

BRIAN PATRICK ENGLISH



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EDUCATION

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|---------------|----------------------------------|---------|---|
| PhD | Harvard University | 11/2007 | <i>Single Molecule Studies of Enzymatic Dynamic Fluctuations. Advisor: Xiaoliang Sunney Xie</i> |
| MA | Harvard University | 11/2003 | Chemistry and Chemical Biology |
| BA | Cornell University | 01/2001 | Bachelor of Arts with Distinction in all Fields |
| Abitur | Simpert Kraemer Gymnasium | 06/1996 | Krumbach, Bavaria, Germany |

PROFESSIONAL EXPERIENCE

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|--|--|-------------------|
| 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

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| 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

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| Estonian Science Foundation (ETF) | PUT37 (co-applicant, PI: Vasili Haurlyuk) <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

34. 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](#))
33. V Gandin*, BP English* *et al.* Cap-dependent translation initiation monitored in living cells. *Nature Communications* 13, 6558 (2022) ([open access](#))
32. L Xie *et al.* BRD2 Compartmentalizes the Accessible Genome. *Nature Genetics*. doi: [10.1038/s41588-022-01044-9](https://doi.org/10.1038/s41588-022-01044-9) (2022)
31. V Gandin*, BP English* *et al.* Cap-dependent translation initiation monitored in living cells. *bioRxiv*. doi: [10.1101/2021.05.21.445166](https://doi.org/10.1101/2021.05.21.445166) (2021)
30. 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](https://doi.org/10.7554/eLife.55667) (2020)

29. L Xie, P Dong *et al.* 3D ATAC-PALM: Super-resolution Imaging of the Accessible Genome. **Nature Methods** 17, 430-436 (2020)
28. A Ranjan *et al.* Live-cell single particle imaging reveals the role of RNA polymerase II in histone H2A.Z eviction. **bioRxiv**. doi: [10.1101/2020.02.13.947119](https://doi.org/10.1101/2020.02.13.947119) (2020)
27. L Xie, P Dong *et al.* Super-resolution Imaging Reveals 3D Structure and Organizing Mechanism of Accessible Chromatin. **bioRxiv**. doi: [10.1101/678649](https://doi.org/10.1101/678649) (2019)
26. JB Grimm, TA Brown, **BP English** *et al.* 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*** *et al.* Bright photoactivatable fluorophores for single-molecule imaging. **Nature Methods** 13(12), 985-988 (2016)
24. YJ Yoon, B Wu *et al.* Glutamate-induced RNA localization and translation in neurons. **PNAS** 113(44), E6877-86 (2016) ([open access](#))
23. 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](#))
22. LD Lavis*, JB Grimm, **BP English** *et al.* Bright photoactivatable fluorophores for single-molecule imaging. **bioRxiv**. doi:[10.1101/066779](https://doi.org/10.1101/066779) (2016)
21. PW Tillberg, F Chen *et al.* Expansion Microscopy of Biological Specimens with Protein Retention. **Nature Biotechnology** 34, 987-992 (2016) ([cover art](#))
20. T Morisaki *et al.* 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** *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) ([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 *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](#), [F1000Prime](#))
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 *et al.* 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](#), [SGD curated paper](#))
7. **BP English** *et al.* Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells. **PNAS** 108(31), E365-373 (2011) ([open access](#), [F1000Prime](#), [featured in: 1, 2, 3, 4](#))
6. **BP English***, A Sanamrad* *et al.* 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](#))
4. W Min *et al.* When Does the Michaelis-Menten Equation Hold for Fluctuating Enzymes? **Journal of Physical Chemistry B** 110, 20093-20097 (2006)
3. SC Kou *et al.* Single-Molecule Michaelis-Menten Equations. **Journal of Physical Chemistry B** 109, 19068-19081 (2005) ([cover art](#))
2. W Min, **BP English** *et al.* Fluctuating Enzymes: Lessons from Single-Molecule Studies. **Accounts of Chemical Research** 38, 923-931 (2005)

1. BP English *et al.* 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

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| UT Southwestern Computational & Systems Biology Seminar Series | <i>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

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| 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 |

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| Focus on Microscopy 2011 Konstanz | <i>Live-cell imaging of invadopodia formation with simultaneous phase-shifted laser feedback interference and fluorescence microscopy</i> (abstract) | 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</i> (abstract) | 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

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| 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</i> (abstract) | 04/2015 |
| Focus on Microscopy 2011 Konstanz | <i>Single Molecule Investigations of the Stringent Response Machinery in Living Bacterial Cells</i> (abstract) | 04/2011 |
| 4th Mechanobiology Workshop - Biophysical | <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</i> (abstract) | 02/2010 |
| 9th International Conference on Systems Biology | <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</i> (abstract) | 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.

- **microscopy** – design and construction of custom microscopes for single-particle tracking, PALM and STORM super resolution imaging, and light-sheet illumination with code written in Labview (hardware timing) and micro-manager. Construction of a diSPIM microscope. Operation and alignment of the multifocus microscope (MFM). PALM-imaging in combination with expansion microscopy. Phase-shifted laser feedback interference microscopy. Hosting of two commercial STED and STED-FCS microscopes for extended demonstrations for which I was responsible for the independent operation of the instruments, as well as for preparing suitable sample preparations for the entire Janelia community.
- **data analysis** – development of co-movement algorithms, and custom-analysis scripts for the Janelia transcription imaging consortium. Bayesian trajectory analysis. Igor Pro, Matlab, Micro-Manager and LabView programming.

PROFESSIONAL MEMBERSHIPS

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

NATIONALITY

Dual German/ American citizen, fluent in both German and English.