **Waharte F**. Lifetime estimation of moving subcellular objects in frequency-domain fluorescence lifetime imaging microscopy. *J Opt Soc Am A Opt Image Sci Vis* **2015**, 32.
13. Rogov A, Irondelle M, Ramos Gomes F, Bode J, Staedler D, Passemard S, Courvoisier S, Yamamoto Y, **Waharte F**, Ciepielewski D, et al.: Simultaneous Multiharmonic Imaging of Nanoparticles in Tissues for Increased Selectivity. *ACS Photonics* **2015**, 2.
14. Chenouard N, et al.: Objective comparison of particle tracking methods. *Nat Methods* **2014**, 11.
15. Delevoye C, Miserey-Lenkei S, Montagnac G, Gilles-Marsens F, Paul-Gilloteaux P, Giordano F, **Waharte F**, Marks MS, Goud B, Raposo G. Recycling endosome tubule morphogenesis from sorting endosomes requires the kinesin motor KIF13A. *Cell Rep* **2014**, 6.
16. Rosse C, Lodillinsky C, Fuhrmann L, Nourieh M, Monteiro P, Irondelle M, Lagoutte E, Vacher S, **Waharte F**, Paul-Gilloteaux P, et al.: Control of MT1-MMP transport by atypical PKC during breast-cancer progression. *Proc Natl Acad Sci U S A* **2014**,111:E1872–E1879.
17. Bertolin G, Ferrando-Miguel R, Jacoupy M, Traver S, Grenier K, Greene AW, Dauphin A, **Waharte F**, Bayot A, Salamero J, et al.: The TOMM machinery is a molecular switch in PINK1 and PARK2/PARKIN- dependent mitochondrial clearance. *Autophagy* **2013**, 9.

18. Umlauf D, Bonnet J, **Waharte F**, Fournier M, Stierle M, Fischer B, Brino L, Devys D, Tora L: The human TREX-2 complex is stably associated with the nuclear pore basket. *J Cell Sci* **2013**, 126.
19. Miermont A, **Waharte F**, Hu S, McClean MN, Bottani S, Léon S, Hersen P: Severe osmotic compression triggers a slowdown of intracellular signaling, which can be explained by molecular crowding. *Proc Natl Acad Sci U S A* **2013**, 110.
20. Angénieux C, **Waharte F**, Gidon A, Signorino-Gelo F, Wurtz V, Hojeij R, Proamer F, Gachet C, van Dorsselaer A, Hanau D, et al.: Lysosomal-associated transmembrane protein 5 (LAPTM5) is a molecular partner of CD1e. *PLoS One* **2012**, 7.
21. Gidon A, Bardin S, Cinquin B, Boulanger J, **Waharte F,** Heliot L, de la Salle H, Hanau D, Kervrann C, Goud B, et al.: A Rab11A/Myosin Vb/Rab11-FIP2 Complex Frames Two Late Recycling Steps of Langerin from the ERC to the Plasma Membrane. *Traffic* **2012**, 13.
22. Floury J, Madec M-N, **Waharte F**, Jeanson S, Lortal S: First assessment of diffusion coefficients in model cheese by fluorescence recovery after photobleaching (FRAP). *Food Chem* **2012**, 133.
23. Rosse C, Chavrier P, Lagoutte E, Irondelle M, Nourieh M, **Waharte F,** Monteiro P, Sengmanivong L, Paul-Gilloteaux P, Romao M, et al.: Atypical PKC is involved in breast tumor cell invasion through the control of MT1-MMP trafficking. *Mol Biol Cell* **2012**, 23.
24. Dokudovskaya S, **Waharte F**, Schlessinger A, Pieper U, Devos DP, Cristea IM, Williams R, Salamero J, Chait BT, Sali A, et al.: A conserved coatomer-related complex containing Sec13 and Seh1 dynamically associates with the vacuole in Saccharomyces cerevisiae. *Mol Cell Proteomics* **2011**, 10.
25. Bourouina N, Husson J, **Waharte F**, Pansu RB, Henry N: Formation of specific receptor-ligand bonds between liquid interfaces. *Soft Matter* **2011**, 7.
26. Rey M, Irondelle M, **Waharte F**, Lizarraga F, Chavrier P: HDAC6 is required for invadopodia activity and invasion by breast tumor cells. *Eur J Cell Biol* **2011**, 90.
27. **Waharte F**, Steenkeste K, Briandet R, Fontaine-Aupart M-P: Diffusion measurements inside biofilms by image-based fluorescence recovery after photobleaching (FRAP) analysis with a commercial confocal laser scanning microscope. *Appl Environ Microbiol* **2010**, 76.
28. Miserey-Lenkei S*, **Waharte F***, Boulet A, Cuif M-H, Tenza D, El Marjou A, Raposo G, Salamero J, Héliot L, Goud B, et al.: Rab6-interacting protein 1 links Rab6 and Rab11 function. *Traffic* **2007**, 8. ***equal contributions**
29. Spriet C, Trinel D, **Waharte F**, Deslee D, Vandenbunder B, Barbillat J, Héliot L: Correlated fluorescence lifetime and spectral measurements in living cells. *Microsc Res Tech* **2007**, 70.
30. **Waharte F**, Spriet C, Héliot L: Setup and characterization of a multiphoton FLIM instrument for protein-protein interaction measurements in living cells. *Cytom Part A* **2006**, 69.
31. **Waharte F**, Brown CM, Coscoy S, Coudrier E, Amblard F: A two-photon FRAP analysis of the cytoskeleton dynamics in the microvilli of intestinal cells. *Biophys J* **2005**, 88.
32. Coscoy S, **Waharte F**, Gautreau A, Martin M, Louvard D, Mangeat P, Arpin M, Amblard F: Molecular analysis of microscopic ezrin dynamics by two-photon FRAP. *Proc Natl Acad Sci U S A* **2002**, 99.
33. Beccaria M, et al.: The creep problem in the VIRGO suspensions: a possible solution using Maraging steel. *Nucl Instruments & Methods Phys Res Sect A* **1998**, 404:455–469.
34. Beccaria M, et al.: Extending the VIRGO gravitational wave detection band down to a few Hz: metal blade springs and magnetic antisprings. *Nucl Instruments & Methods Phys Res Sect A* **1997**, 394:397–408.

Proceedings

35. Basset A, Bouthemy P, Boulanger J, **Waharte F**, Kervrann C, Salamero J. Detection and estimation of membrane diffusion during exocytosis in TIRFM image sequences. In *Proceedings - International Symposium on Biomedical Imaging.* **2015**.

36. Kervrann C, Roudot P, **Waharte F** Approximate Bayesian computation, stochastic algorithms and non-local means for complex noise models. *IEEE International Conference on Image Processing, ICIP* **2014**
37. Fortun D, Chen C, Paul-Gilloteaux P, **Waharte F**, Salamero J, Kervrann C: Correlation and variational approaches for motion and diffusion estimation in fluorescence imaging. *In European Signal Processing Conference.* **2013**
38. Roudot P, Kervrann C, Boulanger J, **Waharte F**. Noise modeling for intensified camera in fluorescence imaging: Application to image denoising. In *Proceedings - International Symposium on Biomedical Imaging.* **2013**.
39. Chessel A, **Waharte F**, Salamero J, Kervrann C. A Maximum Likelihood method for lifetime estimation in photon counting-based Fluorescence Lifetime Imaging Microscopy. *In European Signal Processing Conference* **2013**
40. Roudot P, Kervrann C, **Waharte F**, Boulanger J: Lifetime map reconstruction in frequency-domain fluorescence lifetime imaging microscopy. I*n Proceedings - International Conference on Image Processing, ICIP.* **2012**
41. Oubekka SD, Briandet R, **Waharte F**, Fontaine-Aupart M-P, Steenkeste K: Image-based fluorescence recovery after photobleaching (FRAP) to dissect vancomycin diffusion-reaction processes in Staphylococcus aureus biofilms. In *Progress in Biomedical Optics and Imaging - Proceedings of SPIE.* **2011**
42. Coscoy S, **Waharte F**, Gautreau A, Martin M, Huguet E, De Mey J, Louvard D, Mangeat P, Arpin M, Amblard F: Two-photon FRAP experiments and simulations to study the dynamics of cytoskeletal proteins. In P*rogress in Biomedical Optics and Imaging - Proceedings of SPIE*. **2004**.

Book Chapters

1. Paul-Gilloteaux P, **Waharte F**, Singh MK, Parrini MC: A biologist-friendly method to analyze cross-correlation between protrusion dynamics and membrane recruitment of actin regulators. *Methods in Molecular Biology* **2018**.
2. Bridier A, Tischenko E, Dubois-Brissonnet F, Herry J-M, Thomas V, Daddi-Oubekka S, **Waharte F**, Steenkeste K, Fontaine-Aupart M-P, Briandet R: Deciphering biofilm structure and reactivity by multiscale time-resolved fluorescence analysis. *Adv Exp Med Biol.* **2011**.
3. C. Klein and **F. Waharte**. Analysis of Molecular Mobility by Fluorescence Recovery After Photobleaching in Living Cells. *Microscopy : Science, Technology, Applications and Education - A. Méndez-Vilas and J. Díaz (Eds.)* Dec. **2010**

Recent Oral And Poster Communications

1. **El-Daher F. & Swain P.S.** Cellular chemoreception in fast changing environments. *EPCP Summer School***,** July 10, **2023**. *Poster*.
2. **El-Daher F.,** Becker T, Becker C.G. Microglia are essential to repair the injured brain tissue by exerting mechanical forces. *6th SBPRC* September 27, **2021**. (Online). *Talk*. **1rst prize for the best talk**.
3. **El-Daher F.,** Becker T, Becker C.G. Brain tissue repair and mechanical forces in zebrafish larvae. *EMBO Workshop – Physics of Life*, June, 8th **2021** (Online), *Poster*.
4. **Waharte F.** & Herrgen L. How are brain structure and function restored after a mechanical injury? ***Neuroscience Day*** March 13th, **2019**. Edinburgh. *Poster*.
5. **Waharte F.** A low-cost and easy-to-use visual stimulation system for imaging neuronal activity in the Zebrafish larvae. *EdinFishTech*, August 29th, **2019**. Edinburgh*. Poster and talk*.