

# Theodore Roth, MD, PhD

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Updated: July 1, 2021

## **Current Positions**

Resident, Clinical Pathology, Stanford University  
Co-Founder, Arsenal Biosciences

## **Contact Information**

Name: Theodore Lee Roth  
Email: troth@stanford.edu

## **Education**

- (2024) Residency in Clinical Pathology, Stanford University (Stanford, CA)
- 2021 M.D., UCSF School of Medicine (San Francisco, CA)
- 2019 Ph.D. in Biomedical Sciences, UCSF (San Francisco, CA)  
Research Advisor: Alexander Marson  
Thesis entitled: “*Non-viral engineering of immune cell specificity and function*”
- 2014 M.S., in Biomedical Informatics, Stanford School of Medicine (Stanford, CA)
- 2014 B.S. *with Honors* in Biology, Stanford University (Stanford, CA)  
Research Advisor: Matthew P. Scott
- 2010 HS Diploma *with Advanced Endorsement*, Vestavia Hills High School (Birmingham, AL)

## **Professional Experience**

- 2021 - present Resident in Clinical Pathology  
Department of Pathology, Stanford University, Stanford, CA
- 2019 Co-Founder, Chief Scientific Officer  
Arsenal Biosciences, South San Francisco, CA
- 2014 - 2021 Medical Scientist Training Program (MSTP) Candidate  
Department of Immunology, UCSF School of Medicine, San Francisco, CA
- 2010 - 2013 Predoctoral IRTA Fellow  
National Institute of Neurologic Disorders and Stroke, NIH, Bethesda, MD  
Research Advisor: Dorian B. McGavern

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### *Honors and Awards*

- 2020 Meritorious Abstract Travel Award  
American Society of Gene and Cell Therapy
- 2020 Emerging Cellular Therapies Symposia Scholarship  
Keystone Symposia
- 2019 Mission Award (Inaugural Awardee)  
Arsenal Biosciences
- 2019 Trefethen Family Travel Award  
UCSF Medical Scientist Training Program
- 2018 Graduate Division Travel Award  
University of California, San Francisco
- 2017 Pathways to Discovery Award  
University of California, San Francisco
- 2017 FOCIS Center of Excellence Trainee Award  
Federation of Clinical Immunology Societies
- 2016 Best Poster Award  
UCSF/UC Berkeley Joint Immunology Retreat
- 2014 MCAT Video Competition Award Winner  
Khan Academy
- 2014 Firestone Thesis Award (top 10% of all undergrad thesis)  
*“A Rapid Method for DNA Engineering using Cycled Ligation Assembly”*  
Stanford University
- 2014 Biology Senior Thesis Award  
Stanford University
- 2013 Best Undergraduate Poster Award  
American Society for Biochemistry and Molecular Biology
- 2011 Exceptional Summer Student Award  
National Institute of Neurologic Disorders and Stroke, NIH
- 2010 National AP Scholar  
Vestavia Hills High School
- 2010 National Merit Scholar  
Vestavia Hills High School
- 2009 21 Students Most Likely to Change the World”  
Portico Magazine

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### **Commercial Scientific Advisory Board and Consulting Roles**

- 2019 - present Arsenal Biosciences (Founder, Scientific Advisory Board)
- 2019 Arsenal Biosciences (Chief Scientific Officer)
- 2018 Navigant Consulting (Scientific Consultant)
- 2014-2016 Khan Academy (Health, Medicine, and MCAT Content Consultant)
- 2015 EpiBiome (Scientific Consultant)

### **University Administrative Responsibilities**

- 2015 - Present Interviewer, Stanford Alumni Interview Program (Undergraduate Admissions)
- 2014 - 2021 Student Representative, UCSF MSTP Council
- 2016 - 2019 Student Member, UCSF School of Medicine Curriculum Committee
- 2016 - 2019 Member, UCSF School of Medicine Student Governance Committee
- 2015 - 2019 President, UCSF Pathology Interest Group
- 2019 Interviewer, UCSF Graduate Programs Admissions (PhD Admissions)
- 2018 Student Member, UCSF SOM Core Clerkship Review Committee
- 2017 - 2018 Student Member, UCSF SOM Graduation Requirements Committee

### **Reviewer (ad hoc)**

Nature  
Scientific Reports  
Frontiers in Bioengineering and Biotechnology  
Cytotherapy  
Expert Opinion On Therapeutic Targets

### **Mentorship Experience (Academic)**

- 2020 - 2021 Viva Vykunta (Staff Research Associate; current: Staff Research Associate, UCSF)
- 2020 - 2021 Yan Yi Chen (Staff Research Associate; current: Staff Research Associate, UCSF)
- 2018 - 2019 Jimmy Guo (Medical Student; current: Medical Student, UCSF)
- 2018 - 2019 Shane Vedova (Undergrad Researcher; current: Staff Research Associate, UCSF)
- 2018 - 2019 Ryan Apathy (Staff Research Associate; current: Medical Student, Univ. of Washington)
- 2017 - 2019 Jonathan Li (Staff Research Associate; current: Medical Student, UCSF)
- 2017 - 2019 Victoria Tobin (Staff Research Associate; current: DVM/PhD Student, UC Davis)
- 2018 Jasper Nies (Visiting Medical Student; current: Medical Student, Univ. of Hamburg)
- 2017 - 2018 Anna Truong (Summer High School Student Intern; current: Undergraduate, UC Davis)

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### **Teaching Experience and Courses Taught**

- 2019 INTERDEPT 123A - “Gene and Cell Therapies” (Univ. of California, San Francisco)  
Founder and instructor, Medical School 1<sup>st</sup> and 2<sup>nd</sup> year elective
- 2017 - 2019 INTERDEPT 121 - “Core Inquiry Curriculum” (Univ. of California, San Francisco)  
Discussion Group Facilitator, Medical School 1<sup>st</sup> year core course
- 2015 - 2018 PATH 170.01 - “Introduction to Pathology” (Univ. of California, San Francisco)  
Founder and course organizer, Medical School 1<sup>st</sup> and 2<sup>nd</sup> year elective
- 2017 INTERDEPT 105 - “Infection, Immunity & Inflammation” (UCSF)  
Discussion Group Facilitator, Medical School 2<sup>nd</sup> year core course
- 2014 - 2016 MEDICINE 170.01 - “Basic Science Journal Club” (Univ. of California, San Francisco)  
Course organizer, Medical School 1<sup>st</sup> and 2<sup>nd</sup> year elective
- 2014 - 2016 Content Specialist- Health and Medicine, Khan Academy  
Example Videos: [“Characteristics of eukaryotic cells”](#) ; [“The nucleus”](#)
- 2012 “Introduction to the Mouse in Biomedical Research” (Stanford University)  
Teaching Assistant, Undergraduate course

### **Other Teaching and Career Outreach Activities**

- Jul 2021 Guest speaker, “Physician-scientist careers and training”, Children’s Hospital Oakland Research Institute, Summer Internship Program (Oakland, CA)
- Jul 2020 Guest speaker, “Physician-scientist careers and training”, Children’s Hospital Oakland Research Institute, Summer Internship Program (Oakland, CA)
- Sep 2019 Panelist, “Science Entrepreneurship”, STEM Peers Annual Meeting (San Francisco, CA)
- Sep 2019 Lecturer, “Ideas to Drugs to Patients: Careers in Medicine, Science, and Industry”, Lowell High School Lecture Series (San Francisco, CA)
- Jul 2019 Guest speaker, “Physician-scientist careers and training”, Children’s Hospital Oakland Research Institute, Summer Internship Program (Oakland, CA)
- Feb 2019 Lecturer, “How to get an NIH Fellowship award”, UCSF MSTP Seminar (UCSF)
- Sep 2018 Lecturer, “How to get an NIH Fellowship award”, UCSF MSTP Seminar (UCSF)
- Jul 2018 Speaker, “Physician-scientist careers and training”, Science Education and Policy Seminar (UCSF)
- Jun 2018 Guest speaker, “Physician-scientist careers and training”, Children’s Hospital Oakland Research Institute, Summer Internship Program (Oakland, CA)
- Jun 2017 Guest speaker, “Physician-scientist careers and training”, Children’s Hospital Oakland Research Institute, Summer Internship Program (Oakland, CA)

***Active Patents & Published Patent Applications***

- Methods of Treating and Preventing Diseases and Disorders of the Central Nervous System (issued; 9,308,163)
- Targeted replacement of endogenous T cell receptors (issued; 11,033,584)
  
- Methods for Selection and Generation of Genome Edited T Cells (application; 20200048606)
- Targeted non-viral DNA insertions (application; 20200362355)
- Genetic engineering of endogenous proteins (application; 2019226998)
- Compositions and methods for modifying a target nucleic acid (application; 2020123871)
- Pooled knock-in screening and heterologous polypeptides co-expressed under the control of endogenous loci (application; 2020186219)

**Publications**

(\* denotes equal contributors; # denotes corresponding/senior author(s); grey numbers denote primary publications, defined as those on which I am a corresponding and/or a first author)

Pre-Prints

32. De Silva D, Ferguson L, Smith BE, Chin G, Apathy RA, **Roth TL**, Kudla M, Marson A, Ingolia NT, Cate JHD. Dynamics of T cell activation mediated by eIF3 interactions with T cell receptor mRNAs. [BioRxiv](#).

Published

31. Hiatt J\*, Cavero DA\*, McGregor MJ, Gordon DE, Zheng W, Budzik J, **Roth TL**, Haas KM, Rathore U, Meyer-Franke A, Bouzidi MS, Hultquist JF, Wojcechowskyj JA, Fontaine KA, Pillai SK, Cox JS, Ernst JD, Krogan NJ#, Marson A#. Efficient Generation of Isogenic Primary Human Myeloid Cells using CRISPR-Cas9 Ribonucleoproteins. *Cell Reports* 2021 May 11;35(6):109105.
30. Lee Y##, Bogdanoff D\*, Wang Y\*, Hartoularos F, Woo JM, Mowery CT, Nisonoff HM, Lee DS, Sun Y, Lee J, **Roth TL**, Mehdizadeh S, Cantlon J, Shifrut E, DN Ngyuen, Song YS, Marson A#, Chow ED#, Ye CJ#. XYZeq: Spatially-resolved single-cell RNA-sequencing reveals expression heterogeneity in the tumor microenvironment. *Science Advances* 2021 Apr 21;7(17):eabg4755.
29. Muller YD, Nguyen DP, Ferreira LMR, Ho P, Raffin C, Valencia RB, Congrave-Wilson Z, **Roth TL**, Eyquem J, Van Gool F, Marson A, Wells JA, Bluestone JA, Tang Q. The CD28-transmembrane domain mediates chimeric antigen receptor heterodimerization with CD28. *Frontiers in Immunology* 2021 Mar 23;12:639818.
28. Siddiqui S\*, Johansson K\*, Joo A, Bonser LR, Koh KD, Le Tonqueze O, Bolourchi S, Bautista RA, Zlock L, **Roth TL**, Marson A, Bhakta NR, Ansel KM, Finkbeiner WE, Erle DJ, Woodruff PG. Epithelial miR-141 regulates IL-13-induced airway mucus production. *Journal of Clinical Investigation Insight* 2021 Mar 8;6(5):139019.
27. **Roth TL**#, Marson A#. Genetic Disease and Therapy. *Annual Reviews of Pathology* 2021 Jan 24;16:145-166. doi: 10.1146.
26. Rutishauser RL\*, Deguit CD, Hiatt J, Blaeschke F, **Roth TL**, Wang L, Raymond KA, Starke CE, Mudd JC, Chen W, Smullin CP, Matus-Nicodemos R, Hoh R, Krone MR, Hecht FM, Pilcher CD, Martin JM, Koup RA, Douek DC, Brenchley JM, Sékaly RP, Pillai SK, Marson A, Deeks SQ, McCune JM, Hunt PW. TCF-1 regulates HIV-specific CD8+ T cell expansion capacity. *Journal of Clinical Investigation Insight* 2020 Dec 22;136648.
25. Gordon DE\*, Hiatt J\*, Bouhaddou M\*, Rezelj VV\*, Ulferts S, Braberg H\*, Jureka AS\*, Obernier K\*, Guo JZ\*, Batra J\*, Kaake RM\*, Weckstein AR\*, Owens TW\*, Gupta M\*, Pourmal S\*, Titus EW\*, Cakir M\*, Soucheray M, McGregor M, Cakir Z, Jang G, O'Meara MJ, Tummino TA, Zhang Z, Foussard H, Rojc A, Zhou Y, Kuchenov D, Hüttenhain R, Xu J, Eckhardt M, Swaney DL, Fabius JM, Ummadi M, Tutuncuoglu B, Rathore U, Modak M, Haas P, Haas KM, Naing ZZC, Pulido EH, Shi Y, Barrio-Hernandez I, Memon D, Petsalaki E, Dunham A, Marrero MC, Burke D, Koh C, Vallet T, Silvas JA, Azumaya CM, Billesbølle C, Brilot AF, Campbell MG, Diallo A, Dickinson MS, Diwanji D, Herrera N, Hoppe N, Kratochvil HT, Liu Y, Merz GE, Moritz M, Nguyen HC, Nowotny C, Puchades C, Rizo AN, Schulze-Gahmen U, Smith AM, Sun M, Young ID, Zhao J, Asarnow D, Biel J, Bowen A, Braxton JR, Chen J, Chio CM, Chio US, Deshpande I, Doan L, Faust B, Flores S, Jin M, Kim K, Lam VL, Li F, Li J, Li YL, Li Y, Liu X, Lo M, Lopez KE, Melo AA, Moss FR, Nguyen P, Paulino J, Pawar KI, Peters JK, Pospiech TH, Safari M, Sangwan S, Schaefer K, Thomas PV, Thwin AC, Trenker R, Tse E, Tsui TKM, Wang F, Whitis N, Yu Z, Zhang K, Zhang Y, Zhou F, Saltzberg D, QCRG Structural Biology Consortium; Hodder AJ, Shun-Shion AS, Williams DM, White KM, Rosales R, Kehrer T, Miorin L, Moreno E, Patel AH, Rihn S, Khalid MM, Vallejo-Gracia A, Fozouni P,

- Simoneau CR, **Roth TL**, Wu D, Karim MA, Ghossaini M, Dunham I, Berardi F, Weigang S, Chazal M, Park J, Logue J, McGrath M, Weston S, Haupt R, Hastie CJ, Elliott M, Brown F, Burness KA, Reid E, Dorward M, Johnson C, Wilkinson SG, Geyer A, Giesel DM, Baillie C, Raggett S, Leech H, Toth R, Goodman N, Keough KC, Lind AL, Zoonomia Consortium; Klesh RJ, Hemphill KR, Carlson-Stevermer J, Oki J, Holden K, Maures T, Pollard KS, Sali A, Agard DA, Cheng Y, Fraser JS, Frost A, Jura N, Kortemme T, Manglik A, Southworth DR, Stroud RM, Alessi DR, Davies P, Frieman MB, Ideker T, Abate C, Jouvenet N, Kochs G, Shoichet B, Ott M, Palmarini M, Shokat KM, García-Sastre A, Rassen JA, Grosse R, Rosenberg OS, Verba KA, Basler CF, Vignuzzi M, Peden AA, Beltrao P, Krogan NJ. Comparative host-coronavirus protein interaction networks reveal pan-viral disease mechanisms. *Science* 2020 Dec 4;370(6521):eabe9403.
24. Schumann K<sup>#</sup>, Raju S<sup>\*</sup>, Lauber M, Kolb S, Shifrut E, Cortez JT, Skartsis N, Nguyen VQ, Woo JM, **Roth TL**, Yu R, Nguyen MLT, Simeonov DR, Nguyen DN, Targ S, Gate RE, Tang Q, Bluestone JA, Spitzer M, Ye CJ, Marson A<sup>#</sup>. Functional CRISPR dissection of gene networks controlling human regulatory T cell identity. *Nature Immunology* 2020 Nov;21(11):1456-1466.
23. **Roth TL**. Editing of Endogenous Genes in Cellular Immunotherapies. *Current Hematologic Malignancy Reports* 2020 Aug;15(4):235-240.
22. Gordon DE<sup>\*</sup>, Jang GM<sup>\*</sup>, Bouhaddou M<sup>\*</sup>, Xu J<sup>\*</sup>, Obernier K<sup>\*</sup>, White KM<sup>\*</sup>, O'Meara MJ<sup>\*</sup>, Rezelj VV<sup>\*</sup>, Guo JZ, Swaney DL, Tummino TA, Hüttenhain R, Kaake RM, Richards AL, Tutuncuoglu B, Foussard H, Batra J, Haas K, Modak M, Kim M, Haas P, Polacco BJ, Braberg H, Fabius JM, Eckhardt M, Soucheray M, Bennett MJ, Cakir M, McGregor MJ, Li Q, Meyer B, Roesch F, Vallet T, Kain AM, Miorin L, Moreno E, Naing ZZC, Zhou Y, Peng S, Shi Y, Zhang Z, Shen W, Kirby IT, Melnyk JE, Chorba JS, Lou K, Dai SA, Barrio-Hernandez I, Memon D, Hernandez-Armenta C, Lyu J, Mathy CJP, Perica T, Pilla KB, Ganesan SJ, Saltzberg DJ, Rakesh R, Liu X, Rosenthal SB, Calviello L, Venkataramanan S, Liboy-Lugo J, Lin Y, Huang XP, Liu YF, Wankowicz SA, Bohn M, Safari M, Ugur FS, Koh C, Savar NS, Tran QD, Shengjuler D, Fletcher SJ, O'Neal MC, Cai Y, Chang JCJ, Broadhurst DJ, Klippsten S, Sharp PP, Wenzell NA, Kuzuoglu-Ozturk D, Wang HY, Trenker R, Young JM, Cavero DA, Hiatt J, **Roth TL**, Rathore U, Subramanian S, Noack J, Hubert M, Stroud RM, Frankel AD, Rosenberg OS, Verba KA, Agard DA, Ott M, Emerman M, Jura N, von Zastrow M, Verdin E, Ashworth A, Schwartz O, d'Enfert C, Mukherjee S, Jacobson M, Malik HS, Fujimori DG, Ideker T, Craik CS, Floor SN, Fraser JS, Gross JD, Sali A, Roth BL, Ruggero D, Taunton J, Kortemme T, Beltrao P, Vignuzzi M<sup>#</sup>, García-Sastre A<sup>#</sup>, Shokat KM<sup>#</sup>, Shoichet BK<sup>#</sup>, Krogan NJ<sup>#</sup>. A SARS-CoV-2-Human Protein-Protein Interaction Map Reveals Drug Targets and Potential Drug Repurposing. *Nature* 2020 Jul;583(7816):459-468.
21. Cortez JT<sup>\*</sup>, Montauti E, Shifrut E, Gatchalian J, Zhang Y, Shaked O, Xu Y, **Roth TL**, Simeonov DR, Zhang Y, Chen S, Li Z, Woo JM, Ho J, Vogel IA, Prator GY, Zhang B, Lee Y, Sun Z, Ifergan I, Van Gool F, Hargreaves DC, Bluestone JA, Marson A<sup>#</sup>, Fang D<sup>#</sup>. CRISPR screen in regulatory T cells reveals modulators of Foxp3. *Nature* 2020 Jun;582(7812):416-420.
20. **Roth TL**<sup>#</sup>, Li PJ, Blaeschke F, Nies JF, Apathy R, Mowrey C, Yu R, Nguyen MLT, Lee Y, Truong A, Hiatt J, Wu D, Nguyen DN, Goodman D, Bluestone JA, Roybal K, Shifrut E, Marson A<sup>#</sup>. Pooled Knock-In Targeting for Genome Engineering of Cellular Immunotherapies. *Cell* 2020 Apr 30;181(3):728-744.e21.
- |             |                  |   |
|-------------|------------------|---|
| Commentary: | Cancer Cell      | <a href="#">Article Link</a>                                  |
| Lay Press:  | UCSF News        | <a href="#">Article Link</a> - <a href="#">Animated Video</a> |
|             | Cancer Discovery | <a href="#">Article Link</a>                                  |
19. Nguyen DN<sup>\*</sup>, **Roth TL**<sup>\*</sup>, Li J, Chen PA, Mamedov MR, Vo LT, Tobin V, Apathy R, Goodman D, Shifrut E, Bluestone JA, Puck JM, Szoka FC, Marson A. A Cas9 nanoparticle system with truncated Cas9 binding sequences on DNA repair templates enhances genome targeting in diverse human immune cell types. *Nature Biotechnology* 2020 Jan;38(1):44-49.
18. Ng MSF, **Roth TL**, Mendoza VF, Marson A, Burt TD. Helios enhances the preferential differentiation of human fetal CD4<sup>+</sup> naïve T cells into regulatory T cells. *Science Immunology* 2019 Nov 22;4(41):eaav5947.

17. Leenay RT\*, Aghazadeh A\*, Hiatt J\*, Tse D, **Roth TL**, Apathy R, Shifut E, Hultquist JF, Krogan N, Wu Z, Cirolia G, Canaj H, Leonetti MD, Marson A#, May AP#, Zou J#. Large dataset enables prediction of repair after CRISPR-Cas9 editing in primary T cells. *Nature Biotechnology* 2019 Sep;37(9):1034-1037.
16. Schober K\*, Müller TR\*, Gökmen F, Grassmann S, Schumann K, **Roth TL**, Marson A, Busch DH. Orthotopic T cell receptor  $\alpha$  and  $\beta$  chain replacement enables most physiological T cell engineering. *Nature Biomedical Engineering* 2019 Dec;3(12):974-984.
15. Simeonov DR, Brandt AJ, Chan AY, Cortez JT, Li Z, Woo JM, Lee Y, Carvalho CMB, Indart AC, **Roth TL**, Zou J, May AP, Lupski JR, Anderson MS, Buaas FW, Rokhsar DS, Marson A. A Large CRISPR-Induced Bystander Mutation Causes Immune Dysregulation. *Communications Biology* 2019 Feb 18;2:70.
14. Hultquist JF, Hiatt J, McGregor MJ, **Roth TL**, Schumann K, Haas P, Doudna J, Marson A, Krogan NJ. A CRISPR-Cas9 genome engineering platform in primary CD4+ T Cells for the interrogation of HIV host factors. *Nature Protocols* 2019 Jan;14(1):1-27.
13. Shifrut E\*, Carnevale J\*, Tobin V, **Roth TL**, Woo JM, Bui C, Li PJ, Diolaiti M, Ashworth A#, Marson A#. Genome-wide pooled CRISPR screens in primary human T cells reveal key regulators of immune function. *Cell* 2018 Dec 13;175(7):1958-1971.e15.
12. **Roth TL**, Puig-Saus C, Yu R, Shifrut E, Carnevale J, Li PJ, Hiatt J, Saco J, Krystofinski P, Li H, Tobin V, Nguyen DN, Lee MR, Putnam AL, Ferris AL, Chen JW, Schickel JN, Pellerin L, Carmody D, Alkorta-Aranburu F, del Gaudio D, Matsumoto H, Morell M, Mao Y, Cho M, Quadros RM, Gurusurthy CB, Smith B, Haugwitz M, Hughes SH, Weissman JS, Schumann K, Esensten JH, May AP, Ashworth A, Kupfer GM, Greeley SAW, Bacchetta R, Meffre E, Roncarolo MG, Romberg N, Herold KC, Ribas A, Leonetti MD, Marson A. Reprogramming human T cell function and specificity with non-viral genome targeting. *Nature* 2018 Jul;559(7714):405-409.  
Lay Press:                      New York Times                      <https://nyti.ms/2NFU79b>  
    Washington Post                      <https://wapo.st/2ujulyK>  
    Bloomberg                      <https://goo.gl/DHDK6t>  
#1 Trending Article on Pubmed- July, 2018
11. Farboud B\*, Jarvis E\*, **Roth TL\***, Shin J\*, Corn J, Marson A, Meyer B, Patel N, Hochstrasser M. Enhanced genome editing with Cas9 Ribonucleoprotein in diverse cells and organisms. *Journal of Visual Experiments* 2018 May 25;(135):57350.
10. Mocciaro A\*, **Roth TL\***, Bennett HM, Soumillon M, Shah A, Hiatt J, Chapman K, Marson A#, Lavieu G#. Light-activated cell identification and sorting (LACIS) for selection of edited clones on a nanofluidic device. *Communications Biology* 2018 May 3;1:41.
9. Wu CAM\*, **Roth TL\***, Baglaenko Y\*, Pawluk A, Ferrih DM, Baueri P, Zuniga-Pfluckeri JC, Rosbe KW, Witherh JE#, Marson A#, Allen CDC#. Genetic engineering in primary human B cells with CRISPR-Cas9 ribonucleoproteins. *Journal of Immunological Methods* 2018 Jun;457:33-40.
8. Simeonov DR\*, Gowen BG\*, Boontanart M, **Roth TL**, Gagnon JD, Mumbach MR, Satpathy AT, Lee Y, Bray NL, Chan AY, Lituiev DS, Nguyen ML, Gate RE, Subramaniam M, Li Z, Woo JM, Mitros T, Ray GJ, Curie GL, Naddaf N, Chu JS, Ma H, Boyer E, Van Gool F, Huang H, Liu R, Tobin VR, Schumann K, Daly MJ, Farh KK, Ansel KM, Ye CJ, Greenleaf WJ, Anderson MS, Bluestone JA, Chang HY, Corn JE#, Marson A#. Discovery of Stimulation-Responsive Immune Enhancers with Unbiased CRISPR Activation. *Nature* 2017 Sep 7;549(7670):111-115.
7. Zhang Y, **Roth TL**, Gray EE, Chen H, Rodda LB, Ventura P, Villeda S, Liang Y, Crocker PR, Cyster JG. Migratory and adhesive cues controlling innate-like lymphocyte surveillance of the pathogen-exposed surface of the lymph node. *eLife* 2016 Aug 3;5:e18156.
6. Milenkovic L\*, Weiss LE\*, Yoon J, **Roth TL**, Su YRS, Sahl SJ, Scott MP#, Moerner WE#. Single-molecule imaging of Hedgehog pathway protein Smoothed in primary cilia reveals binding events regulated by Patched1. *Proceedings of the National Academy of Sciences* 2015 Jul 7;112(27):8320-5.



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5. Corps KN, **Roth TL**, McGavern DB. Inflammation and neuroprotection in traumatic brain injury. *JAMA Neurology* 2015 Mar;72(3):355-62.
4. **Roth TL**, Milenkovic L, Scott MP. A rapid and simple method for DNA engineering using cycled ligation assembly. *PLoS One* 2014 Sep 16;9(9):e107329.
3. Nayak D, **Roth TL**, McGavern DB. Microglia development and function. *Annual Reviews of Immunology* 2014;32:367-402.
2. **Roth TL**, Nayak D, Atanasijevic T, Koretsky AP, Latour LL, McGavern DB. Transcranial amelioration of inflammation and cell death after brain injury. *Nature* Jan 9;505(7482):223-8.  
Lay Press:                      New York Times                      <http://nyti.ms/1cvfajr>  
   Sports Illustrated                      <http://goo.gl/zXXjVE>  
   Stanford University                      <http://goo.gl/QkNnRf>
1. Nayak D, Johnson K, Heydari S, **Roth TL**, Zinselmeyer BH, McGavern DB. Type I interferon programs innate myeloid dynamics and gene expression in the virally infected nervous system. *PLoS Pathogens* 2013;9(5):e1003395.

### Research Support

- |  |                     |
|--|---------------------|
| 1F30DK120213-01 (NIH/NIDDK)<br><u>Endogenous T cell receptor replacement in autoimmune diabetes</u> (PI: Roth)<br>Role: PI   | 09/14/18 - 07/13/20 |
| T32DK007418 (NIH/NIDDK)<br><u>Diabetes, endocrinology, and metabolism training program</u> (PI: German)<br>Role: Appointed Trainee   | 09/01/17 - 09/01/18 |
| T32GM007618 (NIH/NIGMS)<br><u>Medical scientist training program</u> (PI: Anderson)<br>Role: Appointed Trainee   | 09/01/14 - 09/01/15 |
| Intramural Research Training Award (NIH/NINDS)<br><u>Viral immunology and intravital imaging section</u> (PI: McGavern)<br>Role: Pre-doctoral Fellow                             | 04/01/13 - 09/14/13 |
| Undergraduate small grant (Stanford University)<br><u>Labeling of the Primary Cilium for Live Cell Imaging Studies</u> (PI: Scott)<br>Role: Student lead                         | 01/03/13 - 03/31/13 |
| Undergraduate major grant (Stanford University)<br><u>Characterization of the essential hedgehog pathway protein SuFu by live cell imaging</u> (PI: Scott)<br>Role: Student lead | 07/01/12 - 09/14/12 |
| Intramural Research Training Award (NIH/NINDS)<br><u>Viral immunology and intravital imaging section</u> (PI: McGavern)<br>Role: Pre-doctoral Fellow                             | 06/14/11 - 09/14/11 |

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Intramural Research Training Award (NIH/NINDS)

06/01/10 - 09/14/10

Viral immunology and intravital imaging section (PI: McGavern)

Role: Pre-doctoral Fellow

***Invited Talks or Workshops***

- Jul 2021 *Invited speaker*, 2021 PEGS Immunotherapies for Solid Tumors. “Scalable engineering of cellular therapies for solid tumors” (Virtual Conference)
- Mar 2021 *Invited speaker*, 2021 Festival of Biologics USA. “Parallel Engineering of Cellular Therapies by Pooled Knockin Targeting” (Virtual Conference)
- Dec 2020 *Invited speaker*, 2020 Antibody Engineering & Therapeutics Conference. “Parallel Engineering of Immune Cell Genomes by Pooled Knockin Targeting” (Virtual Conference)
- Nov 2020 *Invited speaker*, 2020 Kinect: Next Generation CAR & T Cell Therapies Conference. “Non-viral methods to engineer human T cell specificity and function” (Virtual Conference)
- Oct 2020 *Invited speaker*, 2020 AACR Tumor Immunology and Immunotherapy Conference. “Highly Parallel Knock-In Targeting for Genome Engineering of Cellular Immunotherapies.” (Virtual Conference)
- Aug 2020 *Plenary speaker*, 2020 Keystone Symposia on Advances in Cancer Immunotherapy. “Highly Parallel Knock-In Targeting for Genome Engineering of Cellular Immunotherapies” (Virtual Conference)
- May 2020 *Invited presenter*, Festival of Biologics Webinar. “Engineering Immune Cell Function and Specificity” (Webinar)
- May 2020 *Invited speaker*, American Society of Gene and Cell Therapy 2020 Annual Meeting. “Pooled Knock-In Targeting for Genome Engineering of Cellular Immunotherapies” (Virtual Conference)
- Apr 2020 *Plenary session moderator*, American Association for Cancer Research 2020 Annual Meeting: Adoptive Cell Therapy Clinical Trials and Clinical Research Plenary Session. “Accelerating next generation adoptive cell therapies.” (Virtual Conference)
- Mar 2020 *Invited speaker*, 2020 Keystone Symposia on Synthetic Biology. “Highly Parallel Knock-In Targeting for Genome Engineering of Cellular Immunotherapies” (Breckenridge, CO)
- Mar 2020 *Invited speaker*, 2020 Festival of Biologics USA. “Rapid discovery of synthetic DNA sequences to non-virally rewrite endogenous T cell circuits” (San Diego, CA)
- Feb 2020 *Plenary speaker*, 2020 Keystone Symposia on Emerging Cellular Therapies. “Highly Parallel Knock-In Targeting for Genome Engineering of Cellular Immunotherapies” (Banff, Alberta, Canada)
- Oct 2019 *Invited speaker*, Immunogenomics 2019. “Non-viral reprogramming of immune cell function and specificity” (Lisbon, Portugal)
- Apr 2019 *Invited speaker*, Human Islet Research Network 2019 Annual Meeting. “Endogenous TCR engineering for reprogramming T cell specificity in autoimmune disease” (Virtual Meeting)
- Apr 2019 *Invited speaker*, World Orphan Drug Congress 2019 Annual Meeting. “Non-viral genome targeting of rare immune mutations” (Washington, DC)
- Apr 2019 *Invited speaker*, Protein Engineering Summit (PEGS): Improving Immunotherapy Efficacy and Safety Session. “Reprogramming human T cell function and specificity with non-viral genome targeting” (Boston, MA)
- Mar 2019 *Spotlight speaker*, American Association for Cancer Research 2019 Annual Meeting. “Reprogramming human T cell function and specificity with non-viral genome targeting” (Atlanta, GA)
- Mar 2019 *Invited speaker*, Molecular Medicine Tri-Conference: CRISPR for Precision Medicine Session. “Therapeutic non-viral genetic engineering of human T cells” (San Francisco, CA)
- Nov 2018 *Invited presenter*, Takara Bio Webinar. “Choosing the right HDR template for knock-in experiments” (Webinar)

## Theodore Roth, MD, PhD

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- Nov 2018 *Invited presenter*, Bitesize Bio Webinar. “How to use CRISPR to accelerate cancer therapies” (Webinar)
- Sep 2018 *Invited speaker*, California State University, Chico- Biomedical Seminar Series. “CRISPR/Cas9 tools for gene knockout and knockin in human T cells and their application to diverse cell types” (Chico, CA) - [Recording Link](#)
- Sep 2018 *Invited speaker*, UCSF/UC Berkeley Joint Immunology Retreat. “Genetic knockouts and knockins in primary immune cells” (Santa Cruz, CA)
- Oct 2017 *Plenary speaker*, AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics: CAR T Cell Therapies Plenary Session. “Engineering Human T Cells with Non-Viral Genome Targeting” (Philadelphia, PA)
- Jun 2017 *Invited speaker*, Federation of Clinical Immunology Societies 2017 Annual Meeting: Genetic and Epigenetic Control of Immune Responses Thematic Session. “Efficient large non-viral genome insertions in primary human immune cells” (Chicago, IL)
- Mar 2017 *Invited speaker*, UCSF 2017 Single Cell Technologies Meeting. “Microfluidic Selection of Live Edited Cells By Genotype” (San Francisco, CA)
- Jun 2014 *Firestone awardee speaker*, Stanford Honors Symposium. “Seamless DNA Assembly By In Vitro Cycled Ligation. Stanford Honors Symposium” (Stanford, CA)
- Apr 2014 *Invited speaker*, Stanford Traumatic Brain Injury Symposium. “Transcranial Amelioration of Inflammation and Cell Death Following Brain Injury” (Stanford, CA)
- Sep 2011 *Award lecture*, NINDS Summer Internship Program Awards Ceremony. “Meningeal Compression Induces a Highly Dynamic Innate Immune Injury Response” (Bethesda, MD)

### **Media Appearances**

- Jun 2020 Technology Networks Video Series. “Teach Me in 10 - CRISPR, Cell Therapies and Drug Discovery With Dr. Theo Roth” [Link](#).
- Jan 2020 Nature Biotechnology. “Immunotherapy takes aim at exhausted T cells” [Link](#).
- Oct 2019 Fierce Biotech. “ArsenalBio joins next-gen cell therapy field with \$85M A round” [Link](#).
- Sep 2019 Genscript First Author Conversations Podcast. “CRISPR Based T Cell Editing” [Link](#).
- May 2019 Biotechniques Podcast. “Theo Roth on CRISPR, CAR-T and gene editing ethics” [Link](#).
- Nov 2018 Benchling Scientist Spotlight Series. “Scientist Spotlight: Theo Roth engineered a CRISPR breakthrough” [Link](#)
- Oct 2018 UCSF Magazine. “The First Genome Surgeons” [Link](#).
- Oct 2018 Leaps Magazine. “This ‘Absolutely Tireless’ Researcher Made an Important Breakthrough for Cancer Patients” [Link](#).
- Sep 2018 Important Not Important Podcast. “Electrocuting the S\*\*\* out of Cancer” [Link](#).
- Apr 2014 Sports Illustrated. “If You Give a Mouse a Concussion . . .” [Link](#).
- Dec 2013 Stanford Report. “Stanford senior a pioneer in traumatic brain injury research” [Link](#).