

Kate E Galloway

SYNTHETIC BIOLOGY · STEM CELLS · MOLECULAR SYSTEMS BIOLOGY

Massachusetts Institute of Technology, 25 Ames St 66-570A, Cambridge, MA 02420

✉ katiegal@mit.edu | 🏠 gallowaylab.mit.edu | 📞 0000-0001-7416-3193

Professional Experience

- Since 2019 **Assistant Professor of Chemical Engineering**, Massachusetts Institute of Technology
Charles and Hilda Roddey Career Development Chair, Department of Chemical Engineering
Extramural Member, The Koch Institute for Integrative Cancer Research at MIT
Associate Member, The Broad
- 2013-2019 **Postdoctoral Fellow**, University of Southern California, USC Stem Cell
2013 **Adjunct Assistant Professor of Chemistry**, Harvey Mudd College
- 2007-2008 **Graduate Teaching Assistant**, Chemical Engineering, California Institute of Technology
2003 **Intern in Protein Recovery Sciences**, Genentech
- 2000-2001 **High School Research Assistant**, Chemical and Environmental Engineering, University of California, Riverside

Education

- California Institute of Technology** Pasadena, CA
PHD CHEMICAL ENGINEERING, MINOR BIOLOGY 2007 - 2012
• Advisor: Dr. Christina D Smolke
• Thesis: Development of RNA-based control systems and their application to the *Saccharomyces cerevisiae* pheromone-responsive MAPK pathway
- California Institute of Technology** Pasadena, CA
MS CHEMICAL ENGINEERING 2005 - 2007
- University of California, Berkeley** Berkeley, CA
BS CHEMICAL ENGINEERING 2001 - 2005
• Graduated with Honors

Publications

- Beitz, AM, Oakes, CG, and **Galloway, KE**. Synthetic gene circuits as tools for drug discovery. *Trends In Biotechnology*. 2021. doi:10.1016/j.tibtech.2021.06.007
- Johnstone, CP and **Galloway, KE**. Engineering cellular symphonies out of transcriptional noise. *Nature Reviews Molecular Cell Biology* 2021. doi:10.1038/s41580-021-00359-5
- Johnstone, CP*, Wang, NB*, Sevier, SA, and **Galloway, KE**. Understanding and engineering chromatin as a dynamical system across length and time scales. *Cell Systems*. 2020. doi:10.1016/j.cels.2020.09.011. *These authors contributed equally to this work.
- Wang, NB, Beitz, AM, and **Galloway, KE**. Engineering cell fate: Applying synthetic biology to cellular reprogramming. *Current Opinion in Systems Biology*. 2020. doi:10.1016/j.coisb.2020.09.002
- Babos, KN*, **Galloway, KE***, Kisler, K, Zitting, M, Li, Y, Shi, Y, Quintino, B, Chow, RH, Zlokovic, BV, and Ichida, JK. Mitigating antagonism between transcription and proliferation allows near-deterministic cellular reprogramming. *Cell Stem Cell*. 2019. doi:10.1016/j.stem.2019.08.005. *These authors contributed equally to this work. Highlighted in "Collisions on the Busy DNA Highway Set Up Barriers for Reprogramming." Xiao Hu and Shangqin Guo. *Cell Stem Cell*. 2019.
- Ichida, JK, Staats, KA, Davis-Dusenbery, BN, Clement, K, **Galloway, KE**, Babos, KN, Son, EY, Kiskinis, E, Atwater, N, Gu, H, Gnirke, A, Meissner, A, and Eggan, K. Comparative genomic analysis of embryonic, lineage-converted, and stem cell-derived motor neurons. *Development*. 2018. doi: 10.1242/dev.168617.

7. **Galloway, KE** and Ichida, JK. Modeling neurodegenerative diseases and neurodevelopmental disorders with reprogrammed cells. *Stem Cells, Tissue Engineering and Regenerative Medicine*. D.A. Warburton, Ed. (World Scientific, New Jersey, 2015)
8. Franco, E and **Galloway, KE**. Feedback loops in biological networks. *Computational Methods in Synthetic Biology*. M. A. Marchisio, Ed. (Springer New York, 2015). doi:10.1007/978-1-4939-1878-2_10.
9. **Galloway, KE**, Franco, E, and Smolke, CD. Dynamically reshaping signaling networks to program cell fate via genetic controllers. *Science*. 2013. Highlighted in "Concentrating (on) native proteins to control cell fate." Sarkar, Casim A. *Science*. 2013.doi:10.1126/science.12350050
10. Chen, YY*, **Galloway, KE***, and Smolke, CD. Synthetic biology: advancing biological frontiers by building synthetic systems. *Genome Biology*. 2012. doi:10.1186/gb-2012-13-2-240 *These authors contributed equally to this work.
11. Kostal, J, Mulchandani, A, **Gropp, KE**, and Chen, WA. Temperature Responsive Biopolymer for Mercury Remediation. *Environmental Science & Technology*. 2003. doi.10.1021/es034210y

Awards & Honors

- 2017-2019 **Maggie McKnight Russell Memorial Postdoctoral Fellow Award**, ARCS
ARCS, Awarded to one outstanding USC postdoctoral scholar
- 2018 **2nd Place at the Annual UCI Postdoctoral Symposium**, University of California, Irvine
UCI, TED talk-style competition for open to all Southern California postdocs
- 2018 **Audrey E. Streedain Postdoctoral Travel Award**, USC Stem Cell
USC, Travel award
- 2017 **1st Place at the Annual Postdoctoral Symposium**, USC Postdoctoral Association
USC, TED talk-style competition
- 2011 **Everhart Lecturer**, Caltech Everhart Committee
Caltech, Awarded yearly to three graduate students for excellence in research & communication
- 2006 **Honorable Mention**, National Science Foundation
NSF, Graduate Research Fellowship Program
- 2001-2005 **Scholar**, Reagent's and Chancellor's Scholarship
University of California, Berkeley, Top 1% of incoming students
- 2001-2005 **Most Valuable Student**, Elks Foundation
Elks National Foundation, Top 500 students nationally selected for scholarship and leadership
- 2001 **National Finalist**, Stockholm Junior Water Prize
Stockholm International Water Institute, For innovation in water research

Funding & Fellowships

- 08/2021 – 07/2026 **NIH R35 MIRA**, National Institute of General Medical Sciences (NIGMS); Role: PI \$1.94M
- 07/2020 – 06/2021 **Research Support Committee**, Massachusetts Institute of Technology; Role: PI \$75K
- 09/2015 – 08/2018 **NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship**, National Institute of Neurological Disorders and Stroke (NINDS); Role: PI \$287K
- 09/2013 – 08/2015 **California Institute of Regenerative Medicine Postdoctoral Fellowship**, California Institute of Regenerative Medicine (CIRM); Role: PI
- 01/2017 – 12/2017 **Doerr USC Stem Cell Challenge Award**, USC collaborative grant competition; Role: Co-PI \$10K
- 07/2016 – 06/2017 **Single Cell Project Grant**, Fluidigm USC Single Cell Project Grant; Role: PI \$9K

Presentations

TALKS

- Dec 2021. 8th International Conference on Stem Cell Engineering, **Invited**. *Engineering cell fate via cellular reprogramming*. Virtual.
- Nov 2021. AIChE Annual Meeting, **Invited**. *Engineering cell fate via cellular reprogramming*. Boston, MA.
- Sept 2021. NIH Epigenetics and Stem Cell Biology Laboratory, **Invited**. *Engineering cell fate via cellular reprogramming*. Virtual.
- July 2021. Mammalian Synthetic Biology Workshop, **Invited**. *Engineering cell fate via cellular reprogramming*. Virtual.
- Mar 2021. Keystone Single Cell Biology, *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. Virtual.
- Dec 2020. Mammalian Synthetic Biology Workshop Virtual. **Invited**. *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. Virtual.
- Mar 2021. Keystone Single Cell Biology, *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. Virtual.
- Dec 2020. Mammalian Synthetic Biology Workshop Virtual. **Invited talk** *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. Virtual.
- Nov 2020. AIChE Annual Meeting *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. Virtual.
- Oct 2020. Epigenetics and Bioengineering (EpiBio), *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. Virtual.
- Jun 2020. International Society for Stem Cell Research (ISSCR) Annual Meeting, *Harnessing p53 to stabilize accelerated, dual-phase reprogramming*. Virtual.
- May 2020. Mammalian Synthetic Biology Workshop 7.0, **Invited**. *Detangling DNA: Balancing biophysical tradeoffs drives cellular reprogramming*. University of Edinburgh, Edinburgh, Scotland. Delayed: Covid-19
- May 2020. Gene Expression And Regulation (GEARS) Symposium, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. Harvard Medical School, Boston, MA. Delayed: Covid-19
- Mar 2020. Koch Institute for Integrative Cancer Research Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. Massachusetts Institute of Technology, Cambridge, MA.
- Feb 2019. Department of Chemical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. Massachusetts Institute of Technology, Cambridge, MA.
- Feb 2019. Department of Biomedical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. University of Minnesota, Minneapolis, MN.
- Feb 2019. School of Biomedical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. University of British Columbia, Vancouver, BC.
- Feb 2019. Department of Chemical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. University of Delaware. Newark, DE.
- Jan 2019. Department of Chemical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. Columbia University, State College, PA.
- Jan 2019. Department of Chemical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. Penn State University, State College, PA.
- Jan 2019. Department of Chemical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. Rice University, Houston, TX.
- Dec 2018. Department of Biomedical Engineering Seminar, **Invited**. *Slick software, slow hardware: Balancing biophysical tradeoffs drives cellular reprogramming*. University of Florida, Gainesville, FL.
- Sept 2018. 3rd Annual UCI Postdoctoral Symposium, **Invited**. *Slick software, slow hardware: Cellular reprogramming hits a wall* University of California. Irvine, CA.
- May 2018. *Slick software, slow hardware: Balancing biophysical tradeoffs to drive cellular reprogramming*. 5th International Mammalian Synthetic Biology Workshop (mSBW 5.0). Harvard Medical School. Boston, MA.

- Oct 2016. Society for Pure and Applied Systems and Synthetic Biology (SPASS-LA), *Accelerating cellular reprogramming through p53 inhibition enhances neuronal maturation, improves disease modeling*. Los Angeles, CA.
- May 2015. CIRM Tri-institutional Stem Cell Retreat. *Destabilizing established transcriptional programs to enhance direct conversion*. Santa Barbara, CA.
- Mar 2014. Department of Chemical Engineering Seminar. **Invited**. *Dynamically reshaping signaling networks to program cell fate via genetic controllers*. University of Southern California. Los Angeles, CA.
- Mar 2014. Department of Chemical Engineering Seminar. **Invited**. *Dynamically reshaping signaling networks to program cell fate via genetic controllers*. Case Western Reserve University. Cleveland, OH.

Teaching Experience

2019-2021	10.10: Introduction to Chemical Engineering , Instructor	MIT
Fall 2021	10.591: Design Principles in Mammalian Systems and Synthetic Biology , Instructor	MIT
Spring 2013	Chem 24: Freshman Chemistry , Instructor	Harvey Mudd
Fall 2008	ChE 163: Biomolecular Design , Teaching Assistant	Caltech
Spring 2008	ChE 130: Biochemical Engineering Lab , Teaching Assistant	Caltech

Outreach & Professional Development

PROFESSIONAL ACTIVITIES

- 2019- Present **Adhoc reviewer**, Biochemical Engineering, Current Opinion in Biomedical Engineering, Cell Systems, Cell Chemical Biology, ACS Synthetic Biology, Oxford Synthetic Biology
- 2020- Present **Organizing committee**, Mammalian Synthetic Biology Workshop
- 2020- Present **Organizing committee**, Epigenetics and Bioengineering
- 2019- Present **Theme and session chair**, American Institute of Chemical Engineers (AIChE) Annual Meeting, Bioengineering (Division 15)

PROFESSIONAL MEMBERSHIPS

American Institute of Chemical Engineers
 International Society for Stem Cell Research
 Biomedical Engineering Society
 Society for Biological Engineering