L. Stirling Churchman, Ph.D.

churchman@genetics.med.harvard.edu

EDUCATION

UCSF School of Medicine, San Francisco, CA
Postdoctoral Fellowship, 2008-2011
Jonathan Weissman Laboratory

Stanford University, Palo Alto, CA
Ph.D. Physics, 2008
James Spudich Laboratory

Cornell University, Ithaca, NY
B.S. Physics, 1999
Independent Study, Watt W. Webb Laboratory

POSITIONS

Harvard Medical School, Boston, MA, Department of Genetics
Professor
2023 – present
Associate Professor
2017 – 2023
Assistant Professor
2011 – 2017

Broad Institute of Harvard and MIT
Associate/Affiliate Member
2011 – present

HONORS AND AWARDS

2016	Glenn Award for Research in Biological Mechanisms of Aging, Glenn Foundation
2015	John and Virginia Kaneb Fellow, Kaneb Foundation
2015-2017	Scialog Fellow for *Molecules Come to Life*, Research Corporation for Scientific Advancement and Gordon and Betty Moore Foundation
2013-2017	New Scholar in Aging Award, Ellison Medical Foundation
2011-2016	Career Award at the Scientific Interface, Burroughs Wellcome Fund
2011-2013	Dale F. Frey Award for Breakthrough Scientists, Damon Runyon Cancer Research Foundation
2008-2011	Merck Fellow, Damon Runyon Cancer Research Foundation
2002	Kirkpatrick Award for Teaching excellence, Stanford Department of Physics

SELECTED SERVICE AND LEADERSHIP

Harvard University

2024	Institutional Voice Working Group, Office of the Provost "Report on Institutional Voice in the University"

Havard Medical School

2022	Faculty Search Committee, Department of Molecular Biology, Mass General Hospital
2018-2019	Systems Biology Theory Fellows Selection Committee, Harvard Medical School
2017	Faculty Search Committee, Department of Molecular Biology, Mass General Hospital
2016-	Program for Genetics and Genomics Steering Committee, Harvard Medical School
2016 -2022	BBS Admissions Committee, Harvard Medical School
2015	Systems Biology Admissions Committee, Harvard Medical School
2015-2018	Postdoc Office Faculty Advisory Committee, Harvard Medical School
2014	Faculty Search Committee, Department of Biological Chemistry and Molecular Pharmacology (BCMP), Harvard Medical School
2013-2015	Research Computing Advisory Committee
2012-2015	Biopolymers Facility Faculty Advisory Committee

National and International

2025	Conference Co-Organizer, "Gene regulation, one molecule at a time", European Molecular Biology Laboratory, Heidelberg, Germany
2022	Conference Co-Organizer, "Gene Regulation", Keystone Symposia, Santa Fe, New Mexico
2022, 2024	Conference Co-Organizer, "Systems Biology: Global Regulation of Gene Expression", Cold Spring Harbor Laboratories, Cold Spring Harbor, NY
2022	Fellowship Award Committee, Damon Runyon Cancer Research Foundation, *Guest Reviewer*
2021-	Scientific Advisory Board, Max Planck Institute of Immunobiology and Epigenetics, Freiburg, Germany
2021	Gene Network Special Emphasis Panel, National Institutes of Health
2019	Conference Co-Organizer, "Chromatin and Epigenetics", European Molecular Biology Laboratory, Heidelberg, Germany
2019	Genomics, Computational Biology and Technology (GCAT) Study Section, National Institutes of Health, *Ad hoc reviewer*
2017	Advanced Genomic Technology Development Study Section, National Institutes of Health, *Ad hoc reviewer*
2016	Characterizing the Functional Elements in the Encyclopedia of DNA Elements (ENCODE) Catalog review panel, National Human Genome Research Institute

PUBLICATIONS (primary literature)

1. Choquet, K., Chaumont, L.-P., Bache, S., Baxter-Koenigs, A. R., and **Churchman, L. S.** (2025). Genetic regulation of nascent RNA maturation revealed by direct RNA nanopore sequencing. *Genome Research* .
2. Bibel, B., Raskar, T., Couvillion, M., Lee, M., Kleinman, J. I., Takeuchi-Tomita, N., **Churchman, L. S.**, Fraser, J. S., and Fujimori, D. G. (2025). Context-specific inhibition of mitochondrial ribosomes by phenicol and oxazolidinone antibiotics. *Nucleic Acids Research 53*.

3. Tullius T.W., Isaac R.S., Ranchalis, J., Dubocanin, D., **Churchman L.S.#**, Stergachis AB# (2024) RNA polymerases reshape chromatin and coordinate transcription on individual fibers. *Mol Cel.,* **84,** 3209-3222.e5

4. Ietswaart, R.*,#, Smalec, B. M.,* Xu, A.*, Choquet, K., McShane, E., Jowhar, Z. M., Guegler, C. K., Baxter-Koenigs, A. R., West, E. R., Fu, B. X. H., Gilbert, L., Floor, S. N.#, and **Churchman, L. S.#** (2024) Genome-wide quantification of RNA flow across subcellular compartments reveals determinants of the mammalian transcript life cycle. *Mol. Cell*. **84**, 2765-2784.e16

5. McShane, E., Couvillion, M., Ietswaart, R., Prakash, G., Smalec, B. M., Soto, I., Baxter-Koenigs, A. R., Choquet, K., and **Churchman, L. S.** (2024) A kinetic dichotomy between mitochondrial and nuclear gene expression processes. *Mol. Cell*. **84**, 1541-1555.e11

6. Coté, A., O'Farrell, A., Dardani, I., Dunagin, M., Coté, C., Wan, Y., Bayatpour, S., Drexler, H. L., Alexander, K. A., Chen, F., Wassie, A. T., Patel, R., Pham, K., Boyden, E. S., Berger, S., Phillips-Cremins, J., **Churchman, L. S.**, and Raj, A. (2024) Post-transcriptional splicing can occur in a slow-moving zone around the gene. *Elife*. 10.7554/eLife.91357

7. Litsios, A., Grys, B. T., Kraus, O. Z., Friesen, H., Ross, C., Masinas, M. P. D., Forster, D. T., Couvillion, M. T., Timmermann, S., Billmann, M., Myers, C., Johnsson, N., **Churchman, L. S.**, Boone, C., and Andrews, B. J. (2024) Proteome-scale movements and compartment connectivity during the eukaryotic cell cycle. *Cell*. **187**, 1490-1507.e21

8. Isaac, R. S., Tullius, T. W., Hansen, K. G., Dubocanin, D., Couvillion, M., Stergachis, A. B., and **Churchman, L. S.** (2024) Single-nucleoid architecture reveals heterogeneous packaging of mitochondrial DNA. *Nat. Struct. Mol. Biol.* **31**, 568–577

9. Kramer, N. J., Prakash, G., Isaac, R. S., Choquet, K., Soto, I., Petrova, B., Merens, H. E., Kanarek, N., and **Churchman, L. S.** (2023) Regulators of mitonuclear balance link mitochondrial metabolism to mtDNA expression. *Nat. Cell Biol.* **25**, 1575–1589

10. Khitun, A., Brion, C., Moqtaderi, Z., Geisberg, J. V., **Churchman, L. S.**, and Struhl, K. (2023) Elongation rate of RNA polymerase II affects pausing patterns across 3' UTRs. *J. Biol. Chem.* **299**, 105289

11. Martell, D. J., Merens, H. E., Caulier, A., Fiorini, C., Ulirsch, J. C., Ietswaart, R., Choquet, K., Graziadei, G., Brancaleoni, V., Cappellini, M. D., Scott, C., Roberts, N., Proven, M., Roy, N. B. A., Babbs, C., Higgs, D. R., Sankaran, V. G.#, and **Churchman, L. S.#** (2023) RNA polymerase II pausing temporally coordinates cell cycle progression and erythroid differentiation. *Dev. Cell*. **58**, 2112-2127.e4

12. Choquet, K., Baxter-Koenigs, A. R., Dülk, S.-L., Smalec, B. M., Rouskin, S., and **Churchman, L. S.** (2023) Pre-mRNA splicing order is predetermined and maintains splicing fidelity across multi-intronic transcripts. *Nat. Struct. Mol. Biol.* **30**, 1064–1076

13. Bergeron, D., Faucher-Giguère, L., Emmerichs, A.-K., Choquet, K., Song, K. S., Deschamps-Francoeur, G., Fafard-Couture, É., Rivera, A., Couture, S., **Churchman, L. S.**, Heyd, F., Abou Elela, S., and Scott, M. S. (2023) Intronic small nucleolar RNAs regulate host gene splicing through base pairing with their adjacent intronic sequences. *Genome Biol.* **24**, 160

14. Soto, I.*, Couvillion, M.*, Hansen, K. G., McShane, E., Moran, J. C., Barrientos, A., and **Churchman, L. S.** (2022) Balanced mitochondrial and cytosolic translatomes underlie the biogenesis of human respiratory complexes. *Genome Biol.* **23**, 170

15. Couvillion, M.*, Harlen, K. M.*, Lachance, K. C.*, Trotta, K. L., Smith, E., Brion, C., Smalec, B. M., and **Churchman, L. S.** (2022) Transcription elongation is finely tuned by dozens of regulatory factors. *Elife*. 10.7554/eLife.78944

16. Tye, B. W., and **Churchman, L. S.** (2021) Hsf1 activation by proteotoxic stress requires concurrent protein synthesis. *Mol. Biol. Cell*. **32**, 1800–1806

17. Viktorovskaya, O., Chuang, J., Jain, D., Reim, N. I., López-Rivera, F., Murawska, M., Spatt, D., **Churchman, L. S.**, Park, P. J., and Winston, F. (2021) Essential histone chaperones collaborate to regulate transcription and chromatin integrity. *Genes Dev.* **35**, 698–712

18. Drexler, H. L., Choquet, K., and **Churchman, L. S.** (2020). Splicing kinetics and coordination revealed by direct nascent RNA sequencing through nanopores. *Molecular Cell 77*: 985-998.e8.

19. Fischer, J., Song, Y. S., Yosef, N., di Iulio, J., **Churchman, L. S.**, and Choder, M. (2020). The yeast exoribonuclease Xrn1 and associated factors modulate RNA polymerase II processivity in 5‘ and 3‘ gene regions. *The Journal of Biological Chemistry 295*: 11435–11454.

20. Ietswaart, R., Gyori, B. M., Bachman, J. A., Sorger, P. K., and **Churchman, L. S.** (2021). GeneWalk identifies relevant gene functions for a biological context using network representation learning. *Genome Biology 22*: 55.

21. Stergachis, A. B., Debo, B. M., Haugen, E., **Churchman, L. S.**, and Stamatoyannopoulos, J. A. (2020). Single-molecule regulatory architectures captured by chromatin fiber sequencing. *Science 368*: 1449–1454.

22. Tye, B. W., Commins, N., Ryazanova, L. V., Wühr, M., Springer, M., Pincus, D., and **Churchman, L. S.** (2019) Proteotoxicity from aberrant ribosome biogenesis compromises cell fitness. *Elife*. 10.7554/eLife.43002

23. Doris, S. M., Chuang, J., Viktorovskaya, O., Murawska, M., Spatt, D., **Churchman, L. S.**, and Winston, F. (2018) Spt6 is required for the fidelity of promoter selection. *Mol. Cell*. **72**, 687-699.e6

24. Mischo, H. E., Chun, Y., Harlen, K. M., Smalec, B. M., Dhir, S., **Churchman, L. S.**, and Buratowski, S. (2018) Cell-cycle modulation of transcription termination factor Sen1. *Mol. Cell*. **70**, 312-326.e7

25. Dronamraju, R., Jha, D. K., Eser, U., Adams, A. T., Dominguez, D., Choudhury, R., Chiang, Y.-C., Rathmell, W. K., Emanuele, M. J., **Churchman, L. S.**, and Strahl, B. D. (2018) Set2 methyltransferase facilitates cell cycle progression by maintaining transcriptional fidelity. *Nucleic Acids Res.* **46**, 1331–1344

26. Jin, Y.*, Eser, U.*, Struhl, K.#, and **Churchman, L. S.#** (2017) The ground state and evolution of promoter region directionality. *Cell*. **170**, 889-898.e10

27. Winter, G. E.*, Mayer, A.*, Buckley, D. L.*, Erb, M. A., Roderick, J. E., Vittori, S., Reyes, J. M., di Iulio, J., Souza, A., Ott, C. J., Roberts, J. M., Zeid, R., Scott, T. G., Paulk, J., Lachance, K., Olson, C. M., Dastjerdi, S., Bauer, S., Lin, C. Y., Gray, N. S., Kelliher, M. A., **Churchman, L. S.#**, and

Bradner, J. E.# (2017) BET bromodomain proteins function as master transcription elongation factors independent of CDK9 recruitment. *Mol. Cell*. **67**, 5-18.e19

28. Boswell, S. A., Snavely, A., Landry, H. M., **Churchman, L. S.**, Gray, J. M., and Springer, M. (2017) Total RNA-seq to identify pharmacological effects on specific stages of mRNA synthesis. *Nat. Chem. Biol.* **13**, 501–507

29. Harlen, K. M., and **Churchman, L. S.** (2017) Subgenic Pol II interactomes identify region-specific transcription elongation regulators. *Mol. Syst. Biol.* **13**, 900

30. Harlen, K. M., Trotta, K. L., Smith, E. E., Mosaheb, M. M., Fuchs, S. M., and **Churchman, L. S.** (2016) Comprehensive RNA polymerase II interactomes reveal distinct and varied roles for each phospho-CTD residue. *Cell Rep.* **15**, 2147–2158
    - Recommended by the Faculty of 1000

31. Couvillion, M. T., Soto, I. C., Shipkovenska, G., and **Churchman, L. S.** (2016) Synchronized mitochondrial and cytosolic translation programs. *Nature*. **533**, 499–503
    - *News and Views*: Ott M. (2016) Choreography of protein synthesis. *Nature*. 533:472-473
    - *Preview*: St-Pierre J and Topisirovic I. (2016) Nucleus to Mitochondria: Lost in Transcription, Found in Translation. *Dev Cell*. 37:490-492
    - *Principles of Systems Biology – No. 6*: (2016) Couvillion MT and Churchman LS. Synchronized in Translation. *Cell Systems*. 2:356-359

32. Mayer, A.*, di Iulio, J.*, Maleri, S., Eser, U., Vierstra, J., Reynolds, A., Sandstrom, R., Stamatoyannopoulos, J. A., and **Churchman, L. S.** (2015) Native elongating transcript sequencing reveals human transcriptional activity at nucleotide resolution. *Cell*. **161**, 541–554

33. Padovan-Merhar, O., Nair, G. P., Biaesch, A. G., Mayer, A., Scarfone, S., Foley, S. W., Wu, A. R., **Churchman, L. S.**, Singh, A., and Raj, A. (2015) Single mammalian cells compensate for differences in cellular volume and DNA copy number through independent global transcriptional mechanisms. *Mol. Cell*. **58**, 339–352

34. Marquardt, S., Escalante-Chong, R., Pho, N., Wang, J., **Churchman, L. S.**, Springer, M., and Buratowski, S. (2014) A chromatin-based mechanism for limiting divergent noncoding transcription. *Cell*. **157**, 1712–1723

35. Elting, M. W., Leslie, S. R., **Churchman, L. S.**, Korlach, J., McFaul, C. M. J., Leith, J. S., Levene, M. J., Cohen, A. E., and Spudich, J. A. (2013) Single-molecule fluorescence imaging of processive myosin with enhanced background suppression using linear zero-mode waveguides (ZMWs) and convex lens induced confinement (CLIC). *Opt. Express*. **21**, 1189–1202

36. Terzi, N., **Churchman, L. S.**, Vasiljeva, L., Weissman, J., and Buratowski, S. (2011) H3K4 trimethylation by Set1 promotes efficient termination by the Nrd1-Nab3-Sen1 pathway. *Mol. Cell. Biol.* **31**, 3569–3583

37. **Churchman, L. S.**, and Weissman, J. S. (2011) Nascent transcript sequencing visualizes transcription at nucleotide resolution. *Nature*. **469**, 368–373
    - *Research Highlight*. Schuldt A. (2011) Teasing out transcription. *Nature Reviews Genetics*. 12(152)

38. Mortensen, K. I.*, **Churchman, L. S.***, Spudich, J. A., and Flyvbjerg, H. (2010) Optimized localization analysis for single-molecule tracking and super-resolution microscopy. *Nat. Methods*. **7**, 377–381
    - News and Views. Larson DR. The economy of photons. (2010) *Nature Methods*. 7:357-359

39. Bassik, M. C., Lebbink, R. J., **Churchman, L. S.**, Ingolia, N. T., Patena, W., LeProust, E. M., Schuldiner, M., Weissman, J. S., and McManus, M. T. (2009) Rapid creation and quantitative monitoring of high coverage shRNA libraries. *Nat. Methods*. **6**, 443–445

40. **Churchman, L. S.**, Flyvbjerg, H., and Spudich, J. A. (2006) A non-Gaussian distribution quantifies distances measured with fluorescence localization techniques. *Biophys. J.* **90**, 668–671

41. **Churchman, L. S.**, Okten, Z., Rock, R. S., Dawson, J. F., and Spudich, J. A. (2005) Single molecule high-resolution colocalization of Cy3 and Cy5 attached to macromolecules measures intramolecular distances through time. *Proc. Natl. Acad. Sci. U. S. A.* **102**, 1419–1423

42. Okten, Z., **Churchman, L. S**., Rock, R. S., and Spudich, J. A. (2004) Myosin VI walks hand-over-hand along actin. *Nat. Struct. Mol. Biol.* **11**, 884–887

PUBLICATIONS (reviews, protocols and book chapters)

1. McShane, E., and **Churchman, L. S.** (2024) Central dogma rates in human mitochondria. *Hum. Mol. Genet.* **33**, R34–R41

2. Merens, H. E., Choquet, K., Baxter-Koenigs, A. R., and **Churchman, L. S.** (2024) Timing is everything: advances in quantifying splicing kinetics. *Trends Cell Biol.* 10.1016/j.tcb.2024.03.007

3. Soto, I., Couvillion, M., and **Churchman, L. S.** (2023) Human mitoribosome profiling: A re-engineered approach tailored to study mitochondrial translation. *Methods Mol. Biol.* **2661**, 257–280

4. Isaac, R. S*., McShane, E.*, and **Churchman, L. S.** (2018) The multiple levels of mitonuclear coregulation. *Annu. Rev. Genet.* **52**, 511–533

5. Mayer, A., and **Churchman, L. S.** (2017) A Detailed Protocol for Subcellular RNA Sequencing (subRNA-seq). *Curr. Protoc. Mol. Biol.* **120**, 4.29.1-4.29.18

6. Mayer, A., Landry, H. M., and **Churchman, L. S.** (2017) Pause & go: from the discovery of RNA polymerase pausing to its functional implications. *Curr. Opin. Cell Biol.* **46**, 72–80

7. Harlen, K. M., and **Churchman, L. S.** (2017) The code and beyond: transcription regulation by the RNA polymerase II carboxy-terminal domain. *Nat. Rev. Mol. Cell Biol.* **18**, 263–273

8. Couvillion, M. T., and **Churchman, L. S.** (2017) Mitochondrial Ribosome (Mitoribosome) Profiling for Monitoring Mitochondrial Translation In Vivo. in *Current Protocols in Molecular Biology* (Ausubel, F. M., Brent, R., Kingston, R. E., Moore, D. D., Seidman, J. G., Smith, J. A., and Struhl, K. eds), p. 4.28.1-4.28.25, John Wiley & Sons, Inc., Hoboken, NJ, USA, **533**, 4.28.1-4.28.25

9. **Churchman, L. S.,** and Weissman, J. S. (2012) Native elongating transcript sequencing (NET-seq). *Curr. Protoc. Mol. Biol.* **Chapter 4**, Unit 4.14.1-17

10. **Churchman, L. S**., and Spudich, J. A. (2007) Colocalization of Fluorescent Probes: Accurate and Precise Registration with Nanometer Resolution. in *Single-Molecule Techniques: A Laboratory Manual* (Ha, T. ed), pp. 73–84, Cold Spring Harbor Laboratory Press

* denotes co-first authorship
** denotes co-second authorship
# denotes co-corresponding authorship

PUBLICATIONS (commentary)

1. Isaac, R. S., and **Churchman, L. S.** (2019) The long and the short of the RNA polymerase C-terminal domain and phase separation. *Mol. Cell*. **73**, 1087–1088

2. **Churchman, L. S.** (2017) Not just noise: Genomics and genetics bring long noncoding RNAs into focus. *Mol. Cell*. **65**, 1–2

EDITORIAL ACTIVITY

Board of Reviewing Editors
Elife (2019-2023)

Editorial Board Member
Molecular and Cellular Biology (2016-)
Cell Reports (2016-2020)

TEACHING

Harvard Medical School

2015	Instructor in Genetics Boot Camp
2014	Lecturer in Biophysics 242r: Single Molecule Approaches in Biology
2012 -- present	Lecturer in Biochemistry and Molecular Pharmacology 200

Physiology Course, Marine Biological Laboratories, Woods Hole, MA

2009	Teaching Assistant with Jonathan Weissman
2006	Teaching Assistant with James Spudich

PROFESSIONAL SOCIETIES

- American Society for Cell Biology
- Biophysics Society
- American Society for Biochemistry and Molecular Biology

INVITED SEMINARS

2024

- Fusion Conference: Genome Regulation through RNA, Cancun, Mexico
- CSHL Systems Biology: Global Gene Regulation, Cold Spring Harbor, NY
- Stanford School of Medicine Chemical and Systems Biology Seminar, Palo Alto, CA
- EMBO Workshop: Molecular biology of mitochondrial gene maintenance and expression, Warsaw, Poland

- International Mammalian Synthetic Biology Workshop, Keynote Speaker, Boston, MA

2023

- RNA Therapeutics Institute seminar series, University of Massachusetts Medical School Worcester, MA
- University of California, San Diego Genetics, Bioinformatics and Systems Biology Colloqium, San Diego, CA
- Vanderbilt University Department of Molecular Physiology and Biophysics Seminar Series, Nashville, TN
- John Hopkins University School of Medicine Cell Biology Seminar Series, Baltimore, MD
- Sloan Kettering Institute, Memorial Sloan Kettering Cancer Center Seminar Series, New York, NY
- NIH Transcription Interest Group Webinars, On Zoom hosted in Bethesda, MD
- Cold Spring Harbor Laboratory Mechanisms of Eukaryotic Transcription, Cold Spring Harbor, NY
- QBIGS virtual seminar, German Cancer Research Center (DKFZ), By Zoom hosted in Heidelberg, Germany
- Gordan Research Conference - Mitochondria in Health and Disease, Lucca, Italy
- EMBL/EMBO Chromatin and Epigenetics, Heidelburg, Germany
- University of Cambridge Epigenetics Club, Cambridge, United Kingdom
- EUROMIT 2023, Bologna, Italy
- Ribo-Club 2023 meeting, Magog, Quebec, Canada
- Karolinska Institutet, MOLMET seminar, Stockholm, Sweden
- Tampere University, Molecular Biology Seminar, Tampere, Finland

2022

- MIT Biology Department Colloquium, Massachusetts Institute of Technology, Boston, MA
- Keystone Symposia on Mitochondrial Biochemistry, Breckenridge, CO
- Computational Biology & Bioinformatics Program (CBB) seminar series Duke University School of Medicine, By Zoom hosted in Durham, NC
- Keystone Symposia on Gene Regulation, Santa Fe, NM
- James Spudich 80th Birthday Symposium, Stanford University, Palo Alto, CA
- Princeton University Quantitative and Computational Biology seminar series, Princeton, NJ
- ASBMB Transcriptional Regulation Chromatin and RNA Polymerase II, Snowbird, UT
- Ludwig-Maximilians-Universität München Engineering Life seminar, By Zoom hosted in Munich, Germany
- Dahlem Colloquia in Molecular Genetics Max Planck Institute for Molecular Genetics, By Zoom hosted in Berlin, Germany
- EMBO Workshop on Molecular Biology of Mitochondrial Gene Expression, Bro, Sweden

2021

- University of Pittsburgh, Department of Biological Sciences, By Zoom hosted in Pittsburgh, PA
- American Physical Society March Meeting, Liquid phases, spatial genome organization, and transcription, By Zoom
- NIH NIGMS postdoctoral research associate training (PRAT) seminar series, By Zoom hosted in Bethesda, MD
- Cold Spring Harbor Laboratory Mechanisms of Eukaryotic Transcription, By Zoom hosted in Cold Spring Harbor, NY
- NCI RNA Biology Laboratory Seminar Series, By Zoom hosted in Frederick, MD
- Cornell University Biomedical and Biological Sciences Signature Seminars, Ithaca, NY
- University of California, Berkeley BBS-CDG-GGD seminar series, Berkeley, CA
- Microbiology Society Annual Meeting, Fleming Symposium in honor of 75th anniversary, By Zoom hosted in Edinburgh, Scotland

2020

- University of California Davis Joint Seminars in Molecular Biology, Davis, CA
- Princeton University Quantitative and Computational Biology seminar series, Princeton, NJ
- University of California, Berkeley, Molecular and Cellular Biology seminar series
  This presentation was scheduled, but then postponed until 2021 because of a Covid-19 travel/meeting ban
- Keystone Symposia, Mitochondrial Biochemistry in Health and Disease
  This presentation was scheduled, but then postponed until 2022 because of a Covid-19 travel/meeting ban
- Columbia University Department of Biological Sciences seminar series, By Zoom hosted in New York, NY
- Washington University, Department of Genetics seminar series, By Zoom hosted in St. Louis, MI
- The Netherlands Cancer Institute seminar series
  This presentation was scheduled, but then postponed until 2022 because of a Covid-19 travel/meeting ban
- Munich Chromatin Dynamics research network Octoberfest Lecture Award
  This presentation was scheduled, but cancelled because of a Covid-19 travel/meeting ban
- Netherlands Cancer Institute Seminar Series, By Zoom hosted in Amsterdam, Netherlands

2019

- Yale University Department of Molecular Biophysics and Biochemistry seminar series, New Haven, CT
- UC San Diego Joint Division of Biological Sciences/Cellular and Molecular Medicine Seminar Series, San Diego, CA
- Cold Spring Harbor Laboratory Mechanisms of Eukaryotic Transcription, Cold Spring Harbor, NY
- Damon Runyon Cancer Research Foundation Annual Fellows Meeting, Southbridge, MA
- University of Pennsylvania Department of Biochemistry and Biophysics seminar series, Philadelphia, PA
- University of Toronto, Donnelly seminar series, Toronto, Canada
- EMBO/EMBL Chromatin and Epigenetics, Heidelburg, Germany
- EMBL Multiomics to Mechanisms, Heidelburg, Germany
- Cold Spring Harbor Asia Meeting on Mitochondria and Metabolism in Health and Disease, Suzhou, China

2018

- MIT Biophysics Program Seminar series, Massachusetts Institute of Technology, Boston, MA
- Marine Biology Laboratory Physical Biology Course, Woods Hole, MA
- Stanford University Frontiers Seminar, Palo Alto, CA
- Stanford University Biochemistry 60th Anniversary symposium, Palo Alto, CA
- University of Texas Southwestern Molecular Biophysics Program, Dallas, TX
- Advanced Genomic Technology Development Grantee Meeting, Boston, MA
- International Society for Computational Biology, Chicago, Il
- Gordon Research Conference on Post-transcriptional Gene Regulation, Sunday River, ME
- Gordon Research Conference on Chromatin Structure and Function, Sunday River, ME
- University of California, San Francisco, Gladstone Institute and CVRI Joint seminar, San Francisco, CA
- Stowers Institute for Medical Research seminar series / Student invited seminar, Kansas City, MO
- MRC Human Genetic Unit, the Institute of Genetics and Molecular Medicine (IGMM), University of Edinburgh, Edinburgh, Scotland

- Life Sciences Switzerland (LS2) Conference, Lausanne, Switzerland
- Biophysics in the Nucleus, Dresden, Germany
- EMBO workshop on Gene Transcription in Yeast, Sant Feliu de Guíxols, Spain
- Max Planck Institute of Immunobiology and Epigenetics, Freiburg, Germany
- European Bioenergetics Conference, Frontiers in Mitochondrial Research, Budapest, Hungary
- Max Planck Institute of Ageing, Cologne, Germany
- Gene Regulation Workshop, University of Lausanne, Lausanne, Switzerland
- FASEB Transcription, Chromatin & Epigenetics, Florence, Italy
- Max Planck Freiburg Epigenetics Meeting, Freiburg, Germany

2017

- MIT Math & CSAIL Bioinformatics Seminar, Massachusetts Institute of Technology, Boston, MA
- New England Biolabs, Ipswitch, MA
- Marine Biology Laboratory Physical Biology Course, Woods Hole, MA
- Genetics, Bioinformatics and Systems Biology Colloquium, University of California, San Diego, San Diego, CA
- Biophysics of lncRNAs, Biophysical Society Annual Meeting, New Orleans, LA
- Advances in Genome Biology and Technology, Hollywood, FL
- Department of Biochemistry & Molecular Biology, Zhong-Yin Zhang Lectureship, Indiana University School of Medicine, Indianapolis, IN
- NCI RNA Biology Symposium, NIH National Cancer Institute, Bethesda, ML
- Duke Quantitative Biology Symposium, Duke University, Durham, NC
- FASEB Science Research Conference on Mitochondrial Biogenesis and Dynamics in Health, Disease and Aging, West Palm Beach, FL
- Cold Spring Harbor Laboratory Biological Data Science Course, Cold Spring Harbor, NY
- Cold Spring Harbor Laboratory Mechanisms of Eukaryotic Transcription, Cold Spring Harbor, NY
- Cold Spring Harbor Laboratory Quantitative Biology Program, Cold Spring Harbor, NY
- University of California, Irvine Department of Microbiology and Molecular Genetics, Student Invited seminar, Irvine, CA
- Revolutionizing Next-Gen Sequencing : Tools and Technologies Meeting, Vlaams Instituut voor Biotechnologie (VIB), Antwerp, Belgium
- EMBO Conference: Chromatin and Epigenetics, Heidelberg, Germany
- Max Planck Symposium, Organismal Biology meets Epigenetics, Berlin, Germany
- Max Planck Institute of Molecular Physiology, Dortmund, Germany
- Max Planck Institute of Ageing, Cologne, Germany
- University of Padova, Department of Biomedical Sciences, Padova, Italy
- The Biennial Congress of the Italian Association of Cell Biology and Differentiation, Bologna, Italy
- Institut Jacques Monod CNRS, Paris, France

2016

- Systems Biology Seminar Series, Boston University, Boston, MA
- Computational Aspects of Biological Information, Microsoft Research New England, Cambridge, MA
- Epigenomics 2016, NIH Common Fund, Puerto Rico
- Chromatin Non-coding RNAs and RNAP II Regulation in Development and Disease Symposium, University of Texas, Austin, Texas
- Department of Molecular Genetics and Cell Biology, University of Chicago, Chicago, IL
- Department of Molecular and Cellular Biology, Baylor College of Medicine, Houston, TX
- Department of Molecular Biology and Genetics, Cornell University, Ithaca, NY

- Department of Biochemistry and Biophysics, University of California, San Francisco, San Francisco, CA
- Genome Replication and Gene Regulation Minisymposium, ASCB annual meeting, San Francisco, CA
- The Biochemistry and Molecular Biology Graduate Student Association/ Student invited seminar, Pennsylvania State University, University Park, PA
- Department of Biochemistry, University of Wisconsin-Madison, Madison, WI
- Population Epigenomics Workshop, McGill University, Barbados
- Genetic Networks Workshop, McGill University, Barbados
- Unanswered Questions: Tumours at Cellular Resolution, Cancer Research UK, Cambridge, UK
- Mechanisms and Mysteries in Epigenetics, Keynote Speaker, Garvan Institute of Medical Research, Sydney, Australia
- School of Chemistry Seminar, University of Wollongong, Wollongong, Australia
- EMBO workshop: Molecular Biology of Mitochondrial Gene Expression, Bro, Sweden
- Biomedicum Helsinki, University of Helsinki, Helsinki, Finland
- EMBO Gene Transcription in Yeast, Sant Feliu de Guíxols, Spain
- 80th Harden Conference: Machines on Genes, Manchester, UK
- EMBO Chromatin and the Environment, Spetses, Greece
- EMBL Conference: Transcription and chromatin, Heidelberg, Germany
- Graduation Ceremony/ Commencement Keynote speaker, Max Delbrück Center for Molecular Medicine, Berlin, Germany

2015

- Annual Quantitative Biology Bootcamp, Keynote speaker, Brandeis University, Waltham, MA
- Program in Systems Biology Seminar Series, University of Massachusetts Medical School, Worcester, MA
- Cell Press Lab Links, Gene Circuits: From Understanding to Engineering, Broad Institute, Cambridge, MA
- Structural Biology and Biochemistry Seminar Series, University of Colorado, Denver, CO
- 27th Graduate Student Symposium on Emerging Technologies, University of Colorado, Boulder, CO
- American Society for Biochemistry and Molecular Biology: Evolution and Core Processes in Gene Regulation, St. Louis, MO
- Chromatin and Epigenetic Regulation of Transcription, Pennsylvania State Summer Symposium in Molecular Biology, State College, PA
- 4th Cancer Epigenomics Conference, GTCbio, San Francisco, CA
- Physics Department Seminar Series, McGill University, Montreal, Canada
- Third Annual Broad-ISF Symposium, Jerusalem, Israel
- SciLifeLab seminar series, Uppsala University, Uppsala, Sweden
- Department of Biochemistry and Cell Biology, University of Gothenburg, Gothenburg, Sweden
- Department of Biochemistry and Biophysics, University of Stockholm, Sweden

2014

- Cell Press Lab Links, Autophagy and Beyond, Broad Institute, Cambridge, MA
- Department of Biological Sciences Seminar Series, University of Rhode Island, Kingston, RI
- Boston Area Gene Expression Meeting, Tufts Medical School, Boston, MA
- Systems Biology: Global Regulation of Gene Expression, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
- Protein Society Annual Symposia, Frontier High-Throughput Techniques, San Diego, CA
- Genome Sciences Seminar Series, University of Washington, Seattle, WA
- ASBMB Transcriptional Regulation Chromatin and RNA Polymerase II, Snowbird, UT
- Instituto de Medicina Molecular Monday Lecture Series, Lisbon, Portugal

- Max Planck Institute of Molecular Genetics, Berlin, Germany
- Single Molecule Approaches to Biology Gordon Conference, Lucca, Italy
- Vienna Biocenter, Institute of Molecular Pathology/ Postdoc-invited seminar, Vienna, Austria

2013

- MIT Chemical and Systems Biology Graduate Program Retreat, Kennebunkport, ME
- Genomics and Biophysics Symposium/ Invited talk
- New Methods in Genomics, ASCB Annual Meeting, San Francisco, CA
- Bionanoscience Department Seminar, TU Delft, Delft, Netherlands

2012

- Boston Area Gene Expression Meeting, Tufts Medical School, Boston, MA
- Philadelphia Muscle Institute Seminar Series, University of Pennsylvania, Philadelphia, PA
- Quantitative and Computational Biology Seminar, Lewis-Sigler Institute, Princeton University
- Pittsburgh Chromatin Club Symposium, University of Pittsburgh, Pittsburgh, PA
- New Technologies in Molecular Biology workshop, ASCB Annual Meeting, San Francisco, CA

2011

- Biochemistry and Biophysics Seminar, Brandeis University, Waltham, MA

FUNDING

Active Research Support

2013-2027 Mechanisms of transcriptional control revealed by nascent transcript sequencing
NIH R01 HG007173
PI: Churchman

2021-2025 Global control of co-transcriptional splicing
NIH R01 GM136794
PI: Churchman

2024-2026 Subcellular mito-nuclear balance and gene expression dynamics in Alzheimer's disease
NIH R21AG091645-01
PI: Churchman

Past Research Support

2008-2011 Visualizing global transcription *in vivo* at nucleotide resolution
Damon Runyon Cancer Research Foundation
Postdoctoral fellow

2011-2013 Visualizing global transcription *in vivo* at nucleotide resolution
Damon Runyon Cancer Research Foundation, Dale F. Frey Award for Breakthrough Scientists
PI: Churchman

2013-2015 Visualizing the regulation of mitochondrial gene expression with nucleotide resolution
Giovanni Armenise-Harvard Foundation/ HMS Junior Faculty Grant
PI : Churchman

2015-2016 High-resolution analysis of estrogen-induced transcription in rare human mammary cells using native elongating transcript sequencing

Charles E.W. Grinnell Medical Research Award
PI: Churchman

2011-2016 Regulation of the RNA polymerase motor mechanism in vivo
Burroughs Wellcome Fund, Career Award at the Scientific Interface
PI: Churchman

2013-2018 Mitochondrial gene expression landscape of *S. cerevisiae* during aging and life span extension
Ellison Medical Foundation – New Scholar in Aging Award
PI: Churchman

2016-2018 Global measurement of splicing kinetics
NIH R21 HG009264
PI: Churchman

2016-2020 High resolution analysis of transcription-splicing coupling
NIH R01 GM117333
PI: Churchman

2017-2021 Nuclear-mitochondrial co-regulation during mitochondrial biogenesis
NIH R01 GM123002
PI: Churchman

2022-2024 Mitonuclear gene regulation in neuronal soma and neurites
Ludwig Neurodegenerative Disease Seed Grants Program at Harvard Medical School
PI: Churchman

2021-2023 Direct sequencing of nascent RNA to uncover the functional impact of genetic variants on RNA processing
NIH R21 HG011682
PI: Churchman

2019-2023 Direct nanopore detection of modified RNA to probe structure and dynamics
NIH R01 HG010538
Sub-Contract PI (PI: Winston Timp)

CURRENT PERSONNEL

Graduate Students

- Jake Bridgers (BA University of North Carolina-Chapel Hill)
- Claire Nuessmeier (BA Marquette University)
- Hope Merens (BA University of Pennsylvania)
    - *Funded by NSF Graduate Fellowship*
- Lisa Hansen (BA University of Colorado, Boulder)
- Gyan Prakash (MS McGill University, Canada)

Postdoctoral Fellows

- Katja Hansen (PhD University of Kaiserslautern)
    - *Funded by Helen Hay Whitney and EMBO fellowships*
- Inés Patop (PhD Brandeis University)
    - *Funded by Parkinson's Foundation Postdoctoral Fellowship*

- Ana-Maria Raicu (PhD Michigan State University)
    - *Funded by Ruth L. Kirschstein National Research Service Award F32*

PAST PERSONNEL

Undergraduate Students (current position)

- Leah Rosen (PhD student at European Bioinformatics Institute)
    - *Received Harvard College Hoopes Prize for thesis work*

Graduate Students (current position)

- Kevin Harlen (AI & Data Manager at Deloitte Consulting)
- Heather Landry Drexler (Director of Strategy at Sail Biomedicines)
    - *Funded Ruth L. Kirschstein National Research Service Award F31*
- Blake Tye (Research Associate, Wellington Management)
    - *Funded by NSF Graduate Fellowship*
- Kate Lachance (Consultant at McKinsey Consulting)
    - *Funded Ruth L. Kirschstein National Research Service Award F31*
- Aaron Aker (Scientist at Molecular Loop)
    - *Funded by NSF Graduate Fellowship*
- Brendan Smalec (Consultant at Bain & Company)
- Tommy Tullius (Postdoctoral Fellow, Princeton University)

Postdoctoral Fellows (current position)

- Andreas Mayer (Group leader, Max Planck Institute for Molecular Genetics, Berlin, Germany)
    - *Funded by Human Frontiers Science Program Postdoctoral Fellowship*
- Umut Eser (Co-Founder & CTO at Weave)
- Julia di Iulio (Director of Bioinformatics, Vir Biotechnology)
- Mary Couvillion (Founder of Juggling Genomes Consultancy)
    - *Funded by Ruth L. Kirschstein National Research Service Award F32*
- Andrew Stergachis (Associate Professor, Genome Sciences, University of Washington)
- Iliana Soto (Biomedical Program Director, Kaiser University)
- Danya Martell-Smart (Patent agent, Wilson Sonsini)
    - *Funded by Ruth L. Kirschstein National Research Service Award F32*
- Karine Choquet (Assistant Professor, Université de Sherbrooke, Canada)
    - *Funded by Canadian Institutes of Health Research (CIHR) Post-doctoral fellowship*
- Robert Ietswaart (Co-founder and CSO of Cellforma)
    - *Funded by EMBO Long-Term Fellowship*
- Nick Kramer (Research Scientist at Scribe Therapeutics) –
    - *Funded by Ruth L. Kirschstein National Research Service Award F32*
- Stefan Isaac (Assistant Professor, Biochemistry and Cell Biology, Boston University)
    - *Funded by Ruth L. Kirschstein National Research Service Award F32*
- Erik McShane (Research Scientist,)
    - *Funded by EMBO Long-Term Fellowship*