

BRIAN PATRICK ENGLISH



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EDUCATION

PhD	Harvard University	11/2007	<i>Single Molecule Studies of Enzymatic Dynamic Fluctuations</i> Advisor: Xiaoliang Sunney Xie
MA	Harvard University	11/2003	Chemistry and Chemical Biology
BA	Cornell University	01/2001	Bachelor of Arts with Distinction in all Fields

PROFESSIONAL EXPERIENCE

Howard Hughes Medical Institute Janelia Research Campus Ashburn VA	Senior Scientist Research Scientist (01/2015 – 12/2015) Research Specialist (01/2013 – 12/2014)	01/2013– Present
Albert Einstein College of Medicine Bronx NY	Postdoctoral Fellow Anatomy and Structural Biology	09/2010 – 12/2012
Uppsala University Uppsala Sweden	Postdoctoral Fellow Cell and Molecular Biology	09/2007 – 08/2010
Harvard University Cambridge MA	Graduate Research Fellow Chemistry and Chemical Biology	09/2001 – 08/2007
Cornell University Ithaca NY	Research Technician Laboratory of Harold A. Scheraga	01/2001 – 08/2001
Cornell University Ithaca NY	Undergraduate Research Fellow Chemistry and Chemical Biology	09/1997 – 12/2000

HONORS

2015 AAAS Newcomb Cleveland Prize (Lattice light-sheet microscopy)	02/2016
Postdoctoral Representative to the Einstein Senate	10/2010 – 12/2012
Young Researcher Participant of the 59th Meeting of Nobel Laureates in Lindau	06/2009
Student-nominated Fieser Speaker Harvard Chemistry and Chemical Biology	04/2007
Eli Lilly Poster Presentation Award 19th Annual Symposium of the Protein Society	08/2005
George C. Caldwell Prize Cornell Chemistry and Chemical Biology	10/2001
Phi Beta Kappa Honors Society	05/2001
2000 Undergraduate Award in Analytical Chemistry American Chemical Society	10/2000

COMPLETED RESEARCH SUPPORT

Estonian Science Foundation (ETF)	PUT37 (co-applicant, PI: Vasili Haurlyliuk) <i>ppGpp-mediated activation of RSH proteins: from the mechanism of allosteric regulation to computational properties of the stringent response system</i>	01/2013 – 12/2015
Human Frontier Science Program (HFSP)	Cross Disciplinary Fellow (LT00829/2008, PI: Brian English) <i>Transcription factor dynamics in living bacterial cells at the single cell level</i>	06/2008 – 08/2011
Swedish Research Council (VR)	International Postdoctoral Fellowship (623-2007-8116, PI: Brian English) <i>The Dynamics of Gene Regulation – The Study of Individual Transcription Factor Molecules in Living Cells</i>	01/2008 – 05/2008
National Institutes of Health (NIH)	Molecular, Cellular and Chemical Biology Training Grant (5 T32 GM07598) Graduate Research Training Fellowship – Harvard University	01/2002 – 08/2005

PUBLICATIONS

27. L Xie*, P Dong*, Y Qi, M De Marzio, X Chen, S Banala, WR Legant, **BP English**, AS Hansen, A Schulmann, LD Lavis, E Betzig, R Casellas, HY Chang, B Zhang, R Tjian*, Z Liu*. *Super-resolution Imaging Reveals 3D Structure and Organizing Mechanism of Accessible Chromatin*. **bioRxiv** 678649; doi: [10.1101/678649](https://doi.org/10.1101/678649) (2019)
26. JB Grimm, TA Brown, **BP English**, T Lionnet, LD Lavis. *Synthesis of Janelia Fluor HaloTag and SNAP-tag ligands and their use in cellular imaging experiments*. In: Erfle H. (eds) **Super-Resolution Microscopy**. Methods in Molecular Biology, Vol.1663, Humana Press, New York, NY; doi: [10.1007/978-1-4939-7265-4_15](https://doi.org/10.1007/978-1-4939-7265-4_15) (2017)
25. JB Grimm*, **BP English***, H Choi, AK Muthusamy, BP Mehl, P Dong, TA Brown, J Lippincott-Schwartz, Z Liu, T Lionnet*, LD Lavis*. *Bright photoactivatable fluorophores for single-molecule imaging*. **Nature Methods** 13(12), 985-988 (2016)

24. YJ Yoon*, B Wu*, AR Buxbaum, S Das, A Tsai, [BP English](#), JB Grimm, LD Lavis, RH Singer. *Glutamate-induced RNA localization and translation in neurons*. **Proceedings of the National Academy of Sciences** 113(44), E6877-86 (2016) ([open access](#))
23. Z Zhang*, [BP English](#), JB Grimm, SA Kazane, W Hu, A Tsai, C Inouye, C You, J Piehler, PG Schultz, LD Lavis, A Revyakin, R Tjian. *Rapid Dynamics of General Transcription Factor TFIIIB Binding During Preinitiation Complex Assembly Revealed by Single-Molecule Analysis*. **Genes and Development** 30, 2106-2118 (2016) ([open access](#))
22. LD Lavis*, JB Grimm, [BP English](#), H Choi, AK Muthusamy, BP Mehl, P Dong, TA Brown, J Lippincott-Schwartz, Z Liu, T Lionnet. *Bright photoactivatable fluorophores for single-molecule imaging*. **bioRxiv** 066779; doi:[10.1101/066779](#) (2016)
21. PW Tillberg*, F Chen*, KD Piatkevich, Y Zhao, CC Yu, [BP English](#), L Gao, A Martorell, HJ Suk, F Yoshida, EM DeGennaro, DH Roossien, G Gong, U Seneviratne, SR Tannenbaum, R Desimone, D Cai, ES Boyden. *Expansion Microscopy of Biological Specimens with Protein Retention*. **Nature Biotechnology** 34, 987–992 (2016) ([cover art](#))
20. T Morisaki, K Lyon, K DeLuca, J DeLuca, [BP English](#), Z Zhang, L Lavis, JB Grimm, S Viswanathan, L Looger, T Lionnet, TJ Stasevich. *Real-time quantification of single RNA translation dynamics in living cells*. **Science** 352(6292), 1425-1429 (2016) ([F1000Prime](#))
19. WK Cho, N Jayanth, [BP English](#), T Inoue, JO Andrews, W Conway, JB Grimm, JH Spille, LD Lavis, T Lionnet*, II Cissé*. *RNA Polymerase II cluster dynamics predict mRNA output in living cells*. **eLife** 2016;10.7554/eLife.13617 (2016) ([open access](#))
18. ZB Katz*, [BP English](#)*, T Lionnet, YJ Yoon, N Monnier, B Ovrin, M Bathe, RH Singer. *Mapping translation 'hot-spots' in live cells by tracking single molecules of mRNA and ribosomes*. **eLife** 2016;5:e10415 (2016) ([open access](#), [F1000Prime](#))
17. [BP English](#), RH Singer. *Tracking multiple single molecules in living cells*. **SPIE Newsroom**; doi: 10.1117/2.1201509.006125 (November 2, 2015) ([pdf](#))
16. [BP English](#)*, RH Singer. *A three-camera imaging microscope for high-speed single-molecule tracking and super-resolution imaging in living cells*. **Proc. SPIE 9550, Biosensing and Nanomedicine VIII**, 955008 ([invited paper](#)); doi: 10.1117/12.2190246 (2015) ([PMC article](#))
15. N Monnier, Z Barry, HY Park, KC Su, Z Katz, [BP English](#), A Dey, K Pan, IM Cheeseman, RH Singer, M. Bathe. *Inferring transient particle transport dynamics in live cells*. **Nature Methods** 12(9), 838-840 (2015) ([PMC article](#))
14. S Viswanathan, ME Williams, EB Bloss, TJ Stasevich, CM Speer, A Nern, BD Pfeiffer, BM Hooks, WP Li, [BP English](#), T Tian, GL Henry, JJ Macklin, R Patel, CR Gerfen, X Zhuang, Y Wang, GM Rubin, LL Looger. *High-performance probes for light and electron microscopy*. **Nature Methods** 12(6), 568–576 (2015) ([PMC article](#), [F1000Prime](#))
13. JB Grimm, [BP English](#), J Chen, JP Slaughter, Z Zhang, A Revyakin, R Patel, JJ Macklin, D Normanno, RH Singer, T Lionnet*, LD Lavis*. *A general method to improve fluorophores for live-cell and single-molecule microscopy*. **Nature Methods** 12(3), 244 - 250 (2015) ([PMC article](#), featured in: [1](#), [cover art](#))
12. H Jiang*, [BP English](#)*, R Hazan, P Wu*, B Ovrin*. *Tracking surface glycans on live cancer cells with single molecule sensitivity*. **Angewandte Chemie International Edition** 54(6), 1765-1769 (2015) ([PMC article](#), [C&EN News](#))
11. BC Chen*, WR Legant*, K Wang*, L Shao, DE Milkie, MW Davidson, C Janetopoulos, XS Wu, JA Hammer III, Z Liu, [BP English](#), Y Mimori-Kiyosue, DP Romero, AT Ritter, J Lippincott-Schwartz, L Fritz-Laylin, RD Mullins, DM Mitchell, JN Bembek, AC Reymann, R Böhme, SW Grill, JT Wang, G Seydoux, US Tulu, DP Kiehart, E Betzig. *Lattice Light Sheet Microscopy: Imaging Molecules to Embryos at High Spatiotemporal Resolution*. **Science** 346(6208), 1257998 (2014) ([PMC article](#), [F1000Prime](#), [cover art](#))
10. KD Piatkevich, [BP English](#), VN Malashkevich, H Xiao, SC Almo, RH Singer, VV Verkhusha. *Photoswitchable Red Fluorescent Protein with a Large Stokes Shift*. **Chemistry & Biology** 21, 1402–1414 (2014) ([open access](#))
9. V Shyp, S Tankov, A Ermakov, P Kudrin, [BP English](#), M Ehrenberg, T Tenson, J Elf, V Haurlyiuk. *Positive allosteric feedback regulation of the stringent response enzyme RelA by its product*. **EMBO Reports** 13, 835-839 (2012) ([open access](#), featured in: [1](#))
8. A Kuzemenko*, S Tankov*, [BP English](#)*, I Tarassov, T Tenson, P Kamenski, J Elf, V Haurlyiuk. *Single molecule tracking fluorescence microscopy in mitochondria reveals highly dynamic but confined movement of Tom40*. **Scientific Reports** 1, 195; doi:10.1038/srep00195 (2011) ([open access](#), [SGD curated paper](#))
7. [BP English](#), V Haurlyiuk*, A Sanamrad*, S Tankov, N Dekker, J Elf. *Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells*. **Proceedings of the National Academy of Sciences** 108(31), E365-373 (2011) ([open access](#), [F1000Prime](#), featured in: [1](#), [2](#), [3](#), [4](#))
6. [BP English](#)*, A Sanamrad*, S Tankov, V Haurlyiuk, J Elf. *Tracking of individual freely diffusing fluorescent protein molecules in the bacterial cytoplasm*. **arXiv** [1003.2110v1](#) [q-bio.QM] (2010)
5. [BP English](#), W Min, AM van Oijen, KT Lee, G Luo, H Sun, BJ Cherayil, SC Kou, XS Xie. *Ever-fluctuating single enzyme molecules: Michaelis-Menten equation revisited*. **Nature Chemical Biology** 2, 87-94 (2006) ([F1000Prime](#), featured in: [1](#), [2](#), [3](#), [cover art](#))
4. W Min, IV Gopich, [BP English](#), SC Kou, XS Xie, A Szabo. *When Does the Michaelis-Menten Equation Hold for Fluctuating Enzymes?* **Journal of Physical Chemistry B** 110, 20093-20097 (2006)
3. SC Kou, BJ Cherayil, W Min, [BP English](#), XS Xie. *Single-Molecule Michaelis-Menten Equations*. **Journal of Physical Chemistry B** 109, 19068-19081 (2005) ([cover art](#))
2. W Min, [BP English](#), G Luo, BJ Cherayil, SC Kou, XS Xie. *Fluctuating Enzymes: Lessons from Single-Molecule Studies*. **Accounts of Chemical Research** 38, 923-931 (2005)
1. [BP English](#), E Welker, M Narayan, HA Scheraga. *Development of a Novel Method To Populate Native Disulfide-Bonded Intermediates for Structural Characterization of Proteins: Implications for the Mechanism of Oxidative Folding of RNase A*. **Journal of the American Chemical Society** 124, 4995-4999 (2002)

RESEARCH INTERESTS

My aim at Janelia is to develop quantitative single cell and multi-color single molecule tracking assays with high spatial and temporal resolution to study when and where molecules are interacting inside living cells and where enzymes are active. At Harvard I developed turnover assays to study activity fluctuations of individual enzyme molecules *in vitro*. The microscope at Uppsala facilitated the *in vivo* tracking of even fast freely diffusing protein molecules. At Einstein we extended this approach to mapping translation by simultaneous tracking thousands of mRNA and ribosome molecules.

AD HOC REVIEWER

Biomicrofluidics *Biophysical Journal* *J of Nanobiotechnology* *Philosophical Transactions B* *Protein Expression and Purification* *Scientific Reports*

TEACHING FELLOW AT HARVARD CHEMISTRY

Honors Introductory Chemistry *Principles of Chemistry* *Frontiers in Molecular Biophysics*

INVITED SEMINARS

UT Southwestern & Systems Biology Seminar Series	<i>Computational Multiplexed Single-molecule Live-cell Imaging Reveals the Dynamic Nature of Complex Biological Reactions</i>	11/2017
Massachusetts Institute of Technology Biophysics Seminar	<i>Insights into translation by simultaneous single particle tracking of ribosomes and mRNAs</i>	11/2013
Umeå University International Seminar Series	<i>Insights into mRNA translation by simultaneous tracking of ribosomes and mRNAs, and by imaging of cytoskeletal structures in live cells</i>	10/2013
Duke University Joint Biology and Chemistry Seminar	<i>Mechanistic insights from single molecule tracking of individual enzymes, ribosomes and mRNAs in bacteria and mammalian cells</i>	04/2013
University of Tartu Biomedical Technology Seminar	<i>Simultaneous single molecule tracking of β-actin mRNA and the ribosome</i>	11/2012
University of Munich (LMU) Gene Center Seminar	<i>Single molecule investigations into β-actin mRNA localization and compartmentalization</i>	10/2012
University of Munich (LMU) Invited SFB 594 Seminar	<i>Live-cell imaging and single molecule tracking in bacteria and mammalian cells with laser feedback interference and fluorescence microscopy</i>	11/2011
Delft University Applied Physics Seminar	<i>Stringent Response – From the Test-Tube to Living Cell</i>	04/2009
University of Tartu Biomedical Technology Seminar	<i>A Single Molecule Approach to Enzymology – From the Test-Tube to Living Bacterial Cells</i>	12/2008
Harvard University Student-nominated Fieser Lecture	<i>Fluctuating Single Molecules – Zooming in on Enzyme Kinetics</i>	04/2007
Georgia Institute of Technology Molecular Biophysics Seminar	<i>Fluctuating Single Enzyme Molecules</i>	04/2007
Dickinson College Invited Physics Colloquium	<i>Biophysics of Single Molecules – Zooming in on Enzyme Kinetics</i>	10/2006

SELECTED CONFERENCE LECTURES

4D-Nucleome Annual Meeting North Bethesda	<i>Imaging of Multiple Single-Molecules Reveals the Dynamic Nature of Complex Biological Reactions</i>	09/2017
10th Berlin Summer Meeting Berlin	<i>Simultaneous Live-Cell Imaging of Multiple Single-Molecules Reveals the Dynamic Nature of Complex Biological Reactions</i>	06/2017
60th Annual Meeting of the Biophysical Society Los Angeles	<i>Simultaneous High-Speed Tracking of Multiple Single-Molecules Reveals Functional Interactions in Living Cells (abstract)</i>	02/2016
SPIE Optics + Photonics San Diego	<i>A three-camera imaging microscope for high-speed single-molecule tracking and super-resolution imaging in living cells (invited talk)</i>	08/2015
8th Berlin Summer Meeting Berlin	<i>Insights into translation by co-movement analysis of ribosomes and mRNAs</i>	06/2015
EMBO EMBL Symposium: Seeing is Believing 2013 Heidelberg	<i>Insights into mRNA compartmentalization and translation by simultaneous single particle tracking of ribosomes and mRNAs, and by super-resolution imaging of cytoskeletal structures in live cells (meeting booklet)</i>	10/2013
Focus on Microscopy 2011 Konstanz	<i>Live-cell imaging of invadopodia formation with simultaneous phase-shifted laser feedback interference and fluorescence microscopy (abstract)</i>	04/2011
9th HFSP Meeting and 20th Anniversary Celebration Tokyo	<i>Single Molecule Approach to Stringent Response in Individual Living Bacterial Cells</i>	06/2009
232nd American Chemical Society Meeting San Francisco	<i>Ever-fluctuating single enzyme molecules: Michaelis-Menten equation revisited (abstract)</i>	09/2006
40th IUPAC World Chemistry Congress Beijing	<i>From Single Molecule Enzymology to Imaging Gene Expression in Live Cells, One Molecule at a Time</i>	08/2005

SELECTED CONFERENCE PRESENTATIONS

EMBO EMBL Symposium: Seeing is Believing 2019 Heidelberg	<i>Initiation of cap-dependent translation monitored by fluorescence auto- and cross-correlation spectroscopy and single particle tracking in living cells</i>	10/2019
Focus on Microscopy 2015 Göttingen	<i>A three-camera imaging setup and novel cell-permeable dyes for multiplexed single-molecule live cell experiments (abstract)</i>	04/2015
Focus on Microscopy 2011 Konstanz	<i>Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells (abstract)</i>	04/2011
4th Mechanobiology Workshop - Biophysical Society Singapore	<i>Imaging Adhesions with Phase-Shifted Laser Feedback Interference Microscopy</i>	11/2010
54th Biophysical Society Meeting San Francisco	<i>Single Molecule Tracking Inside Individual Living Bacterial Cells (abstract)</i>	02/2010
9th International Conference on Systems Biology Gothenburg	<i>A Single Molecule Approach to Stringent Response in Individual Living Bacterial Cells</i>	08/2008
19th Symposium of the Protein Society Boston	<i>A Michaelis-Menten Study of Individual Beta-Galactosidases</i>	07/2005
228th American Chemical Society Meeting Philadelphia	<i>Enzymatic dynamics of individual Beta-Galactosidases (abstract)</i>	08/2004

PROCEDURAL EXPERTISE

Development of biophysical assays, data analysis routines, and simulation algorithms. Live cell multi-color super-resolution imaging and single-molecule tracking. Design of light-sheet, confocal and HiLo microscopes. Igor Pro, Micro-Manager and LabView programming. Expertise in molecular biology and biochemistry.

PROFESSIONAL MEMBERSHIPS

Biophysical Society American Chemical Society The International Society for Optics and Photonics