Ludovic Leconte, Engineer

Nationality: French
Birthdate: 11/11/1979
SERPICO Team, Inria – Institut Curie, UMR144 CNRS.
12 rue Lhomond, 75005 Paris, FRANCE
Email: ludovic.leconte@curie.fr
Phone : +33 685310257

My research experience ranges from the construction/running of advanced optical microscopes to processing/analyzing as well as visualization of 3D+time image data on cell biology applications, I have also more than 10 years of experience in imaging facilities. Since two years, I am developing my own project, while being in charge of our team as a lab manager and still involved in service in the imaging platform of the Curie institute.

PROFESSIONAL EXPERIENCE

Engineer – Team SERPICO Paris with Dr. C. Kervrann and Dr. J. Salamero, 09/2018 up to now
French National Institute for Research in Digital Science and Technology (Inria) & CNRS-Institut Curie, Paris, France
Project: my project in the team is to evaluate and measure in time and space, the putative interactions of the different components of the endocytosis pathway with mitochondria. I approach it by acquiring 3D data sets of double fluorescently labeled single cells at high temporal frequencies by lattice light sheet microscopy. The analysis of the 3D dynamics of these interactions between endosomal membranes and mitochondria is performed using various tracking tool, such as Trackmate and their visualization via Napari or new VR/AR approaches developed within the team. As a first goal I plan to build a 3D+t Atlas of these interactions in physiological conditions. In a second step similar experiments will be performed under perturbed conditions mimicking autophagy, hypoxia…).
Service: I am also in charge of the LLSM and of the Multi-Angle TIRFM on the Imaging platform of the Institut Curie (PICT)which is part of the National research Infrastructure "France-bioImaging", for 20% of my working time. For this I maintain the setups, manage the user sessions, train them and help them with data analysis.
In addition, I collaborate in the development of machine learning-driven navigation and interaction techniques for 3D+Time data enabling the analysis of localized intra-cellular events (endocytosis and exocytosis) and cell processes (migration, division, etc.).
Finally I am in charge of the exploitation of biological models (cell culture, transfections, data acquisition)take care of orders, and work closely with colleagues from the Rennes part of the team to develop and test new software tools

Facility Engineer –PICT-IBISA-Institut Curie directed by Dr. J.Salamero 03/2013 – 09/2018
On the PICT imaging platform at the Curie Institute in the UMR 144 cell biology department, my schedule was divided into several functions, 60% of the time on the platform and 40% on system development.
On the platform, I was in charge of so-called conventional systems (video microscope, spinning, epi-fluorescence) as well as more advanced systems (SIM, Live SR) and I took care of user training.
Regularly, I made metrology tests on the systems
I was also in charge of "home-made" development or improvement on more sophisticated systems (EasySPIM, Multi-Photon, Frap-W1, LLSM that I had to set up before it was opened on a project basis on the platform).
I also organize demos in order to make new proposals for imaging and application modalities (sample transparency, automation, etc.).
Finally I was responsible for the high-resolution 3D laser printer platform. (Solidwork software referent to design 3D parts for microscopy elements).

Facility Engineer –BIOEMERGENCES Directed by Dr. N. Peyrieras 01/2011 – 02/2013
On this facility, I was in charge of the maintenance and development of biphoton microscopes. More precisely, I was in charge of setting up an optical coupling of two biphoton lasers to be send to two SP5 Leica confocals. The power system had to be motorized and controllable on the acquisition PCs of the two systems. I was also in charge of the first prototype of DSLM (Digital Scanned Laser light sheet fluorescence) in France.
I designed new protocols for their use and developed new techniques of sample preparation for the DSLM (large samples).

Engineer's Assistant–LULI (LABORATORY FOR THE USER OF INTENSE LASERS) Polytechnic School 09/2008 – 12/2010
My first mission was the operation of high power laser chains (Kj). I had to take care of the alignment, the energy measurement (calorimeters), the calibration control before each shot. I also worked on the archiving of the shooting data, preparation of the experiments to the control of the optics (spectrophotometer, interferometer, bidimensional measurement....)
I also had to check that the whole chain was under a secondary vacuum. Finally, I worked with very specific instrumentation of the chain (deformable mirror, Hartmann, Shearring...)

Laser technician in the Quantel company 09/2005 – 09/2008

My first mission was to assemble lasers for dermatology and ophthalmology. I also had to do a metrology on the optical and electronic components before starting the laser assembly. Then I had to follow a very strict protocol to check the alignment and the characterization of the beam (polarization, M^2, imaging, energy, stability...)
Finally I collaborated with the R&D and the industrialization departments for the improvement of the fiber laser so that it can be commercialized

EDUCATION

2019	**CNAM (conservatoire des arts et metiers) Unit on Molecular Biology** evening classes, Paris
2019	**Master Sciences, Technology, Health, Mention Biology Health** Rouen Mention Bien
2004	**Professional degree in electronics and optics for telecommunications** Limoges, Mention assez bien
2003	**BTS in optical engineering Option photonics in alternance in Angoulême** Companie Highwave Optical Technologie specialist in component and fibers optical for the telecommunication in Paris and Lannion

PUBLICATIONS

[1] S. Prigent, C. A. Valades-Cruz, L. Leconte, J. Salamero and C. Kervrann. STracking: a free and open-source python library for particle tracking and analysis, 2022 (Bioiformatics)

[2] A. Salomon, C. Valades-Cruz**, L. Leconte**, C. Kervrann. **Dense mapping of intracellular diffusion and drift from single particle tracking data analysis,** 2022 (in preparation)

[3] Sylvain Prigent.*, Hoai-Nam Nguyen.*, **Ludovic Leconte,** Valades-Cruz, C. A, Bassam Hajj, Salamero, J., Kervrann, C SPITFIR(e): A supermaneuverable algorithm for restoring 2D-3D fluorescence images and videos, and background subtraction. bioRxiv (2022).

[4] Prigent, S.*, Valades-Cruz, C. A.*, **Leconte, L.***, Maury, L., Salamero, J., Kervrann, C. BioImageIT: Open-source framework for integration of image data-management with analysis. bioRxiv (2021) [Manuscript under revision in Nat. Methods.]

[5] Diana Vargas-Hurtado, Jean-Baptiste Brault, Tristan Piolot, **Ludovic Leconte**, Nathalie da Silva, et al.. Differences in Mitotic Spindle Architecture in Mammalian Neural Stem Cells Influence Mitotic Accuracy during Brain Development. Current Biology - CB, Elsevier, 2019, 29 (18), pp.2993-3005.e9.⟨10.1016/j.cub.2019.07.061⟩. ⟨hal-02400423⟩ 2019

[6] **Ludovic Leconte**, Francois Waharte, Jean Salamero EasySPIM: AN Easy Light Sheet Microscope Imaging & Microscopy WILEY-Volume20-JUIN 2018

[7] Venzac B; Madoun R; Benarab T; Monnier S; Cayrac F ; Myram S; **Leconte, L**; Amblard F; Viovy JL; Descroix S. Engineering small tubes with changes in diameter for the study of kidney cell organization BIOMICROFLUIDICS Volume: 12 Issue: 2; Article Number: 024114 DOI: 10.1063/1.5025027 2018

[8] Annexin-A5 organized in 2D-network at the plasmalemma eases human trophoblast fusion By: Degrelle, Severine A.; Gerbaud, Pascale; **Leconte, Ludovic**; et al. SCIENTIFIC REPORTS Volume: 7 Article Number: 42173 Published: FEB 2017

[9] Severine Degrelle, Pascale Gerbaud, **Ludovic Leconte**, Fátima Ferreira, Guillaume Pidoux. Annexin-A5 organized in 2D-network at the plasmalemma eases human trophoblast fusion OPEN. Scientific Reports, Nature Publishing Group, 2017, 7 (1), pp.42173. ⟨10.1038/srep42173⟩. ⟨inserm-02440462⟩ 2017

[10] Lauriane Velot, Angie Molina, Sylvie Rodrigues-Ferreira, Anne Nehlig, Benjamin, Pierre Bouchet, et al. Negative regulation of EB1 turnover at microtubule plus ends by interaction with microtubule-associated protein ATIP3. Oncotarget, Impact journals, 2015, 6 (41) pp.43557-43570. ⟨10.18632/oncotarget.6196⟩. ⟨inserm-01223890⟩ 2015

ADDITIONAL SKILLS

Computational Languages & Tools: Python, LabVIEW, Java, ImageJ/FIJI, Icy, IMARIS, Prism, Microsoft Excel, Zen,Solidworks, FreeCad, Metamorph, BioImageIt

Microscope: Spinning, LiveSR, Confocal scanning, STED, SIM, SPIM, MPhoton, FRAP/FLIP, LLSM.

Acquisition software: Metamorph, Leica, ZEISS, 3i, Nikon, STEDYCON, Homemade Software.

Mechanical's labs: metal turning machine, milling machine, laser cut, 3D printing (Polyjet, FDM, 3D SLA), Hot wire bending machine for plastics processing

Recent and Ongoing PROJECTS & COLLABORATIONS

2022 **Polarization Microscopy for Imaging of Membrane Organization (PoMIMO)**
Objective: Create a new imaging approach that will not only provide novel information about endocytosis, but will have the potential to be applied to all topics where the spatial and molecular organization of lipids/proteins defines both the structure and function of these assemblies (i.e. mitochondria cristae, MAMs....) in reconstituted systems and in living cells.

2019 **Project NAVISCOPE: image-guided navigation and visualization of large data sets in live cell imaging and microscopy.** Acquisition des données en LLSM et test des données , deux journées de demonstration

2019 **Project BioImageIT: open-source integrator for Image DATA management and analysis.** Ongoing project of the Serpico TEAM in the frame of the NRI (National Research Infrastructure – France BioImaging) and dissemination toward the 18 Imaging Facilities that constitute the Core of the Infrastructure.

2017 **Project ANR: Data Assimilation and Lattice LIght Sheet imaging for endocytosis/exocytosis pathway modeling in the whole cell (DALLISH).** Collaboration to investigate endocytosis pathways in the whole cell using 3D single particle tracking.

2013 **Project EasySPIM: An Easy Light Sheet Microscope Optimizing Light Sheet Microscopy at an Imaging Facility (CelTysPhyBio**). Design and production of a light sheet microscope to make it available on the platform

Conference

2021 **BioImage Informatics.** Poster presentation: BioImage-IT _Integration of data-management with analysis Ludovic Leconte, Sylvain Prigent, Léo Maury César Augusto Valades Cruz, Jean Salamero Charles Kervrann

2020 **FOM (Focus On Microscopy)in Japan.** Oral presentation accepted but cancelled due to Covid
Live Cell Imaging of Membrane Recycling Using Lattice Light Sheet Microscopy and Multi-Angle (Ma) TIRF Microscopy [PDF]. L. Leconte, C.A. Valades-Cruz, C. Kervran, J. Salamero (Institut Curie, France)

2019 **ELMI meeting, Brno, Czech Republic Lightning Talk:** Implementation of a commercial Lattice Light Sheet Microscope (LLSM) in an Imaging Facility (PICT-IBiSA) Ludovic Leconte, Cesar Augusto Valades Cruz, Jean Salamero

2018 **LSFM** in Frankfurt , Light Sheet Microscopy Conference, 4-6 December 2019, Germany
Implementation of a commercial Lattice Light Sheet Microscope (LLSM) in an Imaging Facility (PICT-IBiSA)

2017 **FOM in Bordeaux en 2017**, PiCT-IBiSA: DEVELOPMENTS ON A MULTI-SCALE IMAGING PLATFORM; V.Fraisier,L.* Leconte,L*.Sengmanivong, M. Irondelle, F. Waharte, J. SalameroCell and Tissue Imaging Core Facility-IBiSA. UMR144-CNRSInstitut Curie(France)

2016 **FOM in Sydney** , OPTIMIZING LIGHT SHEET MICROSCOPY FOR MULTI-COLOR IMAGING OF VARIABLE SIZE SAMPLES ON AN OPEN IMAGING FACILITYLudovic Leconte, Francois Waharte , Jean Salamero

Other

-Delegate for Engineers, in **The National Committee for Scientific Research** in section 22 and CID 54 2016-2021
-Leading and federating **a working group of the RTMFM** (Réseau Technologique de Microscopie de Fluorescence Multidimensionnelle) of the CNRS, the **GT.ALL** (Architecture and Free Software working group).
Creation of two documents "
- Leading and participating in the **Light Sheet Community working group** (international network group sharing knowledge and know-how on light sheet technology), created in 2020.
- Editing of online courses, "you tube" channel of the National Infrastructure France BioImaging (FBI) (**Working Group "Light Sheet Microscopy"**) and setting up an INSERM workshop (2022) on light sheet microscopy with the FBI Light Sheet Microscopy Working Group
- Animation and realisation of workshops on the **CNRS MIFOBIO** thematic school every two years