BRIAN PATRICK ENGLISH

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EDUCATION

PhD	**Harvard University**	Nov 2007	*Single Molecule Studies of Enzymatic Dynamic Fluctuations. Advisor:* ***Xiaoliang Sunney Xie***
MA	**Harvard University**	Nov 2003	Chemistry and Chemical Biology
BA	**Cornell University**	Jan 2001	**Bachelor of Arts with Distinction in all Fields**
Abitur	**Simpert Kraemer Gymnasium**	Jun 1996	Krumbach, Bavaria, Germany

PROFILE

Senior scientist revealing how cells regulate fundamental biological processes — one molecule at a time. Through quantitative single-molecule tracking, FCS, and super-resolution approaches in living cells, I connect bulk biochemical measurements to the dynamic behavior of individual molecules driving gene expression, protein synthesis, and cellular signaling. Dual German/American citizen, fluent in both languages.

PROFESSIONAL EXPERIENCE

Howard Hughes Medical Institute – Janelia Research Campus Ashburn VA	**Senior Scientist** Research Scientist Research Specialist	Jan 2016 – Present Jan 2015 – Dec 2015 Jan 2013 – Dec 2014
Albert Einstein College of Medicine Bronx NY	**Postdoctoral Fellow** Anatomy and Structural Biology	Sep 2010 – Dec 2012
Uppsala University Uppsala Sweden	**Postdoctoral Fellow** Cell and Molecular Biology	Sep 2007 – Aug 2010
Harvard University Cambridge MA	**Graduate Research Fellow** Chemistry and Chemical Biology	Sep 2001 – Aug 2007
Cornell University Ithaca NY	**Research Technician** Laboratory of Harold A. Scheraga	Jan 2001 – Aug 2001
Cornell University Ithaca NY	**Undergraduate Research Fellow** Chemistry and Chemical Biology	Sep 1997 – Dec 2000

AWARDS

2015 AAAS Newcomb Cleveland Prize (*Lattice light-sheet microscopy*)	Feb 2016
Young Researcher Participant of the 59th Meeting of Nobel Laureates in Lindau	Jun 2009
Student-nominated Fieser Speaker Harvard Chemistry and Chemical Biology	Apr 2007
Eli Lilly Poster Presentation Award 19th Annual Symposium of the Protein Society	Aug 2005
George C. Caldwell Prize Cornell Chemistry and Chemical Biology	Oct 2001
Phi Beta Kappa Honors Society	May 2001
2000 Undergraduate Award in Analytical Chemistry American Chemical Society	Oct 2000

SELECTED MEDIA COVERAGE

Quoted in Science News, "*Microscopy providing 'window into the cell' wins chemistry Nobel*" (*link*) Oct 2014

SERVICE & LEADERSHIP

Janelia & EMBL BioImaging Seminar Series (*co-organizer*)	May 2022 – Present
Postdoctoral Representative to the Einstein Senate Albert Einstein College of Medicine	Oct 2010 – Dec 2012
Ad Hoc Reviewer (Biomicrofluidics, Biophysical Journal, Journal of Nanobiotechnology, Philosophical Transactions B, Protein Expression and Purification, Scientific Reports)	Oct 2001 – Present
Teaching Fellow at Harvard Chemistry (Honors Introductory Chemistry, Principles of Chemistry, Frontiers in Molecular Biophysics)	Sep 2001 – Dec 2003

COMPLETED RESEARCH SUPPORT

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

RESEARCH INTERESTS

By combining multiplexed particle tracking with diffusion-based complex formation assays, I map the spatiotemporal dynamics of endogenous molecular complexes across diverse biological processes — supported by the development and application of new fluorophores and super-resolution modalities, including spontaneously blinking dyes enabling PALM and SOFI in live cells.

PROCEDURAL EXPERTISE

Microscopy: Custom design and construction of single-particle tracking, PALM/STORM, and light-sheet microscopes (LabView, Micro-Manager), including a three-camera system for high-speed multi-color single-molecule tracking. Additional experience with diSPIM, multifocus microscopy (MFM), expansion-PALM, phase-shifted laser feedback interference microscopy, SOFI, and commercial STED/STED-FCS systems. Proficient in both mammalian and bacterial live-cell imaging.

Fluorescence techniques: FCS and FCCS for quantifying molecular interactions in living cells; single-molecule FISH; evaluation and application of novel fluorophores including the Janelia Fluor series and spontaneously blinking dyes for PALM and SOFI.

Data analysis and simulation: Co-movement algorithms and custom analysis pipelines (Janelia Transcription Imaging Consortium); Bayesian trajectory analysis; Monte Carlo and diffusion simulation; programming in Igor Pro, Matlab, and LabView.

MENTORING

International Visiting PhD Scholars

Dr. Stoyan Tankov University of Tartu, Estonia	Primary on-site mentor, Janelia Research Campus. Supervised research on bacterial stringent response; co-wrote successful Estonian Fellowship. *PhD awarded 2016; currently Research Fellow, Institute of Technology, University of Tartu.*	May 2013 – Jul 2013
Dr. Pavel Kudrin University of Tartu, Estonia	Primary on-site mentor, Albert Einstein College of Medicine. Supervised in vivo single-molecule imaging of ppGpp-mediated enzymatic activation; supported by DoRa travel grant. *PhD awarded 2017; currently Research Fellow in RNA Biology, Institute of Biomedicine and Translational Medicine, University of Tartu.*	Feb 2012 – Jul 2012

PREPRINTS (SHARED PRIOR TO PEER REVIEW)

P1. FM Jradi, **BP English**, TA Brown, J Aaron, S Khuon, JA Galbraith, CG Galbraith, LD Lavis
Coumarin as a general switching auxiliary to prepare photochromic and spontaneously blinking fluorophores.
bioRxiv doi: 10.1101/2024.05.12.593749 (2024)

PUBLICATIONS

32. KL Holland*, SE Plutkis*, **BP English***,TA Daugird* et al.
A series of spontaneously blinking dyes for super-resolution microscopy.
Nature Methods 23, 909–913 (2026) (*bioRxiv preprint and open access, featured in: 1*)

31. CG Galbraith, **BP English**, U Boehm, JA Galbraith
Compartmentalized cytoplasmic tradewinds direct soluble proteins.
Nature Communications 17, 2589 (2026) (*bioRxiv preprint and open access, featured in: 1*)

30. Y Feng et al.
Inhibition of coronavirus HCoV-OC43 by targeting the eIF4F complex.
Frontiers in Pharmacology 13:1029093. doi: 10.3389/fphar.2022.1029093 (2022) (*open access*)

29. V Gandin*, **BP English*** et al.
Cap-dependent translation initiation monitored in living cells.
Nature Communications 13, 6558 (2022) (*bioRxiv preprint and open access*)

28. L Xi, P Dong, Y Qi, T-HS Hsieh, **BP English** et al.
BRD2 Compartmentalizes the Accessible Genome.
Nature Genetics 54, 481–491 doi: 10.1038/s41588-022-01044-9 (2022)

27. A Ranjan et al.
Live-cell single particle imaging reveals the role of RNA polymerase II in histone H2A.Z eviction.
eLife doi: 10.7554/eLife.55667 (2020) (*bioRxiv preprint*)

26. L Xie, P Dong et al.
3D ATAC-PALM: Super-resolution Imaging of the Accessible Genome.
Nature Methods 17, 430-436 (2020) (*bioRxiv preprint*)

25. JB Grimm, TA Brown, **BP English** et al.
Synthesis of Janelia Fluor HaloTag and SNAP-tag ligands and their use in cellular imaging experiments.
Super-Resolution Microscopy. **Methods in Molecular Biology**, Vol.1663, Humana Press, New York, NY; doi: 10.1007/978-1-4939-7265-4_15 (2017)

24. JB Grimm*, **BP English*** et al.
Bright photoactivatable fluorophores for single-molecule imaging.
Nature Methods 13(12), 985-988 (2016) (*bioRxiv preprint*)

23. YJ Yoon, B Wu, AR Buxbaum, S Das, A Tsai, **BP English** et al.
Glutamate-induced RNA localization and translation in neurons.
PNAS 113(44), E6877-86 (2016) (*open access*)

22. Z Zhang, **BP English** et al.
Rapid Dynamics of General Transcription Factor TFIIB Binding During Preinitiation Complex Assembly Revealed by Single-Molecule Analysis.
Genes and Development 30, 2106-2118 (2016) (*open access*)

21. PW Tillberg, F Chen, KD Piatkevich, Y Zhao, C-C Yu, **BP English** et al.
Protein-retention expansion microscopy of cells and tissues labeled using standard fluorescent proteins and antibodies
Nature Biotechnology 34(9), 987–992 (2016) (*cover art*)

20. T Morisaki, K Lyon, KF Deluca, JG Deluca, **BP English** et al.
Real-time quantification of single RNA translation dynamics in living cells.
Science 352(6292), 1425-1429 (2016)

19. WK Cho, N Jayanth, **BP English** et al.
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*** et al.
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) (*open access*)

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, K-C Su, Z Katz, **BP English** et al.
Inferring transient particle transport dynamics in live cells.
Nature Methods 12(9), 838-840 (2015) (*PMC article*)

14. S Viswanathan et al.
High-performance probes for light and electron microscopy.
Nature Methods 12(6), 568–576 (2015) (*PMC article*)

13. JB Grimm, **BP English** et al.
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*** et al.
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 et al.
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** et al.
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 Hauryliuk
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*** et al.
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*)

7. **BP English,** V Hauryliuk, A Sanamrad, S Tankov, NH Dekker, J Elf
Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells.
PNAS 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** et al.
Ever-fluctuating single enzyme molecules: Michaelis-Menten equation revisited.
Nature Chemical Biology 2, 87-94 (2006)
(*F1000Prime*, *featured in*: *1*, *2*, *3*, *cover art image provided by Brian English*)

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 designed by Brian English*)

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)

** denotes equal contribution*

INVITED SEMINARS

Albert Einstein College of Medicine *The Program in RNA Biology*	*Monitoring molecular interactions and dynamics in living cells via particle tracking and fluorescence correlation spectroscopy*	Jun 2022
UT Southwestern *Computational & Systems Biology Seminar Series*	*Multiplexed Single-molecule Live-cell Imaging Reveals the Dynamic Nature of Complex Biological Reactions* (*pdf*)	Nov 2017
Massachusetts Institute of Technology *Biophysics Seminar*	*Insights into translation by simultaneous single particle tracking of ribosomes and mRNAs*	Nov 2013
Umeå University *International Seminar Series*	*Insights into mRNA translation by simultaneous tracking of ribosomes and mRNAs, and by imaging of cytoskeletal structures in live cells*	Oct 2013
Duke University *Joint Biology and Chemistry Seminar*	*Mechanistic insights from single molecule tracking of individual enzymes, ribosomes and mRNAs in bacteria and mammalian cells*	Apr 2013
University of Tartu *Biomedical Technology Seminar*	*Simultaneous single molecule tracking of β-actin mRNA and the ribosome*	Nov 2012
University of Munich (LMU) *Gene Center Seminar*	*Single molecule investigations into β-actin mRNA localization and compartmentalization*	Oct 2012
University of Munich (LMU) *Invited SFB 594 Seminar*	*Live-cell imaging and single molecule tracking in bacteria and mammalian cells with laser feedback interference and fluorescence microscopy*	Nov 2011
Delft University *Applied Physics Seminar*	*Stringent Response – From the Test-Tube to Living Cell*	Apr 2009
University of Tartu *Biomedical Technology Seminar*	*A Single Molecule Approach to Enzymology – From the Test-Tube to Living Bacterial Cells*	Dec 2008

Georgia Institute of Technology *Molecular Biophysics Seminar*	*Fluctuating Single Enzyme Molecules*	Apr 2007
Dickinson College *Invited Physics Colloquium*	*Biophysics of Single Molecules – Zooming in on Enzyme Kinetics*	Oct 2006

SELECTED CONFERENCE LECTURES

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

PROFESSIONAL MEMBERSHIPS

Biophysical Society	American Chemical Society
The International Society for Optics and Photonics	The 4D nucleome project: *Imaging Tools Initiative Consortium Member*