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EDUCATION

- 2015 PhD in Applied Physics
Stanford University, Stanford, CA
Thesis title: Single-molecule studies of eukaryotic and prokaryotic transcription
- 2010 MS in Applied Physics
Stanford University, Stanford, CA
- 2008 BA *summa cum laude* in Physics, Chemistry and Biology
Amherst College, Amherst, MA
Thesis title: Approaches to controlling the length of naphthalenediimide helical organic nanotubes (Chemistry)

RESEARCH EXPERIENCE

- 2021 – Present **Assistant Professor, Baylor College of Medicine, Houston, TX**
Cancer Prevention and Research Institute of Texas (CPRIT) Scholar
The Fazal lab focuses on systematically interrogating the subcellular transcriptomes of mammalian cells and characterizing the scope, regulation, and function of subcellular localization, particularly at the systems and organismal level. We use a variety of biochemical, biophysical, imaging, genomic and computational approaches to investigate the sequence-function relationship dictating RNA localization.
- 2015 – 2021 **Postdoctoral Researcher, Stanford University, Stanford, CA**
Advisor: Howard Chang (Genetics)
Collaborators: Alice Ting, Stanford University, Stanford, CA
Qiangfeng (Cliff) Zhang, Tsinghua University, China
- Developed new techniques to map the spatial localization of RNAs transcriptome-wide *in vivo* in human cells (*Cell*, 2019; *Cell Reports*, 2020).
 - Examined the secondary structure of RNA transcriptome-wide *in vivo* in different cellular compartments to understand how RNA structure influences transcription, RNA export and translation (*Nature Structural and Molecular Biology*, 2019).
- 2009 – 2015 **Graduate Researcher, Stanford University, Stanford, CA**
Advisor: Steven Block (Applied Physics and Biology)
Collaborators: Roger Kornberg, Stanford University, Stanford, CA
Robert Landick, University of Wisconsin, Madison, WI
Ben Luisi, University of Cambridge, Cambridge, UK
Kenji Murakami, University of Pennsylvania, Philadelphia, PA
- Established novel single-molecule assays to reveal the mechanism of various aspects of transcription and RNA processing. Studied initiation, elongation and rho-dependent termination in bacteria (*Nature Communications*, 2017; *Journal of Molecular Biology*, 2012); initiation in eukaryotes (*Nature*, 2015); and exoribonuclease digestion in bacteria (*PNAS*, 2015).
 - Accomplished successful study of a 32-protein eukaryotic transcription pre-initiation

- complex, representing one of the most complex systems investigated using single molecule techniques (*Nature*, 2015).
- 2008 **Graduate Researcher (Rotation), Stanford University, Stanford, CA**
Advisor: William Moerner (Chemistry)
- Developed simulations to determine dye and illumination requirements for fast 3D super resolution imaging.
- 2005 – 2008 **Undergraduate Researcher, Amherst College, Amherst, MA**
Advisor: David Hansen (Chemistry)
- Performed experiments to determine the selectivity of specific hydrogels for glucose (*BMCL*, 2007).
 - Designed experiments to construct self-assembling organic nanotubes for a wide variety of applications including catalysis, molecular recognition, and environment-sensitive switching.
- 2007 **Summer Undergraduate Researcher, Harvard University, Cambridge, MA**
Advisor: Tirupati Sridharan (Astrophysics)
- Modeled data from the NASA Spitzer Space Telescope to estimate the accretion rates of high-mass stars to determine how they form (*ApJL*, 2008).
- 2006 **Summer Undergraduate Researcher, Rowland Institute, Cambridge, MA**
Advisor: Peer Fischer (Materials Science)
- Constructed an optical setup to study diffraction through a chiral media. Developed an assay to measure the handedness (enantiomeric excess) of a solution (*Optics Letters*, 2007).

PUBLICATIONS

Selected Publications (* denotes authors contributed equally)

1. **Fazal FM***, Han S*, Parker KR, Kaewsapsak P, Xu J, Boettiger AN, Chang HY, Ting AY. Atlas of subcellular RNA localization revealed by APEX-seq. *Cell*, 178, 473–490 (2019). <http://doi.org/10.1016/j.cell.2019.05.027>
 Covered by GenomeWeb and Nature Technology Feature; F1000Prime Recommended
2. Sun L*, **Fazal FM***, Li P*, Broughton JP, Lee B, Tang L, Huang W, Kool ET, Chang HY, Zhang QC. RNA structure maps across mammalian cellular compartments. *Nature Structural and Molecular Biology (NSMB)*, 26, 322-330 (2019). doi.org/10.1038/s41594-019-0200-7
 Covered by NSMB News and Views, and Tsinghua University News
3. Meng CA*, **Fazal FM***, Block SM. Real-time observation of polymerase-promoter contact remodeling during transcription initiation. *Nature Communications*, 8(1), 1178 (2017). [doi:10.1038/s41467-017-01041-1](https://doi.org/10.1038/s41467-017-01041-1)
4. **Fazal FM***, Meng CA*, Murakami K*, Kornberg RD, Block SM. Real-time observation of the initiation of RNA polymerase II transcription. *Nature*, 525(7568), 274-277 (2015). [doi:10.1038/nature14882](https://doi.org/10.1038/nature14882)
 Covered by Stanford News, Biotechniques, Phys.org and Yeast Genome Database
5. **Fazal FM***, Koslover DJ*, Luisi BF, Block SM. Direct observation of processive exonuclease motion using optical tweezers. *Proceedings of the National Academy of Sciences (PNAS)*, 112(49), 15101-15106 (2015). [doi:10.1073/pnas.1514028112](https://doi.org/10.1073/pnas.1514028112)

Other Publications

6. Maas-Bauer K, Lohmeyer JK, Hirai T, Ramos TL, **Fazal FM** *et al.*, Invariant natural killer T cell subsets have diverse graft-versus-host-disease-preventing and anti-tumor effects. **Blood**, 138(10), 858-870 (2021). [doi:10.1182/blood.2021010887](https://doi.org/10.1182/blood.2021010887)
Covered by Blood Commentary
7. Wu KE, **Fazal FM**, Parker KR, Zou J, Chang HY. RNA-GPS predicts SARS-CoV-2 RNA residency to host mitochondria and nucleolus. **Cell Systems**, 11, 102-110 (2020). [doi:10.1016/j.cels.2020.06.008](https://doi.org/10.1016/j.cels.2020.06.008)
8. **Fazal FM**, Chang HY. Subcellular spatial transcriptomes: emerging frontier for understanding gene regulation. **Cold Spring Harbor Symposium on Quantitative Biology**, advance online (2020). [doi:10.1101/sqb.2019.84.040352](https://doi.org/10.1101/sqb.2019.84.040352)
9. Wu KE, Parker KR, **Fazal FM**, Chang HY, Zhou J. RNA-GPS predicts high-resolution RNA subcellular localization and highlights the role of splicing. **RNA**, advance online (2020). [doi:10.1261/rna.074161.119](https://doi.org/10.1261/rna.074161.119)
10. **Fazal FM**, Chang HY. LncRNA structure: message to the heart. **Molecular Cell**, 64(1), 1-2 (2016). [doi:10.1016/j.molcel.2016.09.030](https://doi.org/10.1016/j.molcel.2016.09.030)
11. Koslover DJ*, **Fazal FM***, Mooney RA, Landick R, Block SM. Binding and translocation of termination factor Rho studied at the single-molecule level. **Journal of Molecular Biology (JMB)**, 423(5), 664-676 (2012). [doi:10.1016/j.jmb.2012.07.027](https://doi.org/10.1016/j.jmb.2012.07.027)
Covered by JMB Commentary; JMB Cover and Featured Article
12. **Fazal FM**, Block SM. Optical tweezers study life under tension. **Nature Photonics**, 5(6), 318-321 (2011). [doi:10.1038/nphoton.2011.100](https://doi.org/10.1038/nphoton.2011.100)
Part of Nobel Prize in Physics 2018 Nature Collection
13. **Fazal FM**, Sridharan TK, Qui K, Whitney B, Zhang Q, Robitaille T. Spectral energy distributions of high-mass protostellar objects – evidence for high accretion rates. **Astrophysical Journal Letters (ApJL)**, 688, L41-L44 (2008). [doi:10.1086/593975](https://doi.org/10.1086/593975)
14. **Fazal FM**, Hansen DE. Glucose-specific poly(allylamine) hydrogels – a reassessment. **Bioorganic and Medicinal Chemistry Letters (BMCL)**, 17(1), 235-238 (2007). [doi:10.1016/j.bmcl.2006.09.054](https://doi.org/10.1016/j.bmcl.2006.09.054)
15. Ghosh A, **Fazal FM**, Fischer P. Circular differential double diffraction in chiral media. **Optics Letters**, 32(13), 1836-1838 (2007). [doi:10.1364/OL.32.001836](https://doi.org/10.1364/OL.32.001836)

FELLOWSHIPS, GRANTS AND AWARDS

Major Fellowships and Grants

- | | |
|-------------|---|
| 2021 – 2026 | Cancer Prevention & Research Institute of Texas (CPRIT) Scholar, \$2000K
5 years of funding covering equipment and research expenses.
Title: Defining new mechanisms and regulation of RNA localization in cancer. |
| 2019 – 2024 | NIH K99/R00 Pathway to Independence Award, \$1025K
5 years of funding covering salary and research expenses.
Title: Revealing principles of subcellular RNA localization by proximity labeling. |
| 2017 – 2020 | Arnold O. Beckman Postdoctoral Fellowship, \$214K
3 years of funding covering salary and miscellaneous expenses.
Title: Landscape of RNA structure in mammalian cells. |
| 2015 – 2017 | Stanford Genome Training Program (SGTP) Fellowship, \$92K |

2 years of funding from National Institutes of Health (NIH) covering salary and travel expenses.

2009 – 2012 **National Science Foundation (NSF) Graduate Fellowship, \$122K**
3 years of funding covering graduate student salary and tuition.
Title: Investigating the mitochondrial-lysosomal axis theory of aging through femtosecond laser nanosurgery.

2008 – 2009 **Forris Jewett Moore Fellowship, Amherst College, \$6K**
1 year of funding partly covering salary.

Other Grants and Honors

2020 RNA society Scaringe young scientist postdoctoral award
2013, 2011 Bio-X travel award, Stanford University
2008 Everett H. Pryde research award (Chemistry), Amherst College
2008 Sigma Xi (scientific research society), Amherst College
2007 Phi beta kappa (top 5% of class), Amherst College
2007 REU summer grant, Smithsonian Astrophysical Observatory (SAO)
2007 David R. Belvetz memorial prize (Chemistry), Amherst College
2006 REU summer grant, Harvard University
2005 CRC press freshman achievement award (Chemistry), Amherst College
2005 Bassett freshman achievement prize (Physics), Amherst College
2004 Founder's gold medal for excellence in ISC examination (1st in school, India)

SERVICE AND OUTREACH

2022 – Present Thesis committee member for 2 graduate students.
2021 – Present Led research conduct of research discussions for postdoc and graduate students
2014 – 2022 Ad hoc reviewer for journals *Science*, *Cell*, *Molecular Cell*, *Nature Methods*, and *Nucleic Acids Research*.
2020 Prepared nasal swab kits for testing of SARS-CoV-2.
2017 – 2020 Mentored a technician and a Stanford undergraduate in lab.
2015, 2013 Organizing staff for the Aspen single molecule biophysics conference.
2010 – 2015 Extensively trained and mentored a student during his graduate training.
2006 – 2008 Founder and contributor to a biweekly science column in the Amherst Student newspaper.
2005 Teaching intern for 4th and 8th grade science and math at Williamsbridge School (Public School 89), New York City, NY.

EXTRAMURAL TALKS AND PRESENTATIONS

Selected Posters [2 out of 16]

2019 Atlas of subcellular RNA localization revealed by APEX-seq. Annual RNA society meeting, Krakow, Poland. **[best poster prize]**
2017 Mapping the spatial organization of RNA genome-wide in mammalian cells. National human genome research institute (NHGRI) research training and career development annual meeting, Saint Louis, MO. **[2nd-best poster prize]**

Selected Talks [14 out of 30]

2022 Investigating the role of cytoskeletal motor proteins in subcellular RNA localization. EMBO RNA localization and local translation conference, Sant Feliu De Guixols, Spain.

- 2022 Investigating the Role of Cytoskeletal Motor Proteins in Subcellular RNA Localization. University of Toronto RNA club webinar.
- 2020 Revealing principles of subcellular RNA localization by APEX-seq. International society for computational biology (ISCB) iRNA COSI and RNA society webinar.
- 2020 Revealing principles of subcellular RNA localization. Columbia biomedical engineering faculty search, New York City, NY.
- 2020 Revealing principles of subcellular RNA localization. Baylor College of Medicine therapeutic innovation center (THINC) faculty search, Houston, TX.
- 2020 Revealing principles of subcellular RNA localization. Princeton Lewis-Sigler institute for integrative genomics faculty search, Princeton, NJ.
- 2020 Revealing principles of subcellular RNA localization. University of Pennsylvania physiology faculty search, Philadelphia, PA.
- 2020 Revealing principles of subcellular RNA localization. Yale genetics faculty search symposium, New Haven, CT.
- 2019 Atlas of subcellular RNA localization revealed by APEX-seq. Riboclub annual meeting, Sherbrooke, Canada.
- 2019 Atlas of subcellular RNA localization by APEX-seq. Next generation genomics conference, New York City, NY.
- 2019 Atlas of subcellular RNA localization revealed by APEX-seq. Regulatory RNAs symposium, Berlin, Germany.
- 2018 Principles of subcellular RNA localization revealed by APEX-seq. Bay area RNA annual meeting, San Francisco, CA. **[2nd-best talk prize]**
- 2016 Real-time observation of the initiation of RNA polymerase II transcription. Biophysical Society (BPS) annual meeting, Los Angeles, CA.
- 2013 Real-time observation of initiation from the T7A1 promoter. Federation of American societies for experimental biology (FASEB) conference, Saxtons River, VT.