Tara L. Deans *updated by TLD 1/2/21*

The University of Utah tara.deans@utah.edu
Department of Biomedical Engineering Tel: 801-585-7859
Sorenson Molecular Biotechnology Building (SMBB), Room 5531
36 South Wasatch Drive
Salt Lake City UT 84112-5001

Lab website: https://sites.google.com/view/thedeanslab/home

CURRENT POSITIONS

Assistant Professor	Dept. Biomedical Engineering University of Utah	2013-present
Adjunct Assistant Professor	Dept. Pharmaceutics & Pharmaceutical Chemistry University of Utah	2019-present

PREVIOUS POSITIONS

Postdoctoral Fellow	The Johns Hopkins University Department of Biomedical Engineering (Jennifer Elisseeff, Ph.D. – advisor)	2009-2013

EDUCATION

Ph.D. Biomedical Engineering	Boston University *Dissertation: An Engineered Synthetic Switch for Regulating Gene Expression in Mammalian Cells* (Jim J. Collins, Ph.D. – advisor)	2001-2009
B.S. Biology	Washington State University	1991-1995

CURRENT RESEARCH SUPPORT

NSF CBET - 1554017 Role: PI 5/1/2016-4/30/2021
Title: Probing and controlling stem cell differentiation with synthetic biology
NSF CAREER Award
Total Project Funds Awarded: $503,184

ONR – N00014-16-1-3012 Role: PI 9/1/2016-8/30/2021
Title: Engineering multifunctional blood products with synthetic biology
Office of Navy Research, Young Investigator Program
Total Project Funds Awarded: $510,000

NIH/NIBIB 1R21EB025413-01 Role: PI 1/1/2018-11/30/2020
Title: Engineering novel delivery systems with synthetic biology
NIH, Trailblazer Award
Total Project Funds Awarded: $400,000

NIH/NCI 1DP2CA250006-01 Role: PI 9/15/2019-6/30/2024
Title: Engineered platelets for the targeted destruction of circulating tumor cells
NIH New Innovator Award
Total amount awarded: $2,287,500

COMPLETED RESEARCH SUPPORT

2017-2020 NIH Hematology Training Fellowship for Lucas Bush Role: Mentor
2019-2020 NSF DMR – 1941318 Role: Co-PI
2017-2018 University of Utah SEED Grant Role: PI
2009-2012 TEDCO Maryland Stem Cell Grant for Postdoctoral Fellows Role: PI

PUBLICATIONS

Under review:

1. Bush LM, Healy CP, Marvin JE, **Deans T.L.** (*submitted).* Combination Image Flow Cytometry Reveals Novel Methods for Isolating Megakaryocyte Progenitor Cells.
DOI: https://doi.org/10.1101/512442.

2. Healy CP, Adler FR, **Deans T.L.** (*submitted).* Rolling Signal-based Ripley's K: A new algorithm to identify spatial patterns in histological specimens. **DOI:**
https://dx.doi.org/10.2139/ssrn.3606781.

3. *MacDonald, I.C., Seamons, T.R., Emmons, J., Javdan, S., and **Deans, T.L.** (*Under Review*). Controlling bacterial transcription with the eukaryotic QF transcription factor.
**The work in this manuscript is under patent review and cannot be submitted to BioRxiv. A copy of this manuscript will be provided upon request.*

Published:

1. Bowdish, D., Desai, T.A., DePace, A., Haswell, E.S., Baltrus, D., Garcia, A.J., **Deans, T.**, Lage, K., and Wittkopp, P. (2021). Leadership. Cell Syst 12, 1-4.

2. Davis, B., Backus, K., Winter, G., Chica, R., Li, D., Lee, S.Y., He, C., Week., A., Overall, C., Hagihara., S., Thuronyi, B., Kamat, S., Chen, L., Guerrero, R.H., Yao, S., Mahal, L.K., Voigt, C., Woo, C., Strauss, E., Kikuchi, K., Dore, T., Radform, S., Li, X.D., Heo, W.D., Superti-Furga., G., **Deans., T.L.**, Belousov., V., Matthews, M., Jackson, C., Malek, S., Waldmann, H., Rising, A., Jewett, M., Stamou, D., Parker, E., Murakami, M., Polizzi, K., Hamachi, I., Erb, T., Joo, C., Uesugi, M., Prinja, R., Rechavi, G., Solano, R., Schulman, B., David, Y., Oslund, R. (2021). Voices of chemical biology. Nature chemical biology 17, 1-4.

3. Persson, K.M., Kneller, P.V., Livingston, M.W., Bush, L.M., and **Deans, T.L.** (2021). High-Throughput Production of Platelet-Like Particles. Methods in molecular biology *2258*, 273-283.

4. Bush, L.M., Healy, C.P., Javdan, S.B., Emmons, J.C., and **Deans, T.L.** (2020). Biological Cells as Therapeutic Delivery Vehicles. Trends Pharmacol Sci.(**cover**)

5. Fitzgerald, M., Livingston, M., Gibbs, C., and **Deans, T.L.** (2020). Rosa26 docking sites for investigating genetic circuit silencing in stem cells. Synth Biol (Oxf) *5*, ysaa014.

6. Yao, S., Aye, Y., Sun, J., Polizzi, K., Paulson, J.C., Kamat, S., Li, D., Chica, R., Weeks, A., Thuronyi, B., Brodin, P., Davis, B., Erb, T., Lei, X., **Deans, T. L.**, Li, X.D., Backus, K., Lee, S.Y., Chen, L., Strauss, E., Malek, S., O'Connor, S.E., Jenner, M., Jewett, M., Parker, E., Hamachi, I., Mahal, L.K., Rechavi, G., Rising, A., Rodriguez, R., Prinjha, R., Murakami, M. (2020). Voices of chemical biology. Nature chemical biology 16, 598-599.

7. Vogel, A.M., Persson, K.M., Seamons, T.R., and **Deans, T.L.** (2019). Synthetic biology for improving cell fate decisions and tissue engineering outcomes. Emerging Topics in Life Sciences.

8. Bush, L.M., Gibbs, C., and **Deans, T.L.** (2019). Synthetic biology: paving the way with novel drug delivery. The Biochemist *41*, 24.

9. Healy, C.P., and **Deans, T.L.** (2019). Genetic circuits to engineer tissues with alternative functions. J Biol Eng *13*, 39.

10. Weisenberger, M.S., and **Deans, T.L.** (2018). Bottom-up approaches in synthetic biology and biomaterials for tissue engineering applications. J Ind Microbiol Biotechnol *45*, 599-614.

11. Fitzgerald, M., Gibbs, C., Shimpi, A.A., and **Deans, T.L.** (2017). Adoption of the Q Transcriptional System for Regulating Gene Expression in Stem Cells. ACS synthetic biology *6*, 2014-2020. (**cover**)

12. MacDonald, I.C., and **Deans, T.L.** (2016). Tools and applications in synthetic biology. Adv Drug Deliv Rev *105*, 20-34. (**cover**)

13. **Deans, T.L.**, Grainger, D.W., and Fussenegger, M. (2016). Synthetic Biology: Innovative approaches for pharmaceutics and drug delivery. Adv Drug Deliv Rev *105*, 1-2.

14. Lam, A., and **Deans, T.L.** (2015). A noisy tug of war: the battle between transcript production and degradation in the liver. Dev Cell *33*, 3-4.

15. **Deans, T.L.** (2014). Parallel Networks: Synthetic Biology and Artificial Intelligence. ACM Journal on Emerging Technologies in computing systems (JETC) *11*, 21:21-21:11.

16. Singh, A., **Deans, T.L.**, and Elisseeff, J.H. (2013). Photomodulation of Cellular Gene Expression in Hydrogels. Acs Macro Letters *2*, 269-272.

17. **Deans, T.L.**, Singh, A., Gibson, M., and Elisseeff, J.H. (2012). Regulating synthetic gene networks in 3D materials. Proceedings of the National Academy of Sciences of the United States of America *109*, 15217-15222.

18. **Deans, T.L.**, and Elisseeff, J.H. (2010). The life of a cell: probing the complex relationships with the world. Cell Stem Cell *6*, 499-501.

19. **Deans, T.L.**, and Elisseeff, J.H. (2009). Mimicking extracellular matrix to direct stem cell differentiation. World Stem Cell Report, Genetics Policy Institute

20. **Deans, T.L.**, and Elisseeff, J.H. (2009). Stem cells in musculoskeletal engineered tissue. Current opinion in biotechnology *20*, 537-544.

21. **Deans, T.L.**, Cantor, C.R., and Collins, J.J. (2007). A tunable genetic switch based on RNAi and repressor proteins for regulating gene expression in mammalian cells. Cell *130*, 363-372.

PRESENTATIONS AND INVITED SEMINARS

2/28/21 University of San Francisco, HIVE/Bioengineering and Therapeutic Sciences. "Engineering cell therapies using synthetic biology"

1/26/2021 Keystone Symposia on molecular and cellular biology. Emerging cell therapies: realizing the vision of next generation cell therapeutics, "Synthetic biology tools for the development of engineered stem cell therapeutics"

1/9/2021 International Conference on Biomedical Engineering (ICBE), "Using synthetic biology to improve cell therapies".

11/17/2020 Dixie State University, The Dixie Forum, "Using synthetic biology to engineer therapeutic devices"

10/13/2020 Rice University, Department of Bioengineering department seminar. "Using synthetic biology to engineer therapeutic devices."

10/12/2020 University of North Carolina, The Division of Pharmacoengineering and Molecular Pharmaceutics, *Rising Stars in Drug Delivery and Novel Carriers* Webinar Series. "Using synthetic biology to engineer therapeutic devices"

9/30/2020 Northeastern University, Department of Bioengineering department seminar. "Using synthetic biology to engineer therapeutic devices."

7/17/2020 Pre-tenure Bioengineering Faculty e-Seminar Series, "Using synthetic biology to engineer therapeutic devices"

3/2020 Keystone Symposia on Synthetic Biology,
"Engineering novel therapeutic delivery devices with synthetic biology"
Cancelled due to COVID-19, rescheduled for next year

2/2020 University of Pennsylvania, Philadelphia, PA
"Engineering stem cells to create novel delivery vehicles"

2/2020 Cell Press, Cambridge, MA
"Engineering stem cells to create novel delivery vehicles"

2/2020 Boston University, Boston, MA
"Engineering stem cells to create novel delivery vehicles"

2/2020 Utah State University, Logan, UT
"Engineering stem cells to create novel delivery vehicles"

1/2020 Huntsman Cancer Institute, Salt Lake City, UT
"Synthetic Biology in medicine"

1/2020 Carnegie Mellon University, Pittsburg, PA
"Engineering stem cells to create novel delivery vehicles"

1/2020 OSHER Lecture, University of Utah, Salt Lake City, UT
"Synthetic biology in medicine"

1/2020 International Research Collaborative Network, University of Pennsylvania, Philadelphia, PA
"Overview of synthetic biology."

1/2020 Dept. Pharmaceutics & Pharmaceutical Chemistry, University of Utah, Salt Lake City, UT
"Engineering stem cells to create novel delivery vehicles"

12/2019 7th International Conference on Stem Cell Engineering, Barcelona, Spain
"Engineering stem cells to create novel delivery vehicles"

11/2019 SYNGEN Series, London, England
"Engineering cells to function as novel delivery vehicles"

7/2019 Office of Naval Research, Washington, DC
"Engineering multifunctional blood products with synthetic biology"

7/2019 Gordon Research Conference, Synthetic Biology, Waterville Valley, NH
"Engineering cells to function as novel delivery vehicles"

5/2019 Mammalian Synthetic Biology Workshop 6.0, Northwestern University, Evanston, IL
"Challenges in gene expression"

5/2019 SYNGEN Series, Boston, MA
"Engineering cells to function as novel delivery devices"

4/2019 Materials Research Society, Phoenix, AZ
"Bottom-up approaches for controlling cell behavior"

4/2019 Department Seminar, Dept. Molecular, Cell and Systems Biology, University of California Riverside, Riverside, CA
"Synthetic biology in medicine"

1/2019 Department Seminar, Dept. Stem Cell Biology and Regenerative Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA
"Synthetic biology in medicine"

1/2019 International Conference on Biomolecular Engineering (ICBE), Newport Beach, CA
"Synthetic biology in medicine"

10/2018 Industrial Synthetic Biology Congress, Munich, Germany
"Synthetic biology in medicine"

9/2018 Department Seminar, Dept. Pharmaceutics & Pharmaceutical Chemistry, University of Utah, Salt Lake City, UT

"Synthetic biology in medicine"

7/2018 Cold Spring Harbor, New York
"Biomedical engineering approaches for studying hematopoiesis"

6/2018 Retreat Seminar, Hematology Department, University of Utah, Park City, UT
"Biomedical engineering approaches for studying and directing hematopoiesis"

2/2018 Department Seminar, Dept. of Mathematics, University of Utah, Salt Lake City, UT
"Biomedical engineering approaches for studying and directing hematopoiesis"

8/2017 IO Summit, Boston, MA
"Synthetic biology in medicine"

1/2017 OSHER Lecture, University of Utah, Salt Lake City, UT
"Synthetic biology approaches for engineering platelets"

10/2016 Biomedical Engineering Society (BMES). Minneapolis, MN
"MMP-triggered activation of mammalian genetic circuits in recombinant protein hydrogels"

7/2016 Synthetic Biology: Engineering, Evolution & Design (SEED). Chicago, IL
"Probing stem cell differentiation with synthetic biology"

5/2016 Stem cell affinity group, University of Utah, Salt Lake City, UT
"Synthetic Biology: New approaches for understanding and directing stem cell fate"

5/2016 The Third International Workshop on Mammalian Synthetic Biology. Massachusetts Institute of Technology, Boston, MA.
"Using Synthetic Biology to Regulate Gene Expression in Stem Cells"

PRESENTATIONS BY MENTORED TRAINEES

12/8/2020 Mark Livingston (Graduate Trainee), Mammalian Synthetic Biology Workshop, Virtual "Rosa26 docking sites for investigating genetic circuit silencing in stem cells"

6/16/2020 Lucas Bush (Graduate Trainee), Engineering Biology Research Consortium, Virtual
"Genetic circuits in stem cells"

4/3/2020 Lucas Bush (Graduate Trainee), Dept. Biomedical Engineering, University of Utah Salt Lake City, UT

11/2019 Cody MacDonald (Graduate Trainee), Dept. Biomedical Engineering, University of Utah, Salt Lake City, UT
"Controlling bacterial transcription with the eukaryotic transcription factor QF"

11/2019 Connor Healy (Graduate Trainee), Dept. Biomedical Engineering, University of Utah, Salt Lake City, UT
"New Tools for Morphological Analyses of Tissue and Cells"

5/2019 Lucas Bush (Graduate Trainee), Hematology Faculty Conference, University of Utah, Salt Lake City, UT
"Combination image flow cytometry reveals novel methods for isolating megakaryocyte progenitors"

12/2018 Lucas Bush (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC). University of Utah, Salt Lake City, UT
"Combination image flow cytometry for single-cell rare event analysis"

10/2018 Chelsea Gibbs (Undergraduate Trainee). Biomedical Engineering Society (BMES). Atlanta, GA
"Studying Genetic Circuit Stability in Pluripotent Stem Cells"

6/2018 Lucas Bush (Graduate Trainee). Department of Hematology. University of Utah, Salt Lake City, UT
"The loaded question: can platelets be used as delivery vehicles?"

2/2018 Chelsea Gibbs (Undergraduate Trainee). Undergraduate Research Symposium. University of Utah, Salt Lake City, UT
A new genetic circuit to control stem cell differentiation"

1/2018 Michael Fitzgerald (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC). Salt Lake City, UT
"Controlling cell fate with synthetic biology to derive anucleate blood cells"

12/2016 Rebecca Goldstein (Graduate Trainee) Utah Bioengineering Conference (UBEC). Salt Lake City, Utah.
"Engineering a Bioinspired Bone Marrow Microenvironment for Enhanced Stem Cell Differentiation"

12/2016 Rebecca Goldstein (Graduate Trainee) Engineering Day 2016 at the University of Utah. Salt Lake City, UT
"Biomedical Engineering: Tissue Engineering"

5/2016 Connor Healy (Undergraduate Trainee) Undergraduate Research Symposium (URS). University of Utah. Salt Lake City, UT
"Decellularizing Tissue through Gene Control."

5/2016 Rebecca Goldstein (Graduate Trainee) Stem Cell Affinity Group, University of Utah, Salt Lake City, UT
"Role of cell-cell and cell-matrix interactions within the hematopoietic stem cell niche"

UNPUBLISHED POSTER PRESENTATIONS

12/7/20 Connor Healy (Graduate Trainee) Mammalian Synthetic Biology Workshop, Virtual
Rolling signal-based Ripley's K: an analytical tool for tissue biomimicry"

10/17/20 Kylie Persson (Undergraduate Trainee), Biomedical Engineering Society (BMES), Virtual. "High-throughput production of platelet-like particles"

10/17/2020 Travis Seamons (Undergraduate Trainee), Biomedical Engineering Society (BMES), Virtual. "Controlling bacterial transcription with the eukaryotic transcription factor QF"

10/2019 Lucas Bush (Graduate Trainee), Synthetic Biology Consortium, National Institutes of Health, NIBIB, Bethesda, MD
"Developing a Platelet-Based Drug Delivery System for the Treatment of Lysosomal Storage Disorders"

10/2019 Connor Healy (Graduate Trainee), Synthetic Biology Consortium, National Institutes of Health, NIBIB, Bethesda, MD
"Rolling Signal Based Ripley's K: An Analytical Tool for Tissue Biomimicry"

10/2019 Lucas Bush (Graduate Trainee), Biomedical Engineering Society (BMES), Philadelphia, PA
"A Simplified Cell Culture Method to Isolate Unipotent Megakaryocyte Progenitors from the Mouse Bone Marrow"

10/2019 Travis Seamons (Undergraduate Trainee), Biomedical Engineering Society (BMES), Philadelphia, PA
"Controlling Bacterial Transcription with the Eukaryotic QF Transcription Factor"

9/2019 Connor Healy (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Quantifying Spatial Structure in the Bone Marrow: A New Tool for Niche Biomimicry"

9/2019 Lucas Bush (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"A Simplified Cell Culture Method to Isolate Unipotent Megakaryocyte Progenitors from the Mouse Bone Marrow"

9/2019 Jonathan Emmons (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Controlling bacterial transcription with the eukaryotic transcription factor QF"

5/2019 Chelsea Gibbs (Undergraduate Trainee), Undergraduate Research Symposium, University of Utah, Salt Lake City, UT
"A new genetic circuit to control stem cell differentiation"

12/2018 Cody MacDonald (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Controlling bacterial transcription with the eukaryotic transcription factor QF"

12/2018 Mitchell Weisenberger (Graduate Trainee). Utah Biomedical Engineering Conference

(UBEC), Salt Lake City, Utah.
"Interfacing Genetic Circuits with Biomaterials for Improving Cardiovascular Tissue Regeneration"

10/2018 Connor Healy (Graduate Trainee). Biomedical Engineering Society (BMES). Atlanta, GA.
"A comprehensive metric for quantifying the spatial organization of the bone marrow microenvironment."

10/2018 Chelsea Gibbs (Undergraduate Trainee), Biomedical Engineering Society (BMES), Atlanta, GA
"Studying Genetic Circuit Stability in Pluripotent Stem Cells"

6/2018 Cody MacDonald (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Toehold Riboregulators to Control Genetic Circuits"

6/2018 Connor Healy (Graduate Trainee). Novel Aspects of Bone Biology Keystone Symposia. Snowbird, UT.
"A comprehensive metric for quantifying the spatial organization of the bone marrow microenvironment".

6/2018 Lucas Bush (Graduate Trainee). Novel Aspects of Bone Biology Keystone Symposia. Snowbird, UT.
"Combination image flow cytometry to identify bone marrow megakaryocytes"

6/2018 Chelsea Gibbs (Undergraduate Trainee). Undergraduate Research Symposium. University of Utah, Salt Lake City, UT.
"A new genetic circuit to control stem cell differentiation"

6/2018 Connor Healy (Graduate Trainee), Novel Aspects of Bone Biology Keystone Symposia, Snowbird, UT
"A comprehensive metric for quantifying the spatial organization of the bone marrow microenvironment".

6/2018 Lucas Bush (Graduate Trainee), Novel Aspects of Bone Biology Keystone Symposia, Snowbird, UT
"Combination image flow cytometry to identify bone marrow megakaryocytes"

6/2018 Lucas Bush (Graduate Trainee), Department Seminar, Dept. Hematology, University of Utah, Salt Lake City, UT
"The loaded question: can platelets be used as delivery vehicles?"

5/2018 Danielle Pompa (Undergraduate Trainee), Undergraduate Research Symposium, University of Utah, Salt Lake City, UT
"Bovine myocardium decellularization and hydrogel formation"

1/2018 Lucas Bush (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC),

Salt Lake City, Utah.
"Engineering platelets using an in vitro cell culture system"

1/2018 Connor Healy (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"A mixed model for hematopoietic stem cell chemotaxis within the bone marrow"

1/2018 Mitchell Weisenberger (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Materials and Genetic Circuits to Control Matrix Metalloprotease Activity"

1/2018 Lucas Bush (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC). Salt Lake City, UT
"Engineering platelets using an in vitro cell culture system"

1/2018 Connor Healy (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC). Salt Lake City, UT
"A mixed model for hematopoietic stem cell chemotaxis within the bone marrow"

1/2018 Mitchell Weisenberger (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC). Salt Lake City, UT
"Materials and Genetic Circuits to Control Matrix Metalloprotease Activity"

1/2018 Cody MacDonald (Graduate Trainee), Utah Biomedical Engineering Conference (UBEC). Salt Lake City, UT
"Toehold Riboregulators to Control Genetic Circuits"

5/2017 Rebecca Goldstein (Graduate Trainee). Nanotechnology training grant program retreat. University of Utah, Salt Lake City, UT
"Decellularized bone marrow extracellular matrix: a novel material for studying hematopoietic stem cell behavior".

5/2017 Mitchell Weisenberger (Graduate Trainee). Nanotechnology training grant program retreat. University of Utah, Salt Lake City, UT
"Interfacing genetic circuits with biomaterials for improving tissue engineering applications".

12/2016 Heidi Spears (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Probing angiogenesis with synthetic biology"

12/2016 Michael Fitzgerald (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Utilizing Genetic Circuits for Enhancing Stem Cell Fate Outcomes".

12/2016 Cody MacDonald (Graduate Trainee). Utah Biomedical Engineering Conference (UBEC), Salt Lake City, Utah.
"Expanding the Genetic Toolbox in Synthetic Biology"

10/2016 Cody MacDonald (Graduate Trainee). Biomedical Engineering Society (BMES), Minneapolis MN.
"Expanding the Genetic Toolbox in Synthetic Biology"

10/2016 Heidi Spears (Graduate Trainee). Biomedical Engineering Society (BMES), Minneapolis, Minnesota.
"Probing angiogenesis with synthetic biology"

10/2016 Rebecca Goldstein (Graduate Trainee). Biomedical Engineering Society (BMES), Minneapolis, Minnesota.
"Engineering a bioinspired bone marrow microenvironment for enhanced stem cell differentiation."

10/2016 Michael Fitzgerald (Graduate Trainee). Biomedical Engineering Society (BMES), Minneapolis, Minnesota.
"Utilizing Genetic Circuits for Enhancing Stem Cell Fate Outcomes."

9/2016 Rebecca Goldstein (Graduate Trainee). University of Utah Translational Medicine Research Student Symposium. University of Utah, Salt Lake City, UT
"Effect of Extracellular Matrix on Mesnechymal Stem Cell Differentiation"

8/2016 Josh Nkoy (High School Trainee). Biology Undergraduate Research Program (BioURP).
"Effect of extracellular matrix on mesenchymal stem cell differentiation".

5/2016 Connor Healy (Undergraduate Trainee), Research on Capitol Hill (ROCH), State of Utah.
"Targeted Decellularization through Controlled Expression of Lethal Genes".

5/2016 Connor Healy (Undergraduate Trainee) Biomedical Engineering Senior Symposium, University of Utah. Salt Lake City, UT
"Decellularizing Tissue through Gene Control"

5/2016 Oliva Davidson (Undergraduate Trainee) Research on Capitol Hill (ROCH), State of Utah.
"Using Synthetic Biology to Enhance Platelet Production"

5/2016 Oliva Davidson (Undergraduate Trainee) University of Utah, Undergraduate Research Symposium.
"Using Synthetic Biology to Enhance Platelet Production"

TEACHING EXPERIENCE

1. BME 6303: Cell and Tissue Engineering

Course Description:

This course will teach strategies and concepts of tissue engineering. Emphasis will be placed on stem cell biology, tissue development and repair to develop a fundamental understanding of the relationships between cells and tissues. We will also learn how to exploit this understanding to rationally design and manipulate cell and tissue properties to alter, restore, maintain, and improve

cell and tissue functions. To learn cutting edge tissue engineering approaches and concepts, there is an emphasis on primary literature in this course. Typical enrollment: 45-55 students.
Learning objectives:
1. To learn about stem cells and their involvement in tissue engineering and regenerative medicine. 2. Understand what constitutes a tissue. 3. Understand how cells can be manipulated to direct their cell fate to augment new tissue formation. 4. Have a basic understanding of cell and tissue engineering so that students can hold a conversation with experts, friends, and family members. 5. Learn how to critically read primary literature.

2. BME 5306: Genetic Engineering and Synthetic Biology
Course Description. *What is synthetic biology?*
Cells have a remarkable ability to continuously sense, integrate, and store relevant physiological and biological information throughout their lives. They integrate many signals that surround them, and execute complex cellular behaviors based on these inputs. These attributes can be harnessed and manipulated using synthetic biology to tightly control gene expression in dynamic patterns, in addition to programming cells to sense, respond, and record changes in their microenvironment. This course will introduce advanced undergraduate and graduate students to the principles of genetic engineering, synthetic biology and the design of biological machines. We will discuss parts, devices and systems in DNA assembly for genetic engineering and synthetic biology applications. Students will learn about network structure, pathway engineering, and ultimately understand how synthetic networks can be simulated, built, and tested in a real organism. Specific topics will include various ways to control gene expression in biological systems, and examples will be discussed to demonstrate how intracellular components interact to give the observed biological behavior. Specifically, we will discuss engineering cellular Boolean logic gates, biosensors, endowing cells with memory, switches, oscillators, noise in cellular systems, feedback, and computational modeling of cellular networks. Typical enrollment: 35-45 students.
Learning objectives:
1. To learn the language in genetic engineering and synthetic biology. 2. To learn basic techniques and methods for manipulating cells (both prokaryotes and eukaryotes). 3. To learn how to build genetic circuits and how to determine their function. 4. To learn how to reprogram cells to obtain desired functions.

Guest Lecturer	University of Utah, Salt Lake City, UT Course: BME 7120 Biocompatibility Topic: Novel delivery devices	04/2020
Guest Lecturer	University of Utah, Salt Lake City, UT Course: ANAT 7760 Stem cell workshop Topic: Biomedical engineering applications for stem cells	02/2020
Guest Lecturer	University of Utah, Salt Lake City, UT Couse: BME 3091 Current research in biomedical engineering Topic: Engineering novel delivery devices with synthetic biology	01/2020
Guest Lecturer	University of Utah, Salt Lake City, UT Couse: BME 3091 Current research in biomedical engineering Topic: Engineering novel delivery devices with synthetic biology	11/2019

Guest Lecturer	University of Utah, Salt Lake City, UT Course: BIOEN 6760 Modeling bionetworks Topic: Mammalian synthetic biology	11/2018
Guest Lecturer	University of Utah, Salt Lake City, UT Course: ANAT 7760 Stem cell workshop Topic: Biomedical engineering applications for stem cells	02/2018
Guest Lecturer	University of Utah, Salt Lake City, UT *Course*: BIOEN 6405/PHCEU 7230 Nanomedicine *Topic*: Synthetic biology in medicine	11/2015
Guest Lecturer	University of Utah, Salt Lake City, UT Course: BIOEN 3091 Current research in biomedical engineering Topic: Synthetic biology	11/2015

TRAINEE MENTORING AND RESEARCH

Predoctoral (PhD)	***Degree Program***	***Dates***
Mahima Chouldhury	U. Utah Biomedical Engineering	2020-present
Shwan Javdan	U. Utah Biomedical Engineering	2020-present
Mark Livingston	U. Utah Biomedical Engineering	2020-present
Jonathan Emmons	U. Utah Biomedical Engineering	2019-present
Connor Healy	U. Utah Biomedical Engineering	2016-present
Lucas Bush	U. Utah Biomedical Engineering	2016-present
T32 Hematology training grant		
Cody MacDonald	U. Utah Biomedical Engineering	2014-2019
Michael Fitzgerald	U. Utah Biomedical Engineering	2014-2018

Predoctoral (MS)	***Degree Program***	***Dates***
Mitchell Weisenberger	U. Utah Biomedical Engineering	2016-2019
Rebecca Goldstein	U. Utah Biomedical Engineering	2015-2017
Heidi Spears	U. Utah Biomedical Engineering	2015-2016

Undergraduate	***Degree Program***	***Dates***
Kylie Persson	U. Utah Biomedical Engineering	2018-present
UROP funding spring 2020 and fall 2020		
Travis Seamons	U. Utah Biomedical Engineering	2018-present
UROP funding fall 2019 and spring 2020		
Pauline Kneller	U. Utah Biomedical Engineering	2019-2020
Mark Livingston	U. Utah Biomedical Engineering	2019-2020
UROP funding fall 2019 and spring 2020		
Adam Vogel	U. Utah Biomedical Engineering	2018-2020
Jenna Langford	U. Utah Biomedical Engineering	2018-2019
UROP funding fall 2018 and spring 2019 semesters		
Elizabeth Hanson	U. Utah Biomedical Engineering	2017-2019
Chelsea Gibbs	U. Utah Biomedical Engineering	2016-2019
UROP funding fall 2018 and spring 2019 semesters		
Danielle Pompa	U. Utah Biomedical Engineering	2016-2018

Dylan Wooton	U. Utah Biomedical Engineering	2016-2018
Ridge Durrant	U. Utah Biomedical Engineering	2016-2018
Alec Lam	U. Utah Biomedical Engineering	2014-2016
Regan Stephenson	U. Utah Biomedical Engineering	2014-2016
UROP funding fall 2016 and spring 2016		
Adrian Shimpi	U. Utah Biomedical Engineering	2014-2016
UROP funding summer 2016 and fall 2016		
Olivia Davidson	U. Utah Biomedical Engineering	2014-2016
Meera Raghavan	U. Utah Biomedical Engineering	2014-2016

GRADUATE DISSERTATION ADVISORY COMMITTEES

Predoctoral (PhD)

Name	***PI lab***	***Department***	***Dates***
Hunter Levis	(Bowles Lab)	U. Utah Biomedical Engineering	current
Stephanie Heard	(Winter lab)	U. Utah Medicinal Chemistry	current
Casia Wardzala	(Kramer lab)	U. Utah Biomedical Engineering	current
Matt Ginley-Hidinger	(Gertz lab)	U. Utah Biomedical Engineering	current
Jake Weston	(Bowles lab)	U. Utah Biomedical Engineering	current
Nick Rejali	(Wittwer lab)	U. Utah Biomedical Engineering	current
Matthew Nelson	(Gale lab)	U. Utah Biomedical Engineering	current
Celia Dunn	(Grainger lab)	U. Utah Biomedical Engineering	current
Pedro Fontanarrosa	(Myers lab)	U. Utah Biomedical Engineering	current
Matthew Talbot	(Ghandehari lab)	U. Utah Biomedical Engineering	current
Tramy Nguyen	(Myers lab)	U. Utah Electrical Engineering	2019
Sun Jin Kim	(Owen lab)	U. Utah Pharmaceutics & Pharmaceutical Chemistry	2019
Leandro Watanabe	(Myers lab)	U. Utah Electrical Engineeering	2018
Dorina Diekjurgen	(Grainger lab)	U. Utah Pharmaceutics & Pharmaceutical Chemistry	2017
Katherine Aiello	(Alter lab)	U. Utah Biomedical Engineering	2017
Joe Aamodt	(Grainger lab)	U. Utah Biomedical Engineering	2016
Nicholas Roehner	(Myers lab)	U. Utah Biomedical Engineering	2014

Predoctoral (MS)

Name	***Department***	***Role***	***Dates***
Sam Philip	U. Utah Biomedical Engineering	Chair	current
Whitney Shuman	U. Utah Biomedical Engineering	Chair	current
Garrett Myers	U. Utah Biomedical Engineering	Chair	current
Nishil Patel	U. Utah Biomedical Engineering	Member	current
Megan Lewis	U. Utah Biomedical Engineering	Chair	current
Austin Schlirf	U. Utah Biomedical Engineering	Member	current
Emma Patterson	U. Utah Biomedical Engineering	Member	current
Matthew Bradley	U. Utah Biomedical Engineering	Chair	2019
Rodmehr (Tivon) Semnai	U. Utah Biomedical Engineering	Chair	2019
Pedro Fontanarrosa	U. Utah Biomedical Engineering	Chair	2019
David Ede	U. Utah Biomedical Engineering	Member	2018
Heidi Spears	U. Utah Biomedical Engineering	Chair	2016
Daniel Betz	U. Utah Biomedical Engineering	Member	2016

ADMINISTRATIVE ACTIVITIES

U. Utah Biomedical Engineering, Biomaterials Track - *Chair* 2019-present
U. Utah Pharmaceutics & Pharmaceutical Chemistry 2018-2019
chair search committee - *Member*
U. Utah Biomedical Engineering, Graduate Committee – *Member* 2015-present
U. Utah Biomedical Engineering, Graduate Admissions Committee – *Member* 2014-present
U. Utah Biomedical Engineering, Department Seminar Series – Organizer 2018-2019
U. Utah Biomedical Engineering, Undergraduate Committee – *Member* 2014-2019

Other Professional Activities – Journal Editorship Activities

- ACS Synthetic Biology Editorial Advisory Board
- Synthetic Biology Editorial Board
- Associate Editor for the Synthetic Biology section of Experimental Biology and Medicine (EBM)

Other Professional Activities – GRANT REVIEWS

2021 i) Panelist, Ford Fellowship, National Academies

2020 i) *Ad hoc* Member, Gene and Drug Delivery (GDD) NIH Study Section
ii) Panelist, BMAT Panel (Biomaterials)

2019 i) Panelist, BMAT Panel (Biomaterials)
ii) Panelist, NSF (CBET)
iii) Panelist, NSF CAREER (CBET)
iv) Panelist, Ford Fellowship, National Academies

2018 i) Panelist, BMAT Panel (Biomaterials)
ii) Panelist, NSF (CBET)
iii) Panelist, Ford Fellowship, National Academies

2017 i) Panelist, BMAT Panel (Biomaterials)
ii) Panelist, NSF (CBET)
iii) Panelist, NSF CAREER (CBET)
iv) Panelist, Ford Fellowship, National Academies

2016 i) Panelist, NSF CAREER (CBET)
ii) Panelist, Ford Fellowship, National Academies

2015 i) External Reviewer, Sir Henry Wellcome Postdoctoral Fellowships
ii) External Reviewer, NSF Graduate Research Fellowship Program (GRFP)
iii) Panelist, NSF, BMAT Panel (Biomaterials)
iv) Panelist, NSF EPSCoR

2014 i) External Reviewer, NSF, Graduate Research Fellowship Program
ii) Panelist, NSF, BMAT Panel (Biomaterials)

Other Professional Activities – MANUSCRIPT REVIEWS

I am a regular (at least 1 manuscript/year) reviewer for the following journals:
Science
Nature
Nature Biotechnology
Nature Communication
Scientific Reports
Developmental Biology
Developmental Dynamics
Nucleic Acids Research
Proceedings of the National Academies of Science
PLoS Genetics
PLoS ONE
ASC Synthetic Biology
Nature Reviews Genetics
Advanced Drug Delivery Reviews
Biomaterials
BMC Biology
EMBO
iScience

Other Professional Activities – SERVICE

2020 Organized and ran an NSF sponsored workshop to interface synthetic biology and biomaterials

2019 i) Reviewer Collegiate Inventors Competition
ii) STEM Ambassador for the University of Utah
iii) Faculty advisor for the Graduate Women in Biomedical Engineering Department

2018 Reviewer Collegiate Inventors Competition
i) STEM Ambassador for the University of Utah
ii) Faculty advisor for the Graduate Women in Biomedical Engineering Department

2017 i) Reviewer Collegiate Inventors Competition
ii) Discussion Leader for the mammalian synthetic biology session at the Gordon Research Conference on Synthetic Biology

2016 i) Reviewer Collegiate Inventors Competition

2015 i) Reviewer Collegiate Inventors Competition
ii) Expert Panel Invitation, National Intelligence Agency, USA

Other Professional Activities – PROFESSIONAL DEVELOPMENT

2019 i) Organizing committee member for the SEED (Synthetic Biology, Engineering, Evolution & Design) annual meeting
ii) Organizing committee member for the Mammalian Synthetic Biology Workshop annual meeting

2018 i) Organizing committee member for the SEED (Synthetic Biology, Engineering, Evolution & Design) annual meeting
ii) Organizing committee member for the Mammalian Synthetic Biology Workshop annual meeting

PROFESSIONAL SOCIETIES

2011-present Biomedical Engineering Society (BMES) Member
2019-present Engineering Biology Research Consortium (EBRC) (Member)

Patents and Disclosures

1. Tunable Genetic Switch for regulating gene expression. Patent #US20100175141- A1. Issued 2007. Inventors: James J. Collins and **Tara L. Deans**

2. Engineering non-nucleated cells for delivery of therapeutics using synthetic biology, U-5979. 07/10/2015. Inventors: **Tara L. Deans**

3. A synthetic biology approach to controlling recombinant protein production using the quinic acid regulatory system, DISC-0113. 12/18/2017. Inventors: Cody MacDonald and **Tara L. Deans**

4. Synthetic biology approaches for engineering novel platelet receptors, U-6682. 1/2/2019 Inventor: **Tara L. Deans**

5. High throughput platelet-like particles, U-7010. 8/17/2020. Inventors: **Kylie Persson** and **Tara L. Deans.**