Michael B. Elowitz

Investigator, Howard Hughes Medical Institute
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Focus Areas: Synthetic Biology and Systems Biology
Administrative contact: Rui Malinowski (ruim@caltech.edu)

Professional Positions

2010-present	Professor of Biology and Biological Engineering, Caltech
2008-present	Investigator, Howard Hughes Medical Institute
2008-present	Assistant Adjunct Professor, Department of Biological Chemistry, David Geffen School of Medicine at UCLA
2014-2021	Executive Officer for Bioengineering, Caltech
2009-2010	Associate Professor of Biology, Bioengineering, and Applied Physics; Bren Scholar, Caltech
2003-2009	Assistant Professor of Biology and Applied Physics, and Bren Scholar, Caltech

Education

2000-2003	Postdoctoral Fellow, Rockefeller University, Center for Studies in Physics and Biology, Advisor: Arnold J. Levine.
1999-2000	Postdoctoral Research, Princeton University, Advisor: Stanislas Leibler
1993-1999	Ph.D (1999) and MA (1997), Physics, Princeton University. Advisor: Stanislas Leibler
1992	NSF Undergraduate Research Fellowship, Dept. of Physics, University of Michigan, Advisor: B. Orr
1988-1992	B.A., Physics, University of California, Berkeley; Regent's Scholarship & Dean's List, UC Berkeley

Honors and awards:

- Clarivate Citation Laureate (2023)
- Elected, U.S. National Academy of Sciences (2022)
- The Raymond and Beverly Sackler International Prize in Biophysics (2019)
- Elected, European Molecular Biology Organization, EMBO (2016)
- Fellow, American Academy for the Advancement of Science, AAAS (2016)
- Sackler Scholar, Tel Aviv University (2015-2016)
- Elected, American Academy of Arts & Sciences (2015)
- Allen Distinguished Investigator (2014)
- Israel Pollak Distinguished Lecturer, Technion-Israel Institute of Technology (Dec. 2014)
- HFSP Nakasone Award (2011)
- Pierre Gilles de Gennes Fellowship (2010)
- Presidential Early Career Award in Science and Engineering (2008)
- Discover Magazine "Top 20 under 40" (2008)
- HHMI Investigator (2008-present)
- MacArthur Fellow (2007)
- Packard Fellow (2006)
- Searle Scholars Award (2004)
- Technology Review magazine TR100 list of top innovators (2004)

- Burroughs Wellcome Career Award at the Scientific Interface (2002-2007)

Selected professional activities:
- Co-director, Allen Discovery Center for Cell Lineage Tracing (link).
- Sloan Kettering Institute External Advisory Board (starting 2023).
- Editorial Board, Cell Systems (2018-present)
- Editorial Advisory Board, ACS Synthetic Biology (2021-present)
- Editorial Board, BioDesign Research (2021-present)
- Scientific Advisory Board, Allen Institute (2018-present)
- Board Member, Living Histories Trust, https://iyerbiswas.com/outreach/livinghistories/ (2021-present)
- Scientific Advisory Board, Friedrich Miescher Institute (2017)
- Advisor, Biodesign Challenge Team at SCI-ARC and CalArts (2016-2018)
- Co-organizer, BIRS Workshop on Principles of Gene Circuit Design, Oaxaca (2017)
- Scientific Advisory Board Member, Allen Institute for Cell Science (2014-present)
- Advisory Council, Allen Institute for Brain Research Cell Networks (2010-2018)
- Advisory Board, Kavli Institute for Theoretical Physics (2010-2012)
- Associate Editor, ACS Synthetic Biology (2012-2015)
- Planning committee, Six Party Symposia on Synthetic Biology, through the U.S., U.K., and China National Academies of Science and Engineering (2012-2013).
- Scientific Advisor, Warwick Centre for Integrative Synthetic Biology (2013-2018)
- Advisory Committee, Sloan Foundation Synthetic Biology (2009-2013)
- Scientific Advisory Board, SynBERC (2008-2013)
- Board of Reviewing Editors, Science (2009-2011).
- Editorial Advisory Board, Molecular Systems Biology (2005-present)
- Editorial Board, BMC Systems Biology (2006-present)
- Steering Committee, NAKFI Synthetic Biology (2009)
- Steering Committee, NAKFI Signaling (2003)

Consulting

- Co-Founder and Scientific Advisor, Asymptote Genetic Medicines (2024)
- Co-Founder and Scientific Advisor, Primordium Labs (now Plasmidsaurus).
- Scientific Advisory Board, TeraCyte (https://www.teracyte.ai)
- Scientific Advisory Board, Spatial Genomics (https://spatialgenomics.com)

Trainees - completed

Postdoctoral fellows (current position)

- Yaron Antebi (Senior Scientist, Weizmann Institute)
- Amjad Askary (Assistant Professor, UCLA/MCDB)
- Lacramioara Bintu (Assistant Professor, Stanford University)
- Mark Budde (Co-Founder and CEO, Primordium Labs)
- Long Cai (Professor, California Institute of Technology)
- Emily Capra (Engagement Manager, McKinsey & Company)
- Zibo Chen (Assistant Professor, Westlake University)
- Fangyuan Ding (Assistant Professor, UC Irvine)
- Avigdor Eldar (Senior Lecturer, Tel-Aviv University)
- Kirsten Frieda (COO, Spatial Genomics)
- Xiaojing Gao (Assistant Professor, Stanford University)
- Alejandro Granados (Data Scientist, Chan Zuckerberg Biohub)

- Sahand Hormoz (Assistant Professor, Harvard Medical School)
- Felix Horns (Core Investigator, Arc Institute; Assistant Professor, Stanford University)
- Hao Yuan Kueh (Assistant Professor, University of Washington)
- Pulin Li (Assistant Professor, MIT; Member, Whitehead Institute)
- Yihan Lin (Assistant Professor, Peking University)
- James Locke (Research Group Leader, University of Cambridge)
- Joseph Markson (Associate, Novo Ventures)
- Laurent Potvin-Trottier (Assistant Professor, Concordia University, Montreal, Canada)
- Adam Rosenthal (Assistant Professor, UNC School of Medicine)
- Georg Seelig (Associate Professor, University of Washington)
- David Sprinzak (Assistant Professor, Tel Aviv University)
- Gürol Süel (Professor, UCSD)
- Julia Tischler (Research Scientist, EPFL)

Graduate students (current position)

- Sidney Cox (Bioinformatics, San Francisco)
- Chiraj Dalal (Scientist, Achaogen)
- Grace Edmonds (née Chow) (Postdoctoral Fellow, Feng Zhang lab, Broad Institute)
- Heidi Klumpe (Postdoctoral Fellow, Boston University)
- Amit Lakhanpal (Resident, NY Presbyterian Hospital-Weill Cornell Medical Center)
- Lauren LeBon (Scientist, Sidrauski Lab, Calico Labs)
- Joe Levine (Co-founder, Better Earth Agronomy)
- Yitong Ma (Postdoctoral Fellow, Stanford University)
- Nagarajan Nandagopal (Postdoctoral Fellow, Harvard Medical School)
- Jin Park (UCLA MD-PhD)
- Shaunak Sen (Associate Professor, Indian Institute Technology, New Delhi)
- Zak Singer (Postdoctoral Fellow, joint between Rockefeller and Columbia Universities)
- Christina Su (MD/PhD program, University of Illinois Chicago)
- Fred Tan (Postdoctoral Fellow, UCSD)
- John Yong (Sr. Research Associate, Jan Lab, Calico Labs)
- Jonathan Young (Ophthalmologist, Legacy Devers Eye Institute)
- Ronghui (Ron) Zhu (Postdoctoral Fellow, Stanford & Gladstone Institute)

For current lab members, see https://www.elowitz.caltech.edu/people

Active preprints:

1. Flynn MJ, Mayfield AMH, Du R, Gradinaru V, Elowitz MB. Synthetic dosage-compensating miRNA circuits allow precision gene therapy for Rett syndrome. **bioRxiv** [Preprint]. 2024

2. Du R, Flynn MJ, Honsa M, Jungmann R, Elowitz MB. miRNA circuit modules for precise, tunable control of gene expression. **bioRxiv** [Preprint]. 2024

3. Chadly DM, Frieda KL, Gui C, Klock L, Tran M, Sui MY, Takei Y, Bouckaert R, Lois C, Cai L, Elowitz MB. Reconstructing cell histories in space with image-readable base editor recording. ***bioRxiv*** (2024).

4. Kuintzle R, Santat LA, Elowitz MB. Diversity in Notch ligand-receptor signaling interactions, ***bioRxiv*** (2023).

5. Parres-Gold, Levine M, Emert B, Stuart A, Elowitz MB. Principles of computation by competitive protein dimerization networks, ***bioRxiv*** (2023).

6.   Chen Z, Linton JM, Zhu R, Elowitz MB, A synthetic protein-level neural network in mammalian cells, **bioRxiv** (2022).

Publications:

7.   Askary A, Chen W, Choi J, Du LY, Elowitz MB, Gagnon JA, Schier AF, Seidel S, Shendure J, Stadler T, Tran M. The lives of cells, recorded. ***Nat Rev Genet.*** 2024 Nov 25. doi: 10.1038/s41576-024-00788-w. PMID: 39587306.

8.   Hadas R, Rubinstein H, Mittnenzweig M, Mayshar Y, Ben-Yair R, Cheng S, Aguilera-Castrejon A, Reines N, Orenbuch AH, Lifshitz A, Chen DY, Elowitz MB, Zernicka-Goetz M, Hanna JH, Tanay A, Stelzer Y. Temporal BMP4 effects on mouse embryonic and extraembryonic development. ***Nature***. 2024 Oct;634(8034):652-661. doi: 10.1038/s41586-024-07937-5. PMID: 39294373.

9.   Troyer Z, Gololobova O, Koppula A, Liao Z, Horns F, Elowitz MB, Tosar JP, Batish M, Witwer KW. Simultaneous Protein and RNA Analysis in Single Extracellular Vesicles, Including Viruses. **ACS Nano**. 2024 Sep 22. doi: 10.1021/acsnano.4c03679. Epub ahead of print. PMID: 39306763.

10.   Xia S, Lu AC, Tobin V, Luo K, Moeller L, Shon DJ, Du R, Linton JM, Sui M, Horns F, Elowitz MB, Synthetic protein circuits for programmable control of mammalian cell death. ***Cell*** (2024).

11.   Tran M, Askary A, Elowitz MB. Lineage motifs as developmental modules for control of cell type proportions. ***Developmental Cell*** (2024); preprint: ***bioRxiv*** (2023).

12.   Granados AA, Kanrar N, Elowitz MB. Combinatorial expression motifs in signaling pathways, ***Cell Genomics*** (2024); preprint: ***bioRxiv*** (2022).

13.   Horns F, Martinez JA, Fan C, Haque M, Linton JM, Tobin V, Santat L, Maggiolo AO, Bjorkman PJ, Lois C, Elowitz MB. Engineering RNA export for measurement and manipulation of living cells, ***Cell*** (2023).

14.   Zhu R, Santat LA, Markson JS, Gregrowicz J, Elowitz MB. Reconstitution of morphogen shuttling circuits, ***Science Advances*** (2023).

15.   Ma Y, Budde MW, Zhu J, Elowitz MB, Tuning Methylation-Dependent Silencing Dynamics by Synthetic Modulation of CpG Density, ***ACS Synthetic Biology*** (2023); preprint: ***bioRxiv*** (2023).

16.   Kong Q, Xia S, Pan X, Ye K, Li Z, Li H, Tang X, Sahni N, Yi SS, Liu X, Wu H, Elowitz MB, Lieberman J, Zhang Z, Alternative splicing of GSDMB modulates killer lymphocyte-triggered pyroptosis, ***Science Immunology*** (2023).

17.   Cabrera A, Edelstein HI, Glykofrydis F, Love KS, Palacios S, Tycko J, Zhang M, Lensch S, Shields CE, Livingston M, Weiss R, Zhao H, Haynes KA, Morsut L, Chen YY, Khalil AS, Wong WW, Collins JJ, Rosser SJ, Polizzi K, Elowitz MB, Fussenegger M, Hilton IB, Leonard JN, Bintu L, Galloway KE, Deans TL. The sound of silence: Transgene silencing in mammalian cell engineering. ***Cell Systems*** (2022).

18.   Chen Z, Linton JM, Zhu R, Elowitz MB, A synthetic protein-level neural network in mammalian cells, ***bioRxiv*** (2022).

19. Wang S, Garcia-Ojalvo J, Elowitz MB, Periodic spatial patterning with a single morphogen, **Cell Systems** (2022); preprint: **bioRxiv** (2022).

20. Amadei G, Handford CE, Qiu C, De Jonghe J, Greenfeld H, Tran M, Martin BK, Chen DY, Aguilera-Castrejon A, Hanna JH, Elowitz MB, Hollfelder F, Shendure J, Glover DM, Zernicka-Goetz M. Embryo model completes gastrulation to neurulation and organogenesis, **Nature** (2022).

21. Ding F, Su C, Chow K-H K, Elowitz MB, Dynamics and functional roles of splicing factor autoregulation, **Cell Reports** (2022); preprint, **bioRxiv** (2020).

22. Zhu R, del Rio-Salgado JM, Garcia-Ojalvo J, Elowitz MB. Synthetic multistability in mammalian cells, **Science** (2022); preprint, **bioRxiv** (2021).

23. Klumpe H, Langley MA, Linton JM, Su CJ, Antebi YE, Elowitz MB. The context-dependent, combinatorial logic of BMP signaling, **Cell Systems** (2022); preprint, **bioRxiv** (2020).

24. Su C, Murugan A, Linton JM, Yeluri A, Bois J, Klumpe H, Antebi YE, Elowitz MB. Ligand-receptor promiscuity enables cellular addressing, **Cell Systems** (2022); preprint, **bioRxiv** (2020).

25. Ma Y, Budde MW, Mayalu MN, Zhu J, Murray RM, Elowitz MB. Synthetic mammalian signaling circuits for robust cell population control. **Cell** (2022); preprint, **bioRxiv** (2022).

26. Vlahos AE, Kang J, Aldrete CA, Zhu R, Chong LS, Elowitz MB, Gao XJ, Protease-controlled secretion and display of intercellular signals. **Nat. Comm.** (2022); preprint, **bioRxiv** (2021).

27. Xu S, Li K, Ma L, Zhang J, Yoon S, Elowitz MB, Lin Y, Ratiometric RNA labeling allows dynamic multiplexed analysis of gene circuits in single cells, **bioRxiv** (2021); preprint, **bioRxiv** (2021).

28. Chow KHK, Budde MW, Granados AA, Cabrera M, Yoon S, Cho S, Huang T, Koulena N, Frieda KL, Cai L, Lois C, Elowitz MB. Imaging cell lineage with a synthetic digital recording system. **Science** (2021); preprint, **bioRxiv** (2020).

29. Gong W, Granados AA, Hu J, Jones MG, Raz O, Salvador-Martínez I, Zhang H, Chow KK, Kwak IY, Retkute R, Prusokas A, Khodaverdian A, Zhang R, Rao S, Wang R, Rennert P, Saipredeep VG, Sivadasan N, Rao A, Joseph T, Srinivasan R, Peng J, Jan L, Shang X, Garry DJ, Yu T, Cheng V, Mason M, Liu Z, Gran Y, Yosef N, Shendure J, Telford MJ, Shapiro E, Elowitz MB, Meyer P. Benchmarked approaches for reconstruction of in vitro cell lineages and in silico models of C. Elegans and M musculus developmental trees. **Cell Systems** (2021).

30. Chen Z, and Elowitz MB. Programmable protein circuit design, **Cell** (2021).

31. Cable J, Elowitz MB, Domingos AI, Habib N, Itzkovitz S, Hamidzada H, Balzer MS, Yanai I, Liberali P, Whited J, Streets A, Cai L, Stergachis AB, Hong CKY, Keren L, Guilliams M, Alon U, Shalek AK, Hamel R, Pfau SJ, Raj A, Quake SR, Zhang NR, Fan J, Trapnell C, Wang B, Greenwald NF, Vento-Tormo R, Santos SDM, Spencer SL, Garcia HG, Arekatla G, Gaiti F, Arbel-Goren R, Rulands S, Junker JP, Klein AM, Morris SA, Murray JI, Galloway KE, Ratz M, Romeike M. Single cell biology-a Keystone Symposia report. **Ann N Y Acad Sci**. (2021).

32. Gao XJ*, Chong LS*, Ince MH, Kim MS, Elowitz MB, Engineering multiple levels of specificity in an RNA viral vector. **bioRxiv** (2020).

33. Flynn MF, Snitser O, Yelin I, Flynn J, Green S, Szwarcwort M, Kishony R, Elowitz MB. A simple direct RT-LAMP SARS-CoV-2 saliva diagnostic, **medRxiv** (2020).

34. Askary A, Sanchez-Guardado L, Linton JM, Chadly DM, Budde MW, Cai L, Lois C, Elowitz, MB. In situ readout of DNA barcodes and single base edits facilitated by in vitro transcription. ***Nature Biotechnology*** (2020).

35. Ding F, and Elowitz MB. Constitutive splicing and economies of scale in gene expression. ***eLife*** (2019).

36. Nandagopal N,* Santat LA*, Elowitz MB. Cis-activation in the Notch signaling pathway. ***eLife*** (2019).

37. Li P, and Elowitz MB. Communication codes in developmental signaling pathways, ***Development*** (2019).

38. Martinez-Corral R, Raimundez E, Lin Y, Elowitz MB, Garcia-Ojalvo J. Self-Amplifying Pulsatile Protein Dynamics without Positive Feedback. ***Cell Systems*** (2018).

39. Gao XJ, Chong LS, Kim, MS, Elowitz MB. Programmable protein circuits in living cells. ***Science*** (2018).

40. Ng KNK, Yui MA, Mehta A, Siu S, Irwin B, Pease S, Hirose S, Elowitz MB[†], Rothenberg EV[†], Kueh HY[†], A stochastic epigenetic switch controls the dynamics of the T-cell lineage commitment. ***eLife*** (2018) ([†]co-corresponding author).

41. Rosenthal AZ, Qi Y, Hormoz S, Park J, LiSH, Elowitz MB. Metabolic interactions between dynamic bacterial subpopulations," ***eLife*** (2018).

42. Li P, Markson JS, Wang S, Chen S, Vachharajani V, Elowitz MB. Morphogen gradient reconstitution reveals Hedgehog pathway design principles, ***Science*** (2018).

43. Park J, Dies M, Hormoz S, Smith-Unna SE, Quinodoz S, Hernández-Jiménez MJ, Garcia-Ojalvo J, Locke JCW, Elowitz MB. Molecular time-sharing through dynamic pulsing in single cells. ***Cell Systems*** (2018).

44. Nandagopal N, Santat LA, LeBon L, Sprinzak D, Bronner ME, Elowitz MB. Dynamic ligand discrimination in the Notch signaling pathway, ***Cell*** (2018).

45. Antebi YE, Linton JM, Klumpe H, Bintu B, Gong M, Su C, McCardell R, Elowitz MB. Combinatorial signal perception in the BMP pathway, ***Cell*** (2017).

46. Antebi YE, Nandagopal N, Elowitz MB. An operational view of intercellular signaling pathways, ***Current Opinion in Systems Biology*** (2017).

47. Cai L, Elowitz MB. Principles of Systems Biology, ***Cell Systems*** (2017).

48. Frieda KL, Linton JM, Hormoz S, Choi J, Chow KK, Singer ZS, Budde MW, Elowitz MB*, Cai L*. Synthetic recording and *in situ* readout of lineage information in single cells, ***Nature.*** (2017; online 2016). *co-corresponding authors.

49. Hormoz S, Singer ZS, Linton JM, Antebi YE, Shraiman BI, Elowitz MB. Inferring cell state transition dynamics from lineage trees and endpoint single-cell measurements, ***Cell Systems.*** (2016).

50. Kueh HY, Yui MA, Ng KK, Pease SS, Zhang JA, Damle SS, Freedman G, Siiu S, Bernstein ID, Elowitz MB, Rothenberg EV. Asynchronous combinatorial action of four regulatory factors activated Bcl11b for T cell commitment, ***Nature Immunology.*** (2016).

51. Gao XJ, Elowitz MB. Synthetic biology: Precision timing in a cell, ***Nature*** (2016).

52. Lin Y, Elowitz MB. Central Dogma Goes Digital, ***Mol. Cell*** (2016).

53. Bintu L, Yong J, Antebi, YE, McCue K, Kazuki Y, Uno N, Oshimura M, Elowitz MB. Dynamics of epigenetic regulation at the single-cell level, ***Science.*** (2016).

54. Lin Y, Sohn CH, Dalal CK, Cai L, Elowitz MB. Combinatorial gene regulation by modulation of relative pulse timing, ***Nature*** (2015).

55. Kim DH, Marinov GK, Pepke S, Singer ZS, He P, Williams B, Schroth GP, Elowitz MB, Wold BJ. Single-cell transcriptome analysis reveals dynamic changes in lncRMA expression during reprogramming, ***Cell Stem Cell.*** (2015).

56. Levine, J, Elowitz, MB, Polyphasic feedback enables tunable cellular timers, ***Current Biology*** (2014).

57. LeBon L, Lee TV, Jafar-Nejad H, Sprinzak D, Elowitz MB. Fringe proteins modulate Notch-ligand Cis and trans interactions to specify signaling states, ***eLife*** (2014).

58. Dalal CK, Cai L, Lin Y, Rahbar K, Elowitz MB. Pulsatile dynamics in the yeast proteome, ***Current Biology*** (2014).

59. Singer ZS, Yong J, Tischler J, Hackett JA, Altinok A, Surani MA, Cai L, Elowitz MB. Dynamic heterogeneity and DNA methylation in embryonic stem cells. ***Mol Cell*** (2014).

60. Tan FE, Elowitz MB. Brf1 posttranscriptionally regulates pluripotency and differentiation responses downstream of Erk MAP kinase, ***PNAS*** (2014).

61. Markson J, Elowitz MB. Synthetic biology of multicellular systems: new platforms and applications for animal cells and organisms, ***ACS Synth Biol***. (2014).

62. Church GM, Elowitz MB, Smolke CD, Voigt CA, Weiss R. Realizing the potential of synthetic biology, ***Nat. Rev. Mol. Cell. Biol.*** (2014).

63. Kueh HY, Champhekhar A, Nutt SL, Elowitz MB, Rothenberg EV. Positive feedback between PU.1 and the cell cycle controls myeloid differentiation, ***Science***. (2013).

64. Young JW, Locke JC, Elowitz MB. Rate of environmental change determines stress response specificity, ***Proc Natl Acad Sci U S A***. (2013).

65. Levine JH, Lin Y, Elowitz MB. Functional Roles of Pulsing in Genetic Circuits, ***Science***. (2013).

66. Levine JH, Fontes ME, Dworkin J, Elowitz MB, Pulsed feedback defers cellular differentiation, ***PLoS Biol***. (2012).

67. Young JW, Locke JC, Altinok A, Rosenfeld N, Bacarian T, Swain PS, Mjolsness E, Elowitz MB. Measuring single-cell gene expression dynamics in bacteria using fluorescence time-lapse microscopy, ***Nat Protoc***. (2011).

68. Locke JC, Young JW, Fontes M, Hernández Jiménez MJ, Elowitz MB. Stochastic pulse regulation in bacterial stress response, ***Science***. (2011).

69. Sen S, Garcia-Ojalvo J, Elowitz MB. Dynamical consequences of bandpass feedback loops in a bacterial phosphorelay, ***PLoS One.*** (2011).

70. Zheng G, Lee SA, Antebi Y, Elowitz MB, Yang C. The ePetri dish, an on-chip cell imaging platform based on subpixel perspective sweeping microscopy (SPSM), ***PNAS*** (2011).

71. Sprinzak D, Lakhanpal A, LeBon L, Garcia-Ojalvo J, Elowitz MB. Mutual Inactivation of Notch Receptors and Ligands Facilitates Developmental Patterning, **PLoS Comp. Bio.** (2011).

72. Nandagopal N, Elowitz MB. Synthetic Biology: Integrated Gene Circuits, **Science**. (2011).

73. Young JW, Elowitz MB. Mixed messages: how bacteria resolve conflicting signals, **Mol. Cell.** (2011).

74. Rosenthal AZ, Elowitz MB. Following evolution of bacterial antibiotic resistance in real time, **Nature Genetics** (2011).

75. Acar M, Pando BF, Arnold FH, Elowitz MB, van Oudenaarden A. A general mechanism for network-dosage compensation in gene circuits, **Science** (2010).

76. Eldar A, Elowitz MB. Functional roles for noise in genetic circuits, **Nature** (2010).

77. Elowitz MB, Lim WA. Build life to understand it, **Nature** (2010).

78. Cox RS III, Dunlop MJ, Elowitz MB. A synthetic three-color scaffold for monitoring genetic regulation and noise, **J. Biol. Eng.** (2010).

79. Sprinzak D, Lakhanpal A, LeBon L, Santat LA, Fontes ME, Anderson GA, Garcia-Ojalvo J, Elowitz MB. *Cis*-interactions between Notch and Delta generate mutually exclusive signaling states, **Nature**, (2010).

80. Çagatay T, Turcotte M, Elowitz MB, Garcia-Ojalvo J, Süel GM. Architecture-Dependent Noise Discriminates Functionally Analogous Differentiation Circuits, **Cell** (2009).

81. Eldar A, Chary VK, Xenopoulos P, Fontes ME, Loson OC, Dworkin J, Piggot PJ & Elowitz MB. Partial penetrance facilitates developmental evolution in bacteria, **Nature** (2009).

82. Locke JCW, Elowitz MB. Using movies to analyze gene circuit dynamics in single cells, **Nat Rev Micro.** (2009).

83. Dunlop MJ, Cox RS III, Levine JH, Murray RM, Elowitz MB. Regulatory activity revealed by dynamic correlations in gene expression noise, **Nature Genetics** (2008).

84. Cai L, Dalal CK, Elowitz MB. Frequency-modulated nuclear localization bursts coordinate gene regulation, **Nature** (2008).

85. Presser A, Elowitz MB, Kellis M, Kishony R. The evolutionary dynamics of the Saccharomyces cerevisiae protein interaction network after duplication, **PNAS** (2008).

86. Cox III RS, Surette MG, Elowitz MB. Programming gene expression with combinatorial promoters, **Mol. Syst. Bio.** (2007).

87. Rosenfeld N, Young JW, Alon U, Swain PS, Elowitz MB. Accurate prediction of gene feedback circuit behavior from component properties, **Mol. Syst. Biol.** (2007).

88. Suel GM, Kulkarni RP, Dworkin J, Garcia-Ojalvo J, Elowitz MB. Tunability and noise dependence in differentiation dynamics, **Science** (2007).

89. Rosenfeld N, Perkins TJ, Alon U, Elowitz MB, Swain PS. A fluctuation method to quantify *in vivo* fluorescence data, **Biophys. J.** (2006).

90. Suel GM, Garcia-Ojalvo J, Liberman LM, Elowitz MB. An excitable gene regulatory circuit induces transient cellular differentiation, **Nature** (2006).

91. Rosenfeld N, Young JW, Alon U, Swain PS, Elowitz MB. Gene regulation at the single-cell level, **Science** (2005).

92. Eldar A, Elowitz M. Systems biology: deviations in mating, **Nature** (2005).

93. Sprinzak D, Elowitz MB. Reconstruction of genetic circuits, **Nature** (2005).

94. Garcia-Ojalvo J, Elowitz MB, Strogatz SH. Modeling a synthetic multicellular clock: repressilators coupled by quorum sensing, **PNAS** (2004)**.**

95. Lahav G, Rosenfeld N, Sigal A, Geva-Zatorsky N, Levine AJ, Elowitz MB, Alon U. Dynamics of the p53-Mdm2 feedback loop in individual cells, **Nat. Genet**. (2004).

96. Overholtzer M, Rao PH, Favis R, Lu XY, Elowitz MB, Barany F, Landanyi M, Gorlick R, Levine AJ. The presence of p53 mutations in human osteosarcomas correlates with high levels of genomic instability, **Proc Natl Acad Sci** (2003).

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98. Swain PS, Elowitz MB, Siggia ED. Intrinsic and Extrinsic Contributions to Stochasticity in Gene Expression, **PNAS** (2002).

99. Guet C, Elowitz MB, Hsing W, Leibler S. Combinatorial synthesis of genetic networks, **Science** (2002).

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101. Elowitz MB & Leibler S. A synthetic oscillatory network of transcriptional regulators, **Nature** (2000).

102. Elowitz MB, Surette MG, Wolf PE, Stock JB, Leibler S. Protein mobility in the cytoplasm of *Escherichia coli, **J. Bacteriol.** (*1999).

103. Surrey T, Elowitz MB, Wolf PE, Yang F, Nedelec F, Shokat K, Leibler S, Chromophore-assisted light inactivation and self-organization of microtubules and motors, **PNAS** (1998).

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106. Sudijono J, Johnson MD, Elowitz MB, Snyder CW, Orr BG. An STM study of molecular-beam epitaxy growth of GaAs, **Surf. Sci.** (1993).

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* equal contribution

Patents:

- U.S. Patent 11,965,191 B2, "Programmable protein circuits in living cells," April 23, 2024
- U.S. Patent 11,946,066, "RNA-Based Delivery Systems With Levels Of Control," April 2, 2024
- U.S. Patent 11,667,676 "Synthetic system for tunable thresholding of protein signals" June 6, 2023.
- U.S. Patent 10,527,631, "Compositions and methods for programmable sensing and control through combinatorial molecular interactions" January 7, 2020. Issued 11,604,198 B2 March 14, 2023.
- U.S. Patent 10,899,823, "Programmable protein circuits in living cells," January 26, 2021.

- U.S. Patent 11,421,273, "In Situ readout of DNA barcodes" August 2022.
- U.S. Patent 11,453,893, "RNA-based delivery systems with levels of control," September, 2022.

Education and outreach:

- Podcast guest, *The Joy of Wh(y)* with Steven Strogatz. March 8, 2023. Episode title: *Can we program our cells? https://www.quantamagazine.org/can-we-program-our-cells-20230308/*
- Course: "Design Principles of Biological Circuits." Co-developed with Justin Bois. This course teaches principles of synthetic and systems biology, integrating mathematical modeling, Python-based computational techniques, and biological insight. Course materials are publicly available as interactive Jupyter notebooks: https://biocircuits.github.io
- Online talk for the Living Histories series of talks on scientific trajectories (2021).
- Central Asia Nobel Fest 2020; Discussion with Michael Sheetz, Don Cleveland, and Jeanette Kunz (2020): https://nobel-fest.inpolicy.net/4f-en.html
- Science journal for teens: Can we write biological "software updates" to cure disease (2019): https://www.sciencejournalforkids.org/wp-content/uploads/2019/09/protein_article.pdf
- Advisor, Biodesign Challenge teams at CalArts and Sci-Arc, 2015-present.
- Instructor, Advanced School of Quantitative Biology on "Microbial Strategies for Survival and Evolution," KITP, UCSB, 2014.
- Participant in film 'Soft Science: Cinema of Attractions," (Rachel Mayeri, 2003, http://bit.ly/1mcpUxM). Contributed time-lapse movies and participated in panel discussion.
- "Life at the single-cell level". KITP (UCSB) workshop for high school science teachers (2011).

Selected recent talks (2017-2024)

2024 Keynote speaker, Santa Cruz Developmental Biology Meeting
2024 CZI Synthetic Biology Workshop
2024 Broad Institute
2024 Harvard Medical School, Department of Systems Biology
2024 CPGE Seminar on Physical Genomics, Northwestern University (remote)
2024 Physics of Evolution Symposium, University of Chicago
2024 UCI Synthetic Biology Symposium
2024 Seminar, UCLA
2024 Seminar, University of Michigan (remote)
2024 Merkin Brain Symposium at Caltech
2024 Seminar, USC
2024 Seminar, University of British Columbia
2024 Keynote speaker, Keystone meeting: Single-Cell Biology: Tissue Genomics, Technologies and Disease (A2-2024)
2023 City of Hope meeting on phenotypic plasticity, Duarte, CA
2023 Amgen-Caltech symposium, Caltech, USA
2023 Flatiron Institute, New York, NY
2023 IEEE EMBS Region 9 Conference, Guadalajara, Mexico
2023 Aspen STAT Physics Meeting, Aspen, CO
2023 MBL Physiology Lecture, Woods Hole, MA
2023 Keynote speaker, Synthetic Biology: Engineering, Evolution & Design, Los Angeles, CA
2023 Keynote speaker, Physics of Life, UK
2023 Keynote speaker, Winter q-Bio, Puerto Rico. https://w-qbio.org
2022 Keynote speaker, 2022 International Mammalian Synthetic Biology Workshop (mSBW), Edinburgh Scotland
2022 Center for Quantitative Biology 20th Anniversary, Peking University
2022 EPFL 20th Anniversary Life Sciences Symposium

2022	Southern California Systems Biology Symposium, UCLA, Los Angeles, CA
2022	NIH/NHLBI Synthetic Biology Workshop (Virtual)
2022	Keynote speaker, 8th Annual Research Symposium of the Centre for BioSystems, Science and Engineering, Indian Institute of Science (Virtual)
2022	UCLA Chemistry & Biochemistry; Physical Chemistry Seminar, UCLA, Los Angeles, CA
2022	International Society for Stem Cell Research Series entitled "Spatial Transcriptomics: From Methods to Insight", Los Angeles, CA
2022	International Society for Stem Cell Research Annual Meeting, San Francisco, CA
2022	FASEB TGF-B Superfamily Conference: Signaling in Development and Disease, Malahide, Ireland
2022	Cold Spring Harbor Laboratory Lab-wide Seminar (Virtual)
2021	Keynote speaker, Boston University Biological Design Center Symposium
2021	Keynote speaker, Keystone Meeting on Single-Cell Biology
2021	Trajectory Talk, APS-DBIO Living History Series, American Physical Society (Virtual)
2021	Lecturer, The Andrew Szent-Gyorgyi Endowed Lecture in Physiology, Marine Biological Laboratory, (Virtual)
2021	Rockefeller University Friday Lecture (Virtual)
2021	Vollum Institute Lecture (Virtual)
2021	Mammalian Synthetic Biology Workshop, American Institute of Chemical Engineers, (Virtual)
2021	Gordon Research Conference entitled "Stochastic Physics in Biology", Ventura, CA
2021	Centre of Excellence for Reproductive and Regenerative Medicine, BMP forum on Modeling the BMP Pathway (Virtual)
2020	Gordon Research Conference Bones and Teeth, Galveston, TX
2020	First BioDesign conference (Virtual)
2020	Johns Hopkins University Molecular Biology and Genetics seminar speaker (Virtual)
2019	Allen Frontiers Symposium
2019	Keynote Speaker, DNA 25, UW (Seattle).
2019	Speaker, Sackler Symposium (Technion)
2019	Quantitative Biology 2019: Dynamic Signaling Cells and Embryos, Center for Quantitative Biology (PKU)
2019	Biotechnology 2.0: Next Generation Biologic Therapeutics, Amgen
2019	Princeton University, Molecular Biology Department Seminar
2019	Princeton Institute for Advanced Study, Governor's Conference
2019	Keystone Symposium, Cellular Plasticity: Reprogramming, Regeneration and Metaplasia / Signal Dynamics and Signal Integration in Development and Disease
2019	Jonah Platt Stem Cell Seminar Lecture Series (UCSF)
2018	Divisions of Biochemistry, Biophysics & Structural Biology, Cell & Developmental Biology, and Genetics, Genomics & Development (Berkeley)
2018	EpiBio 2018, Single Cell Epigenetics Session (AICE, San Francisco)
2018	In Situ methods in cell Biology and Cellular Biophysics (Berlin)
2018	Systems Biology of Human Disease (UCLA)
2018	Mellichamp Lectureship in Systems Biology (UCSB)
2018	Emergent Behaviors of Integrated Cellular Systems, Distinguished Lecture (MIT)
2017	NIH WALS Seminar (Bethesda, MD)
2017	Solvay Conference on Physics (Brussels)