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I am a biophysicist who develops novel imaging technologies to understand the fundamental principles of gene expression.

RESEARCH EXPERIENCE

2013-present Project Scientist. Transcription Imaging Consortium, HHMI Janelia Research Campus
2012-2013 Instructor. Albert Einstein College of Medicine
2007-2012 Research fellow (advisor: Robert H Singer). Albert Einstein College of Medicine
2002-2007 Doctoral student (advisor: Vincent Croquette). Ecole Normale Supérieure, Paris.
2001 Undergraduate Research Assistant. (advisor: Carlos Bustamante). U.C. Berkeley.

EDUCATION

2002-2006 *Ph.D. Biophysics*. Ecole Normale Supérieure, Paris. Single Molecule Studies of DNA Mechanics and Helicase activity (advisor: Vincent Croquette) *Highest Distinction*
2001-2002 *M.S. Solid State Physics*. Université Pierre & Marie Curie, Paris VI
1999-2001 *B.S. Physics*. Ecole Normale Supérieure, Paris

PUBLICATIONS

Updated list available from [Google Scholar Citations](#) or [NCBI My Bibliography](#)

Grimm JB, English BP, Choi H, Muthusamy AK, Mehl BP, Dong P, Brown TA, Lippincott-Schwartz J, Liu Z, **Lionnet T***, Lavis LD* (2016) Bright photoactivatable fluorophores for single-molecule Imaging. *Bioarxiv* <http://dx.doi.org/10.1101/066779> (In press, *Nature Methods*) ***Corresponding author**

Morisaki T, Lyon K, DeLuca KF, DeLuca JG, English BP, Zhang Z, Lavis LD, Grimm JB, Viswanathan S, Looger LL, **Lionnet T**, Stasevich T (2016) Real-time Quantification of single RNA translation dynamics in living cells. *Science* DOI: 10.1126/science.aaf0899

Cho WK, Jayanth N, English BP, Inoue T, Andrews JO, Conway W, Grimm JB, Spille JH, Lavis LD, **Lionnet T***, Cisse II* (2016) RNA Polymerase II cluster dynamics predicts mRNA output in living cells. *eLife* 13617 [PMC](#) ***Corresponding author**

Halstead JM, Wilbertz JH, Wippich F, **Lionnet T**, Ephrussi A, Chao JA (2016) TRICK : A Single-Molecule Method for Imaging the First Round of Translation in Living Cells and Animals. *Methods in Enzymology* doi:10.1016/bs.mie.2016.02.027

Abrahamsson S, Ilic R, Wisniewski J, Mehl B, Yu L, Chen L, Davanco M, Oudjedi L, Fiche J-B, Hajj B, Jin X, Pulupa J, Cho C, Mir M, El Beheiry M, Darzacq X, Nollmann M, Dahan M, Wu C, **Lionnet T**, Liddle AJ, Bargmann CI (2016) Multifocus microscopy with precise color multi-phase diffractive optics applied in functional neuronal imaging. *Biomedical Optics Express* 7 (3) 855

Coleman RA, Liu Z, Darzacq X, Tjian R, Singer RH, **Lionnet T**. (2016) Imaging Transcription : Past, Present, Future. *Cold Spring Harbor Symposia on Quantitative Biology*, DOI: 10.1101/sqb.2015.80.027201 [PMC](#)

Katz ZB, English BP, **Lionnet T**, Yoon YJ, Monnier N, Ovrzyn B, Bathe M, Singer RH. (2016) Mapping translation 'hot spots' in live cells by tracking single molecules of mRNA and ribosomes. *eLife* 10415 [PMC](#)

Deng W, Shi X, Tjian R, **Lionnet T**, Singer RH. (2015) CASFISH : CRISPR/Cas9-mediated in situ labeling of genomic loci in fixed cells. *Proc. Natl. Acad. Sci.*, 112 (38), 11870-11875 [PMC](#)

Treck T, Grosch M, York A, Shroff H, **Lionnet T**, Lehman R. (2015) Drosophila germ granules are structured and contain homotypic mRNA clusters. *Nature Communications*, 6:7962 [PMC](#)

Kalo A, Kanter I, Shraga A, Sheinberger J, Tzemach H, Kinor N, Singer RH, **Lionnet T**, Shav-Tal Y. (2015) Cellular Levels of Signaling Factors Are Sensed by β -actin Alleles to Modulate Transcriptional Pulse Intensity. *Cell Reports* 11(3) 419-32 [PMC](#)

Halstead JM*, **Lionnet T***, Wilbertz JH*, Wippich F*, Ephrussi A, Singer RH, Chao JA. (2015) An RNA biosensor for imaging the first round of translation from single cells to living animals. *Science* 347(6228) 1367-671 [PMC](#) ***Equal Contributions**

Grimm JB, English BP, Chen J, Slaughter JP, Zhang Z, Revyakin A, Patel R, Macklin JJ, Normanno D, Singer RH, **Lionnet T***, Lavis LD.* (2015) A general method to improve fluorophores for live-cell and single-molecule microscopy. *Nature Methods* 12(3) 244-50 [PMC](#) ***Corresponding author**

Chen J, Zhang Z, Li L, Chen BC, Revyakin A, Hajj B, Legant W, Dahan M, **Lionnet T**, Betzig E, Tjian R, Liu Z. (2014) Single-molecule dynamics of enhanceosome assembly in embryonic stem cells. *Cell* 156 (6) 1274-85 [PMC](#)

Lionnet T. (2013) Imaging the Transcriptome. *Mol Syst Biol* (9) 710. [PMC](#)

Chou YY, Heaton NS, Gao Q, Palese P, Singer R, **Lionnet T**. (2013) Colocalization of different influenza viral RNA segments in the cytoplasm before viral budding as shown by single-molecule sensitivity FISH analysis. *PLoS Pathogens*, 9 (5) e1003358 [PMC](#)

Lionnet T, Singer RH (2012). Transcription goes digital. *Embo Reports*, 13(4):313-21 [PMC](#)

Patel VL, Mitra S, Harris R, Buxbaum AR, **Lionnet T**, Girvin M, Levy M, Almo SC, Brenowitz M, Singer RH, Chao JA. (2012) Spatial arrangement of conserved recognition elements identifies RNA regulatory networks. *Genes & Development*, 26 (1) 43-53; [PMC](#)

Lionnet T, Allemand JF, Revyakin A, Strick TR, Saleh OA, Bensimon D, Croquette V. (2012) Magnetic trap construction. *Cold Spring Harbor Protocols* 2012 (1) [PMC](#)

Lionnet T, Allemand JF, Revyakin A, Strick TR, Saleh OA, Bensimon D, Croquette V. (2012) Single molecule studies using magnetic traps. *Cold Spring Harbor Protocols* 2012 (1) [PMC](#)

Wu B, Piatkevich KD, **Lionnet T**, Singer RH, Verkhusha VV (2011). Modern fluorescent proteins and imaging technologies to study gene expression, nuclear localization, and dynamics. *Current Opinion in Cell Biology*, 23 (3):310-7 [PMC](#)

Lionnet T, Czaplinski K, Darzacq X, Shav-Tal Y, Wells AL, Chao JA, Park HY, de Turris V, Lopez-Jones M, Singer RH (2011). A transgenic mouse for in vivo detection of endogenous labeled mRNA. *Nature Methods*, 8(2) 165-70 [PMC](#)

Gandhi SJ, Zenklusen D, **Lionnet T**, Singer RH (2011). Transcription of functionally related genes is not coordinated. *Nature Structural & Molecular Biology*, 18 (1) 27-34 [PMC](#)

Manosas M, **Lionnet T**, Praly E, Fangyuan D, Allemand JF, Bensimon D, Croquette V (2011) Studies of DNA-Replication at the Single Molecule Level Using Magnetic Tweezers. *Progress in Mathematical Physics* (60) 89-122

Lionnet T, Wu B, Grunwald D, Singer RH, Larson DR (2010). Nuclear Physics: Quantitative single-cell approaches to nuclear organization and gene expression. *Cold Spring Harbor Symposia on Quantitative Biology*, 75: 113-26 [PMC](#)

Lionnet T, Singer RH (2010). Transcription, one allele at a time. *Genome Biology* 11 (8): 129 [PMC](#)

Darzacq X, Yao J, Larson DR, Causse SZ, Bosanac L, de Turris V, Ruda VM, **Lionnet T**, Zenklusen D, Guglielmi B, Tjian R, Singer RH (2009). Imaging transcription in living cells. *Annual Review of Biophysics*, 38: 173-96 [PMC](#)

Lionnet T, Spiering MM, Benkovic SJ, Bensimon D, Croquette V (2007). Real-time observation of bacteriophage T4 gp41 helicase reveals an unwinding mechanism. *Proc. Natl. Acad. Sci.* 104 (50): 19790-5 [PMC](#)

Lionnet T, Lankas F (2007). Sequence dependent twist-stretch coupling in DNA. *Biophys. J.* 92 (4): L30-32 [PMC](#)

Neuman KC, **Lionnet T**, Allemand JF (2007). Single molecule techniques. *Annual Review of Materials Research*, 37 33-67 (2007)

Lionnet T, Joubaud S, Lavery R, Bensimon D, Croquette V (2006). Wringing out DNA. *Phys. Rev. Lett.*, 96 (17): 178102 [PMC](#)

Lionnet T, Dawid A, Bigot S, Barre FX, Saleh OA, Heslot F, Allemand JF, Bensimon D, Croquette V (2006). DNA mechanics as a tool to probe helicase and translocase activity. *Nucleic Acids Research*, 34 (15): 4232-44 [PMC](#)

Neuman KC, Saleh OA, **Lionnet T**, Lia G, Allemand JF, Bensimon D, Croquette V (2005). Statistical determination of the step size of molecular motors. *J. of Phys. : Condens. Matter*, 17: S3811-20 [PMC](#)

Dessinges MN, **Lionnet T**, Xi XG, Bensimon D, Croquette V (2004). Single-molecule assay reveals strand switching and enhanced processivity of UvrD. *Proc. Natl. Acad. Sci.*, 101 (17): 6439-44 [PMC](#)

AWARDS AND HONORS

2014-present Member of the Janelia Advanced Imaging Center Review Committee

2014 Organizer of the Janelia Conference “Long Range Genome Organization and Transcription Dynamics” (Co-organizers: Carl Wu, Wendy Bickmore)
 2013-present Member of Transcription Imaging Consortium Steering Committee
 2011 Albert Einstein College of Medicine Dennis Shields Postdoctoral Award
 2008-2011 Human Frontier Science Foundation Long Term Fellowship
 2002-2006 French Ministry of education - Paris VII University Graduate Fellowship
 1999 Admitted to Ecole Normale Supérieure. *Ranked 3rd in nation-wide competitive exam*

PATENTS

Singer R, Deng W, Lionnet T, Decker, MW. Genomic Probes. WO/2016/061523 ; 04/21/2016
 Lavis, LD, Grimm JB, Chen J, Lionnet T, Zhang Z, Revyakin A, Slaughter J, Decker MW; Azetidine-substituted Fluorescent Compounds. WO/2015/153813 ; 10/08/2015

TEACHING

2016 Quantitative Imaging, Temple Bioengineering Department (Invited Lecture)
 2004-2007 Graduate Biophysics Teaching Asst, Université P. & M. Curie, Paris
 2003-2005 Undergraduate Physics Teaching Asst. Université P. & M. Curie, Paris

INVITED TALKS

2016 NYU Langone Medical Center, Institute of Systems Genetics:
 2016 ABRF Meeting, Fort Lauderdale: New Imaging Tools to Quantify Gene Expression Regulation in Living Cells
 2016 Chemistry & Biochemistry Dept, UCLA: Imaging and Quantifying Transcription Regulation in Living Cells
 2015 Gladstone Institute (San Francisco): "Imaging and Quantifying Transcription Regulation in Living Cells"
 2015 Seeing is Believing: Imaging the Processes of Life (EMBL Symposium). "Imaging Endogenous Histone Modifications and Transcription in Living Cells"
 2015 Genetic Control of Development and Evolution (EMBO-Institut Pasteur, Paris) "Mechanism of Transcriptional Regulation Through Spatiotemporal Modulation of Regulators in Living Cells"
 2015 Transcription Imaging Consortium Annual Meeting (Janelia Research Campus): "*Single molecule mechanisms of transcription activation*"
 2014 Transcription Imaging Consortium Annual Meeting (Janelia Research Campus): "*Single molecule mechanisms of transcription activation*"
 2014 Stowers Institute "Imaging Transcription Dynamics in Live Cells".
 2014 Janelia Long Range Genome Organization and Transcription Dynamics Conference. "Mechanisms of Transcription Activation at the Single Molecule Level".
 2013 Cold Spring Harbor Single Cell Analyses Meeting. "Probing transcription regulation in live cells, one mRNA at a time"
 2012 Max Delbrück Center, Berlin, Germany. "Probing transcription regulation in live cells, one mRNA at a time"
 2012 Universitat Pompeu Fabra, Barcelona, Spain. "Probing transcription regulation in live cells, one mRNA at a time"
 2012 Biology Department, New York University. "Probing transcription regulation in live cells, one mRNA at a time"

- 2011 Courant Institute, New York University. "Probing transcription regulation in live cells, one mRNA at a time"
- 2011 EMBL, Heidelberg, Germany. "Probing transcription regulation in live cells"
- 2011 IGBMC, Strasbourg, France. "Probing transcription regulation in live cells"
- 2011 Institut Curie, Paris, France. "Probing transcription regulation in live cells"
- 2009 Human Frontier Science Program Annual Meeting, Tokyo, Japan. "Imaging Transcription of a Single Endogenous Gene in Live Cells"
- 2007 American Physical Society Meeting, Denver, CO. "Dynamics of Single Molecule DNA"
- 2006 European Science Foundation workshop, Barcelona, Spain. "Single Molecule Analysis of gp41 Helicase Reveals a Passive Unwinding Mechanism"
- 2006 Young researchers and Life Sciences, Institut Curie, France. "Uncovering Helicase Mechanism Using Magnetic Tweezers"

BOOKS & PROCEEDINGS

- Le Grimellec C, Milhiet P, Perez E, Pincet F, Aime JP, Emiliani V, Thoumine O, **Lionnet T**, Croquette V, Allemand JF, Bensimon D. Nanoforce and Imaging. *in Nanoscience: Nanobiotechnologies & Nanobiology*. Ed. P. Boisseau, M. Lahmani, Springer 2009.
- Allemand JF, Bensimon D, Charvin G, Croquette V, Lia G, **Lionnet T**, Neuman KC, Saleh OA, Yokota H. Studies of DNA-Protein Interactions at the Single Molecule Level with Magnetic Tweezers. *in Controlled Nanoscale Motion in Biological and Artificial Systems*. Ed. H. Linke, A. Mansson, Proceedings of the Nobel Symposium 2005.
- Lionnet T**, Allemand JF, Revyakin A, Strick TR, Saleh OA, Bensimon D, Croquette V. Single Molecule Studies Using Magnetic Traps. *in Single Molecule Techniques: a Laboratory Manual*. Ed. PR Selvin, T. Ha, Cold Spring Harbor Laboratory Press 2008.