

BRIAN PATRICK ENGLISH

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EDUCATION

- PhD Harvard University** 11/2007 *Single Molecule Studies of Enzymatic Dynamic Fluctuations*
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** **Research Scientist** 01/2015 – Present
Ashburn VA Janelia Research Campus
- Howard Hughes Medical Institute** **Research Specialist** 01/2013 – 12/2014
Ashburn VA Janelia Research Campus
- Albert Einstein College of Medicine** **Postdoctoral Fellow** 09/2010 – 12/2012
Bronx NY Anatomy and Structural Biology
- Uppsala University** **Postdoctoral Fellow** 09/2007 – 08/2010
Uppsala Sweden Cell and Molecular Biology
- Harvard University** **Graduate Research Fellow** 10/2001 – 08/2007
Cambridge MA Chemistry and Chemical Biology
- Cornell University** **Research Technician** 01/2001 – 08/2001
Ithaca NY Laboratory of Harold A. Scheraga

HONORS

- Estonian Science Foundation PUT37 Grant**, co-applicant with Dr. Vasili Hauryliuk 08/2012
- Postdoctoral Representative to the Einstein Senate** 10/2010 – 12/2012
- Human Frontier Science Program (HFSP) Cross Disciplinary Fellow** 06/01/2008 – 08/31/2011
- Young Researcher Participant of the 59th Meeting of Nobel Laureates in Lindau** 06/2009
- Swedish Research Council Postdoctoral Fellowship** (terminated on 06/2008 for HFSP fellowship) 01/01/2008 – 09/24/2009
- Student-nominated Fieser Speaker**, Harvard University, Department of Chemistry 04/2007
- National Institute of Health Training Grant** 01/01/2002 – 08/31/2005
- Eli Lilly Poster Presentation Award**, 19th Annual Symposium of the Protein Society 08/2005
- George C. Caldwell Prize**, Cornell University, Department of Chemistry, Ithaca, NY 10/2001
- Phi Beta Kappa Honors Society** 05/2001
- 2000 Undergraduate Award in Analytical Chemistry**, American Chemical Society 10/2000

PUBLICATIONS

ZB Katz*, [BP English*](#), T Lionnet, YJ Yoon, B Ovryn, RH Singer. *Mapping translation in live cells by tracking single molecules of mRNA and ribosomes (submitted)*

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)

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**, doi: 10.1038/nmeth.3483 (2015)

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, 568–576 (2015)

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, 244 - 250 (2015) ([cover art](#))

12. H Jiang*, [BP English*](#), R Hazan, P Wu*, B Ovryn*. *Tracking surface glycans on live cancer cells with single molecule sensitivity*. **Angewandte Chemie International Edition** 54(6), 1765-1769 (2015)

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 Bembenek, 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** 346,1257998 (2014) ([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)
9. V Shyp, S Tankov, A Ermakov, P Kudrin, BP English, M Ehrenberg, T Tenson, J Elf, V Hauryliuk. *Positive allosteric feedback regulation of the stringent response enzyme RelA by its product*. **EMBO Reports** 13, 835-839 (2012) (featured in: [1](#))
8. A Kuzemenko*, S Tankov*, BP English*, I Tarassov, T Tenson, P Kamenski, J Elf, V Hauryliuk. *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 Hauryliuk*, 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](#), featured in: [1](#), [2](#), [3](#))
6. BP English*, A Sanamrad*, S Tankov, V Hauryliuk, 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) ([cover art](#), featured in: [1](#), [2](#), [3](#))
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 single molecule assays to study when and where molecules are interacting inside living cells and where enzymes are active. To this end I have developed a simultaneous three-camera single particle-tracking microscope that is custom built for high temporal and spatial resolution.

In my thesis work at Harvard I developed single molecule turnover assays to study the activity fluctuations of single enzyme molecules *in vitro*. At the Elf lab in Uppsala I was directly responsible in setting up a single-molecule *in vivo* imaging laboratory. This stroboscopic excitation setup facilitated the tracking of even fast freely diffusing protein molecules in the cytosol of a living bacterial cells. At Einstein we extended this imaging approach to mapping translation in living fibroblast cells by simultaneous tracking and co-movement analysis of thousands of individual 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

Massachusetts Institute of Technology <i>Biophysics Seminar</i>	<i>Insights into translation by simultaneous single particle tracking of ribosomes and mRNAs</i>	11/2013
Umeå University <i>International Seminar Series</i>	<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 <i>Joint Biology and Chemistry Seminar</i>	<i>Mechanistic insights from single molecule tracking of individual enzymes, ribosomes and mRNAs in bacteria and mammalian cells</i>	04/2013
University of Tartu <i>Biomedical Technology Seminar</i>	<i>Simultaneous single molecule tracking of β-actin mRNA and the ribosome</i>	11/2012
University of Munich (LMU) <i>Gene Center Seminar</i>	<i>Single molecule investigations into β-actin mRNA localization and compartmentalization</i>	10/2012
University of Munich (LMU) <i>Invited SFB 594 Seminar</i>	<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 <i>Applied Physics Seminar</i>	<i>Stringent Response – From the Test-Tube to Living Cell</i>	04/2009
University of Tartu <i>Biomedical Technology Seminar</i>	<i>A Single Molecule Approach to Enzymology – From the Test-Tube to Living Bacterial Cells</i>	12/2008

Harvard University <i>Student-nominated Fieser Lecture</i>	<i>Fluctuating Single Molecules – Zooming in on Enzyme Kinetics</i>	04/2007
Georgia Institute of Technology <i>Molecular Biophysics Seminar</i>	<i>Fluctuating Single Enzyme Molecules</i>	04/2007
Dickinson College <i>Invited Physics Colloquium</i>	<i>Biophysics of Single Molecules – Zooming in on Enzyme Kinetics</i>	10/2006
CONFERENCE LECTURES		
SPIE Optics + Photonics San Diego, CA	<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, Computational and Experimental Molecular Biology Berlin, Germany	<i>A three-camera imaging microscope for high-speed single-molecule tracking: Insights into translation by co-movement analysis of ribosomes and mRNAs, and by and super-resolution imaging of cytoskeletal structures in living cells</i>	06/2015
Transcription Imaging Consortium Meeting HHMI Janelia Research Campus, Ashburn, VA	<i>A three-color live cell microscope for fast and accurate tracking of multiple interacting molecules</i>	10/2014
EMBO EMBL Symposium: Seeing is Believing Heidelberg, Germany	<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</i>	10/2013
Transcription Imaging Consortium Meeting HHMI Janelia Farm, Ashburn, VA	<i>Positively alarming: mechanistic insights from single particle tracking in a living cell</i>	09/2012
Focus on Microscopy 2011 Konstanz, Germany	<i>Live-cell imaging of invadopodia formation with simultaneous phase-shifted laser feedback interference and fluorescence microscopy (abstract)</i>	04/2011
9th HFSP Awardees Meeting and 20th Anniversary Celebration , Tokyo, Japan	<i>Single Molecule Approach to Stringent Response in Individual Living Bacterial Cells</i>	06/2009
232nd American Chemical Society National Meeting , San Francisco, CA	<i>Ever-fluctuating single enzyme molecules: Michaelis-Menten equation revisited (abstract)</i>	09/2006
40th IUPAC World Chemistry Congress Beijing, China	<i>From Single Molecule Enzymology to Imaging Gene Expression in Live Cells, One Molecule at a Time</i>	08/2005
CONFERENCE PRESENTATIONS		
Focus on Microscopy 2015 Göttingen, Germany	<i>A three-camera imaging setup and novel cell-permeable dyes for multiplexed single-molecule live cell experiments</i>	04/2015
Focus on Microscopy 2011 Konstanz, Germany	<i>Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells (abstract)</i>	04/2011
4th Mechanobiology Workshop and Biophysical Society Meeting , Singapore	<i>Imaging Adhesions with Phase-Shifted Laser Feedback Interference Microscopy</i>	11/2010
10th HFSP Awardees Meeting Thiruvananthapuram, India	<i>Stroboscopic Single-molecule Tracking of Freely Diffusing Cytoplasmic Proteins in Living Cells</i>	11/2010
54th Annual Meeting of the Biophysical Society , San Francisco, CA	<i>Single Molecule Tracking Inside Individual Living Bacterial Cells (abstract)</i>	02/2010
Wallenberg Symposium on Modeling and Systems Biology , Stockholm, Sweden	<i>Single Molecule Tracking Inside Living Cells</i>	09/2009
9th International Conference on Systems Biology , Göteborg, Sweden	<i>A Single Molecule Approach to Stringent Response in Individual Living Bacterial Cells</i>	08/2008
19th Symposium of the Protein Society Boston, MA	<i>A Michaelis-Menten Study of Individual Beta-Galactosidases</i>	07/2005
228th American Chemical Society National Meeting , Philadelphia, PA	<i>Enzymatic dynamics of individual Beta-Galactosidases (abstract)</i>	08/2004
17th Symposium of the Protein Society Boston, MA	<i>Single-molecule Enzymatic Dynamics Probed by Fluorescent-product Detection</i>	07/2003
COMPLETED RESEARCH SUPPORT		
International Human Frontier Science Program (HFSP) Cross Disciplinary Fellow	LT00829/2008 (PI: English, Brian P) <i>Transcription factor dynamics in living bacterial cells at the single cell level</i>	06/01/2008 – 08/31/2011
Swedish Research Council (VR) Postdoctoral Fellowship	623-2007-8116 (PI: English, Brian P) <i>The Dynamics of Gene Regulation – The Study of Individual Transcription Factor Molecules in Living Cells</i>	01/01/2008 – 05/31/2008
Molecular, Cellular and Chemical Biology Training Grant (NIH)	National Institutes of Health Graduate Research Training Fellowship – Harvard University	01/01/2002 – 08/31/2005