

# BRIAN PATRICK ENGLISH



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## EDUCATION

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

## PROFESSIONAL EXPERIENCE

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

## HONORS

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

## COMPLETED RESEARCH SUPPORT

Estonian Science Foundation ( <b>ETF</b> )	<b>PUT37</b> (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 ( <b>HFSP</b> )	<b>Cross Disciplinary Fellow</b> (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 ( <b>VR</b> )	<b>International Postdoctoral Fellowship</b> (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 ( <b>NIH</b> )	<b>Molecular, Cellular and Chemical Biology Training Grant</b> (5 T32 GM07598) Graduate Research Training Fellowship – Harvard University	01/2002 – 08/2005

## PUBLICATIONS

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

*Biomechanics*   *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

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

## SELECTED CONFERENCE LECTURES

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

## SELECTED CONFERENCE PRESENTATIONS

<b>Focus on Microscopy 2015</b> Göttingen	<i>A three-camera imaging setup and novel cell-permeable dyes for multiplexed single-molecule live cell experiments (<a href="#">abstract</a>)</i>	04/2015
<b>Focus on Microscopy 2011</b> Konstanz	<i>Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells (<a href="#">abstract</a>)</i>	04/2011
<b>4th Mechanobiology Workshop - Biophysical Society</b> Singapore	<i>Imaging Adhesions with Phase-Shifted Laser Feedback Interference Microscopy</i>	11/2010
<b>54th Biophysical Society Meeting</b> San Francisco	<i>Single Molecule Tracking Inside Individual Living Bacterial Cells (<a href="#">abstract</a>)</i>	02/2010
<b>9th International Conference on Systems Biology</b> Gothenburg	<i>A Single Molecule Approach to Stringent Response in Individual Living Bacterial Cells</i>	08/2008
<b>19th Symposium of the Protein Society</b> Boston	<i>A Michaelis-Menten Study of Individual Beta-Galactosidases</i>	07/2005
<b>228th American Chemical Society Meeting</b> Philadelphia	<i>Enzymatic dynamics of individual Beta-Galactosidases (<a href="#">abstract</a>)</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