Tal Danino — Curriculum Vitae

Assistant Professor
Department of Biomedical Engineering
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EDUCATION

- Ph.D., Bioengineering, University of California, San Diego (2011)
- B.S., Physics, University of California, Los Angeles (2005)
- B.S., Mathematics, University of California, Los Angeles (2005)
- B.S., Chemistry, University of California, Los Angeles (2005)

POSITIONS

- Assistant Professor, Department of Biomedical Engineering, Columbia University, 2016 - present
- Member, Herbert Irving Comprehensive Cancer Center, Columbia University, 2016 - present
- Member, Data Science Institute, Columbia University, 2016 - present
- Postdoctoral Fellow, Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, Dr. Sangeeta N. Bhatia, 2011-2015
- Ph.D student, Department of Bioengineering, University of California-San Diego, Dr. Jeff Hasty, 2005-2011

HONORS AND AWARDS

- 2019 NSF CAREER Award
- 2018 ALCF Young Innovators Team Awards (YITA)
- 2017 Breast Cancer Research Foundation-AACR Career Development Award
- 2017 Department of Defense Era of Hope Breast Cancer Scholar Award
- 2015 NIH Pathway to Independence Award (K99/R00)
- 2015 TED Fellow
- 2014 New England Biolabs Passion in Science Award
- 2012 NIH Ruth L. Kirschstein National Research Service Award (NRSA)
- 2011 Misrock Postdoctoral Fellowship
- 2006 Department of Energy Computational Science Graduate Fellowship (DoE CSGF)
- 2002 Arthur Beckman Undergraduate Research Scholar
- 2001 California Governor's Math and Science Scholar

PUBLICATIONS

1. Chowdhury, C., Hinchliffe, T., Castro, S., Coker, C., Arpaia, N.*, Danino, T.* Programmable bacteria induce durable tumor regression and systemic antitumor immunity. ***bioRxiv*** 491159 (2019) (Nature Medicine, in revision)

2. Gurbatri, C., Coker, C., Hinchliffe, T., Lia, I., Arpaia, N., Danino, T. Engineered probiotics for local tumor delivery of checkpoint blockade nanobodies. ***bioRxiv*** 562785 (2019) - (Science Translational Medicine, in review)

3. Zhu, S., Deb, D., Danino, T. A spatial cell culture model for predicting tumor evolution and chemotherapy dosing strategies for breast cancer. ***bioRxiv*** 561746 (2019) - (PLoS ONE, in review)

4. Fedorec, A J.H., Ozdemir, T., Doshi, A., Rosa, L., Velazquez, O., Danino, T., Barnes, C P. Two new plasmid post-segregational killing mechanisms for the implementation of synthetic gene networks in E. coli. ***bioRxiv*** - (iScience, in press) 350744 (2018)

5. Harimoto, T., Singer, Z., Velazquez, O., Zhang, J., Castro, S., Hinchliffe, T., Mather, W., Danino, T. Rapid screening of engineered microbial therapies in a 3-D multicellular model. ***PNAS*** (in press, 2019) - bioRxiv 491159

6. Ozdemir, T., Fedorec, A J.H., Danino, T., Barnes, C P. Synthetic Biology and Engineered Live Biotherapeutics: Toward Increasing System Complexity. ***Cell Systems*** 7 (1), 5-16 (2018)

7. Chien, T.*, Doshi, A.*, Danino, T. Synthetic Biology Advances in Bacterial Cancer Therapies. ***Current Opinions in Systems Biology*** 5:1-8 (2017)

8. Geller, L.*, Barzily-Rokni, M.*, Danino, T., Shee, K., Thaiss, C., Livny, R., Avraham, R., Barczak, A., Zwang, Y., Mosher, C., Smith, D., Chatman, K., Skalak, M., Bu, J., Cooper, Z., Tompers, F., Ligorio, M., Qian, Z., Muzumdar, M., Michaud, M., Mandinova, A., Garrett, W., Jacks, T., Ogino, S., Ferrone, C., Thayer, S., Warger, J., Trauger, S., Johnston, S., Huttenhower, C., Gevers, D., Bhatia, S., Golub, T. Straussman, R. Tumor-microbiome mediated resistance to gemcitabine. ***Science*** 357(6356), 1156-1160 (2017)

9. Moon, S.*, Fritz, I.*, Singer, Z.*, Danino, T. Controlling spatial patterning of bacteria via screen printing. ***3D Printing and Additive Manufacturing*** 3(4); 194-203 (2016)

10. Din, M.*, Danino, T.*, Prindle, A., Allen, K., Skalak, M., Bhatia, S., Hasty, J. Synchronized cycles of bacterial lysis for in vivo delivery. ***Nature*** 536, 81-85 (2016)

11. Luna, J., Scheel, T., Danino, T., Shaw, K., Takacs, C., Mele, A., Fak, J., Nishiuchi, E., Cantanese, M., Rice, C., Darnell, R. Hepatitis C virus RNA functionally sequesters miR-122. ***Cell*** 160(6), 1099-1110 (2015)

12. Danino, T.*, Prindle, A.*, Kwong, G., Skalak, M., Li, H., Allen, K., Hasty, J., and Bhatia, S. Programmable probiotics for cancer detection in urine. ***Science Translational Medicine*** 7, 289ra84 (2015)

13. Danino, T.*, Prindle, A.*, Hasty, J., and Bhatia, S. Measuring growth and gene expression dynamics of tumor-targeted S. typhimurium bacteria. ***Journal of Visualized Experiments*** 77, e50540 (2013)

14. Danino, T., Lo, J., Prindle, A., Hasty, J., and Bhatia, S. In vivo gene expression dynamics from tumor-targeted bacteria. ***ACS Synthetic biology*** 1(10), 465-470 (2012)

15. Prindle, A., Danino, T., Selimkhanov, J.S., Samayoa, P., Goldberg, A., Bhatia, S., and Hasty, J. Synthetic biology in clinically relevant microbes. ***ACS Synthetic biology*** 1(10), 458-464 (2012)

16. Cookson, N.A., Mather, W.H., Danino, T., Mondragón-Palomino, O., Williams, R. J., Tsimring, L. S., and Hasty, J. Queueing up for enzymatic processing: Correlated signaling through coupled degradation. ***Molecular Systems Biology*** 7:561, (2011)

17. Prindle, A., Samayoa, P., Razinkov, I., Danino, T., Tsimring, L.S. and Hasty, J. Sensing array of radically coupled genetic biopixels. ***Nature*** 481, 39-44 (2011)

18. Mondragon-Palomino, O., Danino, T., Selimkhanov, J., Tsimring, L.S., and Hasty, J. Entrainment of a population of synthetic genetic oscillators. ***Science*** 333(6047), 1315-1319 (2011)

19. Boyer, D., Mather, W., Mondragon-Palomino, O., Orozco-Fuentes, S., Danino, T., Hasty, J., and Tsimring, L. S. Buckling instability in ordered bacterial colonies. ***Physical Biology*** 8, 026008 (2011)

20. Danino, T., Volfson, D., Bhatia, S., Tsimring, L., and Hasty, J. In-silico pattern formation of vascular mesenchymal stem-cells in three-dimensions. ***PLoS ONE*** 6(5), e20182 (2011)

21. Mather, W., Mondragon-Palomino, O., Danino, T., Hasty, J., and Tsimring, L.S. Streaming instability in growing cell populations. ***Physical Review Letters*** 104(20), 208101 (2010)

22. Danino, T.*, Mondragon-Palomino, O.*, Tsimring, L., and Hasty, J. A synchronized quorum of genetic clocks. ***Nature*** 463, 326-330 (2010)

PATENTS

- Three-dimensional co-culture system for high-throughput testing of therapeutics and diagnostics (006844-US0, Provisional)
- Programmable bacteria for tumor-targeted immunotherapeutic delivery (006821-US2, Provisional)
- Programmable drug delivery profiles of tumor-targeted bacteria (WO2014043593A3)
- Compositions and methods for cancer diagnosis (WO2014146035A3)
- Engineered Bacteria for Production and Release of Therapeutics (US20180148729A1)
- Programmable Bacterial Tattoos (US20160339120)
- Communication using programmable materials (US20170325737A1)
- Dynamic biological and chemical sensor interfaces (US20170071536A1)
- Cumulative biosensor system to detect alcohol (WO2018/144627A)

TEACHING

- Instructor, Art of Engineering E1102: Biomedical Engineering - Engineering Living Materials (2019-present)
- Instructor, Biomedical Engineering 4520: Introduction to Synthetic Biology, Design Principles of Genetic Circuits (2017-present)
- Instructor, Biomedical Engineering 6003: Computational Modeling of Physiological Systems (2017-present)
- Invited Instructor, Center for Theoretical Biological Physics Summer School (Rio de Janeiro, Brazil): Experimental and Mathematical models in Synthetic Biology (2017)
- Invited Instructor, Q-bio Summer School (San Diego, CA): Experimental methods in Synthetic Biology (2013)
- Teaching Assistant, Bioengineering 125, Computational Molecular Biology, UCSD (2008)

MENTORSHIP

- *Postdoctoral Trainees:* Shu Zhu (2018), Zakary Singer (current), Dhruba Deb (current), Jaeseung Hahn (current)

- *Ph.D. Graduate Trainees:* Tetsuhiro Harimoto (BME, current), Tiffany Chien (BME, current), Candice Gurbatri (BME, current), Sreyan Chowdhury (CMBS, current), Anjali Doshi (BME, current), Rosa Vincent (BME, current), Amanda Decker (CMBS, current)
- *M.S. Trainees:* Gabe Reder (M.S. in Applied Mathematics 2016), Shikha Sharma (M.S. BME 2017)
- *Undergraduate Trainees:* UCSD: Shon Mordo, Anna Goldberg, Colin Lam, Leo Baumgart, Chris Lee, Omar Din. MIT: Eta Atolia, Jeffrey Bu, Matthew Skalak, Kaitlin Allen, Sarine Shahmirian. Columbia: Edward Ko, Samuel Castro, Joanna Zhang, Benjamin Kepecs, Soonhee Moon, Marian Shaw, Jil Berenblum, Phoenix Lai, Stan Liao, Ioanna Lia, Ruxandra Toneda, Tamjeed Azad, Clare Nimura, Kelsey Grey, Kelly Pu
- *Senior Design Teams:* BME 2016-2017, iGEM 2016-2018, Biodesign Challenge 2017/2019
- *Thesis Committees:* Alan Chramiec (CMBS, in progress), Pedro A. Baldera-Aguayo (CMBS, in progress), Holly Wobma (BME, 2018), Zen Liu (BME, 2017), Holly Wobma (BME, 2018)

SELECTED TALKS

- UC Merced NSF CREST Center (Keynote), Merced, CA (2018)
- STEAM lecture series, Broward College, Fort Lauderdale, FL (2018)
- Veterinary Seminar Series, University of Pennsylvania, PA (2018)
- Ideas Festival Aspen Institute, Abu Dhabi, UAE (2018)
- Being Material, MIT, Cambridge, MA (2017)
- Biotrans, University of Granrio, Rio de Janeiro, Brazil (2017, Keynote)
- Pontificia Universidad Católica de Chile Symposium, Santiago, Chile (2017)
- Engineering in Medicine Symposium, Columbia University, New York, NY (2017)
- BME Graduate Seminar, Columbia University, New York, NY (2016)
- Biofabricate, New York, NY (2016)
- Active Matter, MIT, Cambridge, MA (2016)
- Biomedical Engineering Society, San Antonio, TX (2014, contributed)
- Q-bio Winter Conference, Kona, HI (2014, contributed)
- Biomedical Engineering Society, Seattle (2013, contributed)
- Q-Bio Winter Conference, Honolulu, HI (2013, contributed)
- Society for Industrial and Applied Mathematics (Dynamical Systems), Snowbird, UT (2011)
- Japan Society of Molecular Biology, Kyoto, Japan (2010)
- DoE Computational Science Fellowship Conference, Washington, D.C. (2010)
- American Physical Society Meeting, Montreal, QC, Canada (2004)

SELECTED MEDIA

- Programming bacteria to detect and treat cancer, TED talk (Vancouver, Canada), Approximately 1 million views [Link]
- Synthetic biology: Bacteria synchronized for drug delivery, Nature News and Views on Din et al. Nature 2016 [Link]
- Synthetic Biology: Synchronized bacterial clocks, Nature commentary as part of the special Synthetic Systems Biology feature [Link]
- Bacteria make Mexican waves, Nature produced Youtube video [Link]
- Scientists Are Retooling Bacteria to Cure Disease, New York Times [Link]