

Updated: November 12th, 2025**Adam L. MacLean, Ph.D.**

Assistant Professor
Department of Quantitative and Computational Biology
University of Southern California

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EDUCATION

- 2011 - 2014 **Imperial College London, UK**
Ph.D. in Systems Biology
Advisors: Michael P. H. Stumpf, Cristina Lo Celso
Thesis: "Modelling haematopoietic stem cells in their niche"
- 2009 - 2010 **Imperial College London, UK**
M.Sc. Bioinformatics and Theoretical Systems Biology, *with distinction*
- 2005 - 2009 **University of Edinburgh, UK**
B.Sc. Mathematical Physics, *1st (first class)*

POSITIONS AND APPOINTMENTS

- 01/2019 – present **University of Southern California**
Assistant Professor
Department of Quantitative and Computational Biology
Dornsife College of Arts, Letters and Sciences, Los Angeles, CA
- 2019 - present Member, Norris Comprehensive Cancer Center, Keck School of Medicine,
University of Southern California, Los Angeles, CA
- 2020 - present Member, Eli and Edythe Broad Center for Regenerative Medicine and
Stem Cell Research, University of Southern California, Los Angeles, CA
- 09/2016 – 12/2018 **University of California, Irvine**
Assistant Project Scientist (06/18 - 12/18)
Postdoctoral Scholar (09/16 - 05/18)
Department of Mathematics, Irvine, CA
Advisor: Qing Nie
- 01/2015 – 08/2016 **Imperial College London**
Research Associate, Department of Life Sciences, London, UK
Advisor: Michael P. H. Stumpf
- 01/2014 – 12/2014 **University of Oxford**
Research Associate, Mathematical Institute, Oxford, UK
Advisors: Helen M. Byrne, Heather A. Harrington

HONORS AND AWARDS

- 2021 NSF CAREER Award
2021 NIH NIGMS R35 MIRA Award

2017-2018	Thrice awardee of UCI Opportunity Award Grant
2016	Travel Scholarship <i>Stem Cells</i> Copenhagen Biosciences
2013	International media coverage of first publication (<i>J Roy Soc Interface</i> , 2013) in science news outlets
2012	MIT—Imperial International Collaboration Scholarship
2011	BBSRC PhD Studentship Award, Imperial College London

Lab trainee honors, awards, and fellowships

2022	Postdoc mentee (Kreger) awarded a Mistletoe Research Fellowship
2021	PhD student (Rommelfanger) achieved two invited talks at: Southern California Sys Bio Conference 2021, and JuliaCon 2021
2021	UCI Opportunity Award Grant; \$8500 (Kreger, Wu)
2020	NSF GRFP Honorable Mention (Rommelfanger)
2019	UCI Opportunity Award Grant; \$8,500 (Wu)

PUBLICATIONS

MacLean Lab members are in **bold**.

** denotes corresponding author research articles, led by members of my lab at USC.

Peer-Reviewed Journal Articles

Submitted and under review

** 45. **J Kreger**, E Gonzalez, **X Wu**, ET Roussos Torres[¶], **AL MacLean[¶]** (2025), Beyond RECIST: mathematical modeling and Bayesian inference reveal the importance of immune parameters in metastatic breast cancer. *bioRxiv*; 10.1101/2025.08.11.669777.

[¶]Co-corresponding author

Role: Conceptualized, co-led, and co-supervised the study. Led all modeling, computation, and theory; ETRT led clinical and experimental work.

** 44. E Gonzalez*, **J Kreger***, **Y Liu**, **X Wu**, A Barbetta, AG Baugh, B Al-Zubeidy, J Jang, SM Shin, M Jacobo, V Stearns, RM Connolly, W Ho, J Emamaullee, **AL MacLean[¶]** ET Roussos Torres[¶] (2025), Cancer systems immunology reveals myeloid - T cell interactions and B cell activation mediate response to checkpoint inhibition in metastatic breast cancer. *bioRxiv*; 10.1101/2025.06.09.658361.

*Co-first author, [¶]Co-corresponding author

Role: Conceptualized, co-led, and co-supervised the study. Led all computational data analysis and modeling; ETRT led the experimental work.

** 43. **Y Liu**, AG Baugh, ET Roussos Torres[¶], **AL MacLean[¶]** (2025), iterative logistic regression balances differential gene activity and cell classification for marker gene prediction. *bioRxiv*; 11.1101/2025.05.23.655858.

[¶]Co-corresponding author

Role: Conceptualized, co-led, and co-supervised the study. Led computational work; ETRT led the experimental work.

42. DE Frankhouser, D Zhao, Y Fu, **A Dey**, Z Chen, J Irizarry, JR Ambriz, S Branciamore, D O'Meally, L Ghoda, JM Trent, S Forman, **AL MacLean**, Y Kuo, B Zhang, RC Rockne, G Marcucci (2025), Longitudinal single cell RNA-sequencing reveals evolution of micro- and macro-states in chronic myeloid leukemia. *bioRxiv*; 10.1101/2025.05.14.653262.

Role: Supervised and performed mathematical modeling of cell state transition dynamics.

41. DP Anastasiadou, N Couturier, S Goel, DG Argyris, S Vodopyanov, L Rivera-Sanchez, E Gonzalez, **J Kreger**, A Griffen, A Kazakov, J Burt, N Recoder, CL Duran, AS Harney, A Quesnel, PS Filippou, VP Lenis, S Shukla, D Entenberg, A Zintiridou, X Chen, RJ Eddy, MH Oktay, JS Condeelis, NS Karagiannis, A Briceno, H Guzik, Rotem Alon, V DesMarais, G Ioannou, S Gnjatic, DM Reynolds, R Macedo, R Reshef, H Gil-Henn, **AL MacLean**, ET Roussos Torres, LM LaFave, G Lauvau, GS Karagiannis, (2024), Intratumoral CXCL12 gradients contextualize tumor cell invasion, migration and immune Suppression in breast cancer. **bioRxiv**; 10.1101/2024.10.15.618571.

Role: Performed and supervised the analysis of single-cell sequencing data.

40. LA Higginson, X Wang, K He, M Torstrick, M Kim, BA Benayoun, **AL MacLean**, GF Chanfreau, DJ Morton (2024), The RNA exosome maintains cellular RNA homeostasis by controlling transcript abundance in the brain. **bioRxiv**; 10.1101/2024.10.30.620488.

Role: Consulted and contributed to the single-cell data analysis.

Published

** 39. **MK Rommelfanger***, M Behrends*, Y Chen, **J Martinez**, **N Kurella**, N Geisler, D Guturu, M Bens, **L Xiong**, Z Xiang, KL Rudolph[†], **AL MacLean**[†] (2025), Gene regulatory network inference with popInfer reveals dynamic regulation of hematopoietic stem cell quiescence upon diet restriction and aging. **iScience**. [10.1016/j.isci.2025.114010](https://doi.org/10.1016/j.isci.2025.114010).

*Co-first author, [†]Co-corresponding author

Role: Conceptualized, led, and co-supervised the study. Led theoretical/computational work; experimental work led by KLR.

** 38. **A Dey**, **AL MacLean**[†] (2025), Transition paths across the EMT landscape are dictated by network logic, **Development**. [10.1242/dev.204583](https://doi.org/10.1242/dev.204583).

[†]Corresponding author

Role: Conceptualized, led, and supervised the study.

** 37. **M McDermott**, **R Mehta**, ET Roussos Torres, **AL MacLean**[†] (2025), Modeling the dynamics of EMT reveals genes associated with pan-cancer intermediate states and plasticity. **npj Syst Biol Appl**; [10.1038/s41540-025-00512-2](https://doi.org/10.1038/s41540-025-00512-2).

[†]Corresponding author

Role: Conceptualized, led, and supervised the study.

** 36. **X Wu**, **M McDermott**, **AL MacLean**[†] (2024), Data-driven model discovery and model selection for noisy biological systems. **PLOS Comp Biol**; [10.1371/journal.pcbi.1012762](https://doi.org/10.1371/journal.pcbi.1012762).

[†]Corresponding author

Role: Conceptualized, led, and supervised the study.

** 35. **J Kreger**, JA Mooney, D Shibata, **AL MacLean**[†] (2024), Developmental hematopoietic stem cell variation explains clonal hematopoiesis later in life. **Nat Commun**; [10.1038/s41467-024-54711-2](https://doi.org/10.1038/s41467-024-54711-2).

[†]Corresponding author

Role: Conceptualized, led, and supervised the study.

** 34. JL Stellmann, AE Zambidis, **AL MacLean**[†], DJ Kast[†] (2024), Exploring Stem Cells: A Hands-On Approach to Elementary STEM Education. **Connected Science Learning**; [10.1080/24758779.2024.2439370](https://doi.org/10.1080/24758779.2024.2439370).

[†]Co-corresponding author

Role: Conceptualized, led, and supervised the development of educational curriculum in quantitative stem cell biology (funded by NSF CAREER award).

33. AG Baugh, E Gonzalez, VH Narumi, **J Kreger**, **Y Liu**, C Rafie, S Castanon, J Jang, LT Kagohara, DP Anastasiadou, J Leatherman, TD Armstrong, I Chan, GS Karagiannis, EM Jaffee, **AL MacLean**, ET Roussos Torres (2024), Mimicking the breast metastatic microenvironment: characterization of a novel syngeneic model of HER2+ breast cancer. **Clin Exp Metastas**; [10.1007/s10585-024-10289-z](https://doi.org/10.1007/s10585-024-10289-z).

Role: Led & supervised the computational methods and data analysis.

32. S Chea, **J Kreger**, ME Lopez-Burks, **AL MacLean**, AD Lander, AL Calof (2024), Gastrulation-stage gene expression in Nipbl+/- mouse embryos foreshadows the development of syndromic birth defects. **Science Advances**; [10.1126/sciadv.adl4239](https://doi.org/10.1126/sciadv.adl4239).

Role: Supervised and performed the single-cell data analysis of cell fates via CellRank.

31. **L Xiong***, J Liu*, SY Han, K Koppitch, JJ Guo, **MK Rommelfanger**, F Gao, IB Hallgrimsdottir, L Pachter, J Kim, **AL MacLean**, AP McMahon (2023). Direct androgen receptor regulation of sexually dimorphic gene expression in the mammalian kidney. **Dev Cell**; [10.1016/j.devcel.2023.08.010](https://doi.org/10.1016/j.devcel.2023.08.010).

**Co-first author*

Role: Co-supervised the study, led by APM and involving collaboration across four laboratories. First author LX was joint postdoc shared between my lab and APM.

- ** 30. **X Wu**, R Wollman, **AL MacLean**[¶] (2023), Single-cell Ca²⁺ parameter inference reveals how transcriptional states inform dynamic cell fates. **J Roy Soc Interface**; 20:20230172. [10.1098/rsif.2023.0172](https://doi.org/10.1098/rsif.2023.0172).

[¶]Corresponding author

Role: Conceptualized, led, and supervised the study.

29. G Coulis, D Jaime, C Guerrero-Juarez, JM Kastenschmidt, PK Farahat, Q Nguyen, N Pervolarakis, K McLinden, L Thurlow, S Movahedi, J Duarte, A Sorn, E Montoya, I Mozaffar, M Dragan, S Othy, T Joshi, CP Hans, V Kimonis, **AL MacLean**, Q Nie, LM Wallace, SQ Harper, T Mozaffar, MW Hogarth, S Bhattacharya, JK Jaiswal, DR Golann, Q Su, K Kessenbrock, M Stec, MJ Spencer, JR Zamudio, SA Villalta (2022), Single-cell and spatial transcriptomics identify a macrophage population associated with skeletal muscle fibrosis. **Science Advances**; 9: eadd9984. [10.1126/sciadv.add9984](https://doi.org/10.1126/sciadv.add9984).

Role: Contributed to the methods and performed single-cell data analyses.

- ** 28. **J Kreger**, ET Roussos Torres[¶], **AL MacLean**[¶] (2023), Myeloid-derived suppressor cell dynamics control outcomes in the metastatic niche. **Cancer Immunol Res**; 11 (5): 614–628. [10.1158/2326-6066.CIR-22-0617](https://doi.org/10.1158/2326-6066.CIR-22-0617).

[¶]Co-corresponding author

Role: Conceptualized, led, and co-supervised the study. First author JK is a postdoc in my lab. I supervised the conceptual approach and mathematical/computational investigation. Corresponding author ETRT supervised the biological approach and methods.

27. E Roesch, JG Greener, **AL MacLean**, H Nassar, C Rackauckas, T Holy, M Stumpf (2023), Julia for Biologists. **Nature Methods**; [10.1038/s41592-023-01832-z](https://doi.org/10.1038/s41592-023-01832-z).

Role: contributed to a perspective on programming in the Julia language; led section on Metaprogramming.

26. M Suo, **MK Rommelfanger**, Y Chen, EM Amro, B Han, Z Chen, K Szafranski, SR Chakkarappan, BO Boehm, **AL MacLean**, KL Rudolph (2022), Age-dependent effects of

Igf2bp2 on gene regulation, function, and aging of hematopoietic stem cells in mice. **Blood**; 139(17), doi.org/10.1182/blood.2021012197.

Role: Co-led and co-supervised the study. Led the data analysis of bulk and single-cell RNA sequencing data with MKR, a PhD student in my lab.

25. D Tatarakis, Z Cang, **X Wu**, P Sharma, MK Karikomi, **AL MacLean**, Q Nie, TF Schilling (2021). Single-cell transcriptomic analysis of zebrafish cranial neural crest reveals spatiotemporal regulation of lineage decisions during development. **Cell Reports**; 37(12). 10.1016/j.celrep.2021.110140.

Role: supervised the computational analysis of temporal gene expression clustering, analysis by XW, a PhD student in my lab.

- ** 24. **MK Rommelfanger**, **AL MacLean**[†] (2021), A single-cell resolved cell-cell communication model explains lineage commitment in hematopoiesis. **Development**; 148(24), dev199779. 10.1242/dev.199779.

[†]Corresponding author

Role: Conceptualized, led, and supervised the study.

23. HM Rando, **AL MacLean**, AJ Lee, S Ray, V Bansal, AN Skelly, E Sell, JJ Dziak, L Shinholster, LD McGowan, MB Guebila, N Wellhausen, S Knyazev, SM Boca, S Capone, Y Qi, Y Park, David Mai, Y Sun, JD Boerckel, C Brueffer, JB Byrd, JP Kamil, J Wang, R Velazquez, GL Szeto, JP Barton, RR Goel, S Mangul, T Lubiana, COVID-19 Review Consortium, A Gitter, CS Greene (2021), Pathogenesis, Symptomatology, and Transmission of SARS-CoV-2 through analysis of Viral Genomics and Structure. **mSystems**; 10.1128/mSystems.00095-21.

Role: contributed to a collaborative review of Covid-19; led section on: modeling the dynamics of transmission.

- ** 22. R Mitra, **AL MacLean**[†] (2021), RVAgene: Generative modeling of gene expression time series data. **Bioinformatics**; 10.1093/bioinformatics/btab260.

[†]Corresponding author

Role: Led and supervised the project; first author is a CBB student who completed the project under my supervision on rotation in my lab.

21. DR Bergman, MK Karikomi, M Yu, Q Nie[†], **AL MacLean**[†] (2021), Modeling the competing effects of the immune system and EMT on tumor development, **Communications Biology**, doi: 10.1038/s42003-021-02499-y.

[†]Co-corresponding author

Role: Led and co-supervised the project; coordinated between authors; wrote the paper with DRB and MKK.

20. S Wang, ML Drummond, CF Guerrero-Juarez, E Tarapore, **AL MacLean**, AR Stabell, SC Wu, G Gutierrez, BT That, CA Benavente, Q Nie, SX Atwood, (2020) Single cell transcriptomics of human epidermis reveals basal stem cell transition states. **Nat Commun**, doi: 10.1038/s41467-020-18075-7.

Role: contributed to the experimental design, statistical analysis, and computational analysis of single-cell RNA-data.

19. D Haensel, S Jin, R Cinco, P Sun, Q Nguyen, Z Cang, M Dragan, Y Gong, **AL MacLean**, K Kessenbrock, E Gratton, Q Nie, X Dai, (2020) Defining epidermal basal cell states during skin homeostasis and wound healing using single-cell transcriptomics, **Cell Reports**, doi: 10.1016/j.celrep.2020.02.091.

Role: supervised and led the computational data analyses and machine learning herein.

18. S Wang, MK Karikomi, **AL MacLean**[†], Q Nie[†], (2019) Cell lineage and communication network inference via optimization for single-cell transcriptomics. **Nucleic Acids Res**, doi: [10.1101/168922](https://doi.org/10.1101/168922).

[†]Corresponding author

Role: co-led and co-supervised the project together with QN.

Peer-Reviewed Journal Articles (before 1/1/2019; prior to joining USC)

17. P Sharma, **AL MacLean**, L Meinecke, D Clouthier, Q Nie, TF Schilling, (2018) Transcriptomics reveals complex kinetics of dorsal-ventral patterning gene expression in the mandibular arch. **genesis**, [10.1002/dvg.23275](https://doi.org/10.1002/dvg.23275).
16. D Haensel, P Sun, **AL MacLean**, X Ma, Y Zhou, MP Stemmler, S Brabletz, G Berx, MV Plikus, Q Nie, T Brabletz, X Dai, (2018) An Ovol2-Zeb1 transcriptional circuit regulates epithelial directional migration and proliferation. **EMBO Rep**, 20:e46273. [10.15252/embr.201846273](https://doi.org/10.15252/embr.201846273).
15. **AL MacLean**^{*}, T Hong^{*}, Q Nie, (2018) Exploring intermediate cell states through the lens of single cells. **Curr Opin Sys Biol**, 9;31-42. doi:[10.1016/j.coisb.2018.02.009](https://doi.org/10.1016/j.coisb.2018.02.009).
14. S Jin, **AL MacLean**, T Peng, Q Nie, (2018) scEpath: Energy landscape-based inference of transition probabilities and cellular trajectories from single-cell transcriptomic data. **Bioinformatics**, doi:[10.1093/bioinformatics/bty058](https://doi.org/10.1093/bioinformatics/bty058).
13. B Lambert^{*}, **AL MacLean**^{*}, AG Fletcher, AN Coombes, MH Little, HM Byrne, (2018) Bayesian inference of agent-based models: a tool for studying kidney branching morphogenesis. **J Math Biol**, doi:[10.1007/s00285-018-1208-z](https://doi.org/10.1007/s00285-018-1208-z).
12. Y Guo, Q Nie, **AL MacLean**, Y Li, J Lei, and S Li, (2017) An agent-based model reveals evolutionary dynamics of inflammation-induced cancer. **Cancer Research**, doi:[10.1158/0008-5472.CAN-17-1662](https://doi.org/10.1158/0008-5472.CAN-17-1662).
11. **AL MacLean**^{*}, MA Smith^{*}, J Liepe, A Sim, R Khorshed, NM Rashidi, N Scherf, A Krinner, I Roeder, C Lo Celso, MPH Stumpf, (2017) Single Cell Phenotyping Reveals Heterogeneity among Haematopoietic Stem Cells Following Infection. **Stem Cells**, 35(11). doi:[10.1002/stem2692](https://doi.org/10.1002/stem2692).
10. T Peng^{*}, L Liu^{*}, **AL MacLean**, CW Wong, W Zhao, Q Nie, (2017) A Mathematical Model of Mechanotransduction Reveals How Mechanical Memory Regulates Mesenchymal Stem Cell Fate Decisions. **BMC Sys Biol**, 11(1). doi:[10.1186/s12918-017-0429-x](https://doi.org/10.1186/s12918-017-0429-x).
9. **AL MacLean**, C Lo Celso, MPH Stumpf, (2016) Stem Cell Population Biology: Insights from Haematopoiesis. **Stem Cells**, 35(1) 80-88. doi:[10.1002/stem.2508](https://doi.org/10.1002/stem.2508).
8. ML Vainieri, AM Blagborough, **AL MacLean**, N Ruivo, HA Fletcher, MPH Stumpf, RE Sinden, C Lo Celso, (2016) Sporozoite-mediated malaria infection causes multiple levels of responses across the haematopoietic hierarchy before anaemia onset. **Open Biology**, doi:[10.1098/rsob.160038](https://doi.org/10.1098/rsob.160038).
7. HL Crowell^{*}, **AL MacLean**^{*}, MPH Stumpf, (2016) Feedback mechanisms control coexistence regions in a stem cell model of acute myeloid leukaemia. **Journal of Theoretical Biology**, 401(1) 43-53. doi:[10.1016/j.jtbi.2016.04.002](https://doi.org/10.1016/j.jtbi.2016.04.002).

6. **AL MacLean***, P Kirk*, MPH Stumpf, (2015) Cellular population dynamics control the robustness of the stem cell niche. **Biol Open**, doi:10.1242/bio.013714.
5. P Kirk*, D Rolando*, **AL MacLean**, MPH Stumpf, (2015) Conditional Random Matrix Ensembles and the Stability of Dynamical Systems. **New J Phys**, 17(8) 083025. doi:10.1088/1367-2630/17/8/083025.
4. **AL MacLean**, Z Rosen, HM Byrne, HA Harrington, (2015) Parameter-free methods distinguish Wnt pathway models and guide design of experiments. **Proc Natl Acad Sci USA**, 102(9) 2652-57. doi:10.1073/pnas.1416655112.
3. **AL MacLean**, HA Harrington, MPH Stumpf, MDH Hansen, (2014) Epithelial-mesenchymal transition in metastases affects tumor dormancy in a simple mathematical model. **Biomedicines**, 2(4) 384-402. doi:10.3390/biomedicines2040384.
2. **AL MacLean***, S Filippi*, MPH Stumpf, (2014) Ecology in the hematopoietic stem cell niche determines the clinical outcome in chronic myeloid leukemia, **Proc Natl Acad Sci USA**, 111(10) 3882-88. doi:10.1073/pnas.1317072111.
1. **AL MacLean**, C Lo Celso, MPH Stumpf, (2013) Population dynamics of normal and leukaemia stem cells in the haematopoietic niche show distinct regimes where leukaemia will be controlled. **J Roy Soc Interface**, doi:10.20120968.

Editorials, Perspectives, and News and Views

4. **AL MacLean**, KL Rudolph (2024), Hematopoietic stem cell aging by the niche. **Blood**, doi.org/10.1182/blood.2024024890.
3. **AL MacLean**, (2023), Voices carry. **Nat Chem Biol**, doi.org/10.1038/s41589-022-01238-6.
2. **AL MacLean**, (2022), Profiling intermediate cell states in high resolution. **Cell Rep Meth**, doi.org/10.1016/j.crmeth.2022.100204.
1. **AL MacLean**, Q Nie (2021), The diverse landscape of modeling in single-cell biology. **Phys Biol**, doi:10.1088/1478-3975/ac0b7f.

Book Chapters

1. **AL MacLean**, HA Harrington, MPH Stumpf, HM Byrne, (2016) Mathematical and Statistical Techniques for Systems Medicine, in *Systems Medicine: Methods in Molecular Biology*, New York: Springer; 405-40. doi:10.1007/978-1-4939-3283-2_18.

GRANTS AND RESEARCH SUPPORT

Current Support

Role: PI

Project/Proposal Title: Computational methods to predict gene regulatory network dynamics and cell state

Source of Support: National Institutes of Health, NIGMS R35 MIRA

Total Amount Awarded: \$2,062,500

Total Award Period Covered: 09/18/2021 – 08/31/2026

Role: PI

Project/Proposal Title: CAREER: Inference of gene regulatory networks and cell dynamics that control stem cell fate

Source of Support: National Science Foundation, Division of Mathematical Sciences: program in Mathematical Biology

Total Amount Awarded: \$571,458

Total Award Period Covered: 03/01/2021 – 02/28/2026

Role: co-PI

co-PI: Karl L. Rudolph (Fritz-Lipmann Institute, Jena, Germany)

Project/Proposal Title: Developmental IGF-signaling activity influencing dynamic trajectories of hematopoietic stem cell subpopulation selection in adult life

Source of Support: National Science Foundation, Division of Molecular and Cellular Biosciences / German Research Foundation (DFG)

Total Amount Awarded to MacLean lab: \$224,307 (NSF)

Total Amount Awarded to Rudolph lab: €596,824 (DFG)

Total Award Period Covered: 06/15/2024 – 05/31/2027

Role: Co-I

PI: Evanthia T. Roussos Torres, USC Keck

Project/Proposal Title: Targeting myeloid suppression to enhance anti-tumor immunity in breast cancer

Source of Support: National Institutes of Health, NCI R01

Total Amount Awarded: \$2,831,905.00

Total Amount Awarded to MacLean lab: \$198,380.

Total Award Period Covered: 07/21/2023 – 06/30/2028

Past Support

Role: PI

Project/Proposal Title: Identifying carcinoma risk factors by single-cell data analysis and parameter inference of EMT-mediated tumor dynamics

Source of Support: American Cancer Society, Institutional Research Grant, ACS-IRG

Total Amount Awarded: \$30,000

Total Award Period Covered: 09/01/2019 – 08/31/2020

Applications submitted and declined (federal support)

Role: PI (MPI proposal submitted with R. Wollman, UCLA)

Project/Proposal Title: Learning informative mechanistic models of Ca²⁺ signaling

Source of Support: National Institutes of Health, NIGMS (R01)

Total Amount Requested: \$1,784,728

Total Award Period Proposed: 07/01/2022 - 06/30/2026

Role: PI

Project/Proposal Title: Computational modeling of cell communication and dynamic regulation of nephrogenesis

Source of Support: National Institutes of Health, NIDDK, (R01)

Total Amount Requested: \$2,447,646

Total Award Period Proposed: 09/01/2020 - 08/31/2025

Role: PI

Project/Proposal Title: Predicting stem cell dynamics & tissue fate from single-cell genomics

Source of Support: National Institutes of Health (DP2)

Total Amount Requested: \$1,500,000

Total Award Period Proposed: 08/15/2020 - 08/14/2025

PROFESSIONAL ACTIVITIES

Meeting Organization, Program & Society Committees

2025	Lead organizer and scientific organizing committee chair, "Systems Biology of Single Cells" conference, May 8-9 2025, at UC Irvine.
2025	Member, Organizing Committee, 14th annual Southern California Systems Biology Conference, May 10, UC Riverside.
2024	Member, Organizing Committee, 13th annual Southern California Systems Biology Conference, Mar 16, UC Irvine.
2023	Co-organizer (with S. Finley) of the 12th annual Southern California Systems Biology Conference. Apr 29, USC.
2021 - 2023	Member, Society for Mathematical Biology (SMB) Publications Committee; Social media publications board
2020 - 2023	Member, Society for Mathematical Biology (SMB) Committee to promote diversity, equity and inclusion (DEI) within mathematical biology.
2022	Host and co-organizer of keynote DEI panel discussions on career paths and graduate education, 14th ECMTB conference, Heidelberg, Germany.
2021	Co-organizer (with R. Rockne) of mini-symposium at SMB 2021: Dynamics and networks in single-cell biology, Jun 13-217, 2021, UC Riverside, smb2021.org.
2021	Program Committee Member, 3rd International Symposium on Mathematical and Computational Oncology (ISMCO), Oct 11-13 2021, San Diego, CA.
2020	Panel Member, "Careers in Bioinformatics," ASCB annual meeting 2020.
2020	Program Committee Member, 2nd International Symposium on Mathematical and Computational Oncology (ISMCO), Oct 8-10 2020, San Diego, CA.
2020	Co-organizer (with R. Rockne) of mini-symposium at SMB 2020: Modeling dynamics in single-cell biology, Aug 17-20, 2020, smb2020.org.
2019	Co-organizer (with L. Pinello) of two-day conference: "Algorithms and Models for Single-Cell Genomics" funded by the NSF-Simons Center for Multiscale Cell Fate Research, held at the University of California, Irvine, June 6-7, 2019

Review & Editorial Panels, External Thesis Committees, Grant & Manuscript Review

2025-present	Associate Editor, <i>Journal of the Royal Society, Interface</i>
2022-present	Associate Editor, <i>Bulletin of Mathematical Biology</i>
2025	Grant reviewer & panel member for Sweden's largest research program: WASP ("Wallenberg AI Autonomous Systems and Software"): NEST team grants
2024	External ad-hoc grant review for Genome BC, Vancouver, Canada

2024-2025	External committee member for PhD thesis of: Nino Geisler, Fritz Lipmann Institute (Leibniz Institute on Aging). PI: KL Rudolph
2024	Thesis committee chair, for the PhD thesis of: Daniel Glazar at Moffitt Cancer Center, University of South Florida
2023	Grant reviewer (mail review) for NIH NIGMS
2023	External grant review for UKRI sLoLa (strategic Longer and Larger) research grants
2022	Member of Grant Review Panel, NSF Division of Mathematical Sciences
2022-2025	External thesis committee member (James Eapen), Van Andel Institute, Grand Rapids, Michigan. PI: Hui Shen
2021	External Reviewer for PhD thesis of: Alexander Browning, Queensland University of Technology, Brisbane, Australia. PI: Matthew Simpson. Thesis written report date: December, 2021
2021	Member of Grant Review Panel, NSF Division of Mathematical Sciences
2021	External Reviewer for PhD thesis of: Zachary DeBruine, Van Andel Institute, Grand Rapids, Michigan. PI: Karsten Melcher. Dissertation defense date: 9/16/2021
2021	Guest Editor of special issue of <i>Physical Biology</i> , “Building models in single-cell biology,” co-edited with Q. Nie
2020	Member of Grant Review Panel, Sector Innovation Program SIP-7: research in “single-cell omics”, Genome BC, Vancouver, Canada, Virtual. Panel dates: 7/30/2020
2020	Grant reviewer for C3.ai Digital Transformation Institute call for COVID-19 research, Berkeley, CA
2019	Grant reviewer for United Kingdom Research Innovation (UKRI) Future Leaders Fellowships, London, UK
2014-present	Reviewer for research articles at journals including: Nature, Cell, PNAS, eLife, Science Advances, Blood, Mol Syst Biol, Nat Chem Biol, Nat Meth, Nat Commun**, Cell Stem Cell, Cell Systems**, Developmental Cell, Cell Reports, Cancer Research, Genome Medicine, PLOS Comp Biol**, Bioinformatics**, J Theor Biol**, J Roy Soc Interface**, BMC Biology, BMC Bioinformatics, BMC Systems Biology, Physical Biology, Bull Math Biol ** denotes frequent reviewer

UNIVERSITY SERVICE

Departmental committees

2021-present	Member, Communications and Outreach committee, Department of Quantitative and Computational Biology
2023-2024	Member, Admissions committee for Computational Biology and Bioinformatics PhD program
2022-2023	Member, Admissions committee for Computational Biology and Bioinformatics PhD program
2021-2022	Member, Admissions committee for Computational Biology and Bioinformatics PhD program

2019-2020	Member, Tenure-track Faculty Search Committee, Computational Structural, Synthetic, or Systems Biology, Quantitative and Computational Biology Section
2019-2020	Member, Admissions committee for Computational Biology and Bioinformatics PhD program
2018-2019	Member, Admissions committee for Computational Biology and Bioinformatics PhD program

Student committees

2025	Member, PhD Defense committee (Lynne Cherchia), BME Program, Viterbi, Advisors: Stacey Finley & Scott Fraser
2025	Member, PhD Qualification exam committee (Yue Huang), CBB Program, Viterbi, Advisor: Fengzhzhu Sun
2025	Member, PhD Defense committee (Holly Huber), BME Program, Viterbi, Advisor: Stacey Finley
2025	Member, PhD Qualification Exam committee (Obadiah Mulder), CBB Program, QCB, Advisor: Michael Edge
2025	Member, PhD Qualification Exam committee (Handan Cetin), CBB Program, QCB, Advisor: Stacey Finley
2025	Member, PhD Qualification Exam committee (Xinyu Guo), CBB Program, QCB, Advisor: Liang Chen
2024	Member, PhD Defense committee (Raktim Mitra), CBB Program, QCB, Advisor: Remo Rohs
2024	Member, PhD Defense committee (Vardges Tserunyan), CBB Program, QCB, Advisor: Stacey Finley
2023	Member, committee for Annual Progress Meeting (Jiya Eerdeng), PIBBS, Keck School of Medicine, Advisor: Rong Lu.
2023	External Examiner, PhD Qualification Exam committee (James Eapen), VAI Graduate School, Van Andel Institute, Michigan, Advisor: Hui Chen.
2023	Member, Thesis committee (Belinda Garana), Chemical Engineering, Viterbi School of Engineering, Advisor: Nicholas Graham
2023	Member, Thesis committee (Lynne Cherchia), BME, Viterbi School of Engineering, Advisor: Stacey Finley
2022	Member, Thesis committee (Holly Huber), BME, Viterbi School of Engineering, Advisor: Stacey Finley
2022	Member, Thesis committee (Jiya Eerdeng), PIBBS, Keck School of Medicine, Advisor: Rong Lu
2021	Member, PhD Qualification Exam committee (Petar Antovski), BME Program, Viterbi School of Engineering, Advisor: Rong Lu
2021	Member, PhD Thesis committee (Ding Li), BME, Viterbi School of Engineering, Advisor: Stacey Finley
2021	Member, PhD Qualification Exam committee (Bowen Wang), PIBBS, Keck School of Medicine, Advisor: Rong Lu
2021	Member, PhD Qualification Exam committee (Vardges Tserunyan), BME, Viterbi School of Engineering, Advisor: Stacey Finley
2021	Member, PhD Qualification Exam committee (Raktim Mitra), Department of Quantitative and Computational Biology, Advisor: Remo Rohs
2021	Member, PhD Qualification Exam committee (Belinda Garana), Chem End, Viterbi School of Engineering, Advisor: Nicholas Graham
2021	Member, PhD Qualification Exam committee (Jiya Eerdeng), PIBBS, Keck School of Medicine, Advisor: Rong Lu

2020	Member, PhD Thesis committee (James Joly), Department of Chemical Engineering, Viterbi School of Engineering, Advisor: Nicholas Graham
2020	Member, PhD Thesis committee (Du Jiang), PIBBS, Keck School of Medicine, Advisor: Rong Lu
2019	Member, PhD Qualification Exam (Saket Choudhary), CBB, Biological Sciences, Dornsife, Advisor: Andrew Smith
2019	Member, PhD Qualification Exam committee (Ding Li), BME, Viterbi School of Engineering, Advisor: Stacey Finley
2019	Member, PhD Qualification Exam committee (Ted Tseng), PIBBS, Keck School of Medicine, Advisor: Gage Crump

Other university service

2024-2025	Internal grant reviewer, limited submissions
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TEACHING AND MENTORING

Research Supervision

Postdoctoral Scholars

06/2024 - present	Xiaojun Wu <i>Notable Talks:</i> Minisymposium on model discovery, Society of Mathematical Biology (SMB), University of Alberta, Canada, 2025
11/2023 - present	Anupam Dey <i>Notable Talks:</i> International Conference on Systems Biology (ICSB), IIT Bombay, India, 2024 Joint Annual Meeting of the Korean Society of Mathematical Biology (KSMB) and the Society of Mathematical Biology, Konkuk University, South Korea, 2024
7/2021 - present	Jesse Kreger <i>Awards:</i> Mistletoe Foundation Fellowship <i>Notable Talks:</i> Systems Medicine Seminar, University of Florida, 2022 Joint Mathematics Meeting (Virtual), AMS Special Session on Mathematical Modeling of Population Dynamics Across Scales, Apr 2022
7/2021 - 07/2023	Lingyun (Ivy) Xiong <i>Notable talks/awards:</i> UC Davis Mathematics Colloquia and Seminars, City of Hope Seminars in Mathematical Oncology, 2022 USC Stem Cell Annual Retreat Best Speaker Award, 2022 <i>Current position:</i> Postdoc, UCLA

PhD Students

2025 - present	Jonathan Martinez <i>Milestones:</i> screening passed: May 2025
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- 2022 - present **Yingtong Liu**
Milestones: screening passed: May 2022; QE passed: Jan 2025
Notable Talks: SMB minisymposium, Konkuk University, South Korea, 2024
- 2020 - present **MeiLu McDermott**
Milestones: screening passed: May 2020; QE passed: Dec 2022
Notable Talks: ELLIIT conference cancer immunotherapy, Lund, Sweden, May 2022 (invited), SMB minisymposium, The Ohio State University, 2023
Awards: Travel scholarship, ELLIIT workshop at Lund University
- 2019 - 2024 **Xiaojun Wu**
Milestones: screening passed: May 2019; QE passed: June 2021; PhD defended: Mar 2024
Notable Talks: RECOMB/ISCB Regulatory and Systems Genomics, Las Vegas, Nov 2022
Awards:
 UCI Opportunity Award (w Chea, Kreger), 2021
 UCI Opportunity Award Funding (w Tatarakis), 2019
 USC Viterbi Scholarship 2019
Current position: Postdoc, MacLean lab.
- 2019 - 2023 **Megan Rommelfanger**
Milestones: screening passed: May 2019; QE passed: May 2021; PhD defended: Mar 2023
Notable Talks: SoCal SysBio annual conference, UC Riverside, Apr 2021 (invited), JuliaCon, Virtual, July 2021
Awards: NSF GRFP Honorable Mention 2020, USC WiSE Top-Up Fellowship 2019
Current position: Computational research scientist, Altos Labs.

Courses Taught

- 2025-26 QBIO 482: Systems biology: modeling the dynamics of life, *Spring 2026*
 Units: 2, Effort: 50% (w. Fudenberg)
- 2025-26 QBIO 494: Honors Thesis, *Spring 2026*
 Units: 2, Effort: 50% (w. Finley)
- 2025-26 QBIO 555: Scientific Writing in Quantitative and Computational Biology, *Spring 2026*
 Units: 1, Effort: 100%
- 2025-26 QBIO 577: Computational Molecular Biology, *Fall 2025*
 Units: 2, Effort: 50% (w. Chaisson)
- 2024-25 QBIO 494: Honors Thesis, *Spring 2025*
 Units: 2, Effort: 100%
- 2024-25 QBIO 482: Systems biology: modeling the dynamics of life, *Spring 2025*
 Units: 4, Effort: 50% (w. Chiu)

2023-24	QBIO 494: Honors Thesis, <i>Spring 2024</i> Units: 2, Effort: 100%
2023-24	QBIO 482: Systems biology: modeling the dynamics of life, <i>Spring 2024</i> Units: 4, Effort: 50% (w. Fudenberg)
2022-23	QBIO 494: Honors Thesis, <i>Spring 2023</i> Units: 2, Effort: 100%
2022-23	QBIO 482: Systems biology: modeling the dynamics of life, <i>Spring 2023</i> Units: 4, Effort: 50% (w. Fudenberg)
2022-23	QBIO 577: Computational Molecular Biology, <i>Fall 2022</i> Units: 2, Effort: 50% (w. Fudenberg)
2021-22	QBIO 494: Honors Thesis, <i>Spring 2022</i> Units: 2, Effort: 100%
2021-22	QBIO 481: Structural Bioinformatics, <i>Fall 2021</i> Units: 4, Effort: 50% (w. Sagendorf)
2021-22	BISC 577a: Computational Molecular Biology Lab, <i>Fall 2021</i> Units: 2, Effort: 50% (w. Fudenberg)
2020-21	BISC 577a: Computational Molecular Biology Lab, <i>Fall 2020</i> Units: 2, Effort: 100% (w. Katritch)
2019-20	QBIO 494: Honors Thesis, <i>Spring 2020</i> Units: 2, Effort: 50% (w. Rohs)
2019-20	BISC 577a: Computational Molecular Biology Lab, <i>Fall 2019</i> Units: 2; Effort: 50% (w. Katritch)
2018-19	BISC 577a: Computational Molecular Biology Lab, <i>Spring 2019</i> Units: 2; Effort: 50% (w. Sun)
2017-18	Math 5A: Calculus for the Life Sciences, University of California, Irvine Units: 4; Effort: 100%

Guest Lectures

2024-25	BME 530: Introduction to Systems Biology (Finley)
2024-25	QBIO 401: Introduction to Computational Analysis of Biological Data (Calabrese)
2023-24	QBIO 401: Introduction to Computational Analysis of Biological Data (Calabrese)
2021-22	CBG 580: Cancer Systems Biology (two lectures), (DeClerck)
2022-23	QBIO 401: Introduction to Computational Analysis of Biological Data (Calabrese)
2021-22	CBG 580: Cancer Systems Biology (two lectures), (DeClerck)
2021-22	QBIO 401: Introduction to Computational Analysis of Biological Data (Calabrese)
2021-22	QBIO 493: Quantitative Biology Honors Seminar
2019-20	QBIO 401: Introduction to Computational Analysis of Biological Data (Calabrese)
2019-20	BISC 194: Introduction to Research
2018-19	QBIO 105: Introduction to Quantitative Biology Seminar

TALKS AND SEMINARS

Invited Seminars

30. Mathematical Biology seminar series, **Duke University**, Sep 2025. (In person)
29. Department of Biostatistics seminar, **University of North Carolina, Chapel Hill**, Sep 2025. (In person)
28. Division of Biosciences, **University College London**, London, UK. Jul 2025. (In person)
27. Department of Mathematics, **University of California, Riverside**, Jun 2025. (Postponed)
26. Stanford Center for Cancer Systems Biology, annual symposium, **Stanford University**, May 2025. (In person)
25. Department of Mathematics, Mathematical Biology seminar series, **UMass Amherst**. Nov 2024. (Virtual)
24. Center for Computational Molecular Biology (CCMB), **Brown University**. Providence, RI. Oct 2024. (In person)
23. Irving Institute for Cancer Dynamics, **Columbia University**. New York, NY. Oct 2024. (In person)
22. Leibniz Institute on Aging — **Fritz-Lipmann Institute (FLI)**. Jena, Germany. July 2024. (In person)
21. Defense Research Chair seminar, Moffitt Graduate School, **Moffitt Cancer Center**, Tampa, FL. May 2024 (In person)
20. Computational Biology Research Center, **Human Technopole**, Milan, Italy. Apr 2024. (In person)
19. Biomathematics seminar, **North Carolina State University**, Raleigh, NC. Feb 2024. (Virtual)
18. Koch Institute for Integrative Cancer Research, **Massachusetts Institute of Technology**, Boston, MA. Sep 2023. (In person)
17. Department of Integrated Mathematical Oncology, **Moffitt Cancer Center**, Tampa, FL. Feb 2023 (In person)
16. Department of Biomedical Engineering, **University of Florida**, Gainesville, FL. Feb 2023 (In person)
15. Mathematical Institute, **University of Oxford**, Oxford, UK. Oct 2022. (Virtual)
14. Centre for Regenerative Medicine, Institute for Regeneration and Repair, **University of Edinburgh**, Edinburgh, UK. June 2022. (In person)
13. Baskin School of Engineering Applied Mathematics seminar series, **University of California, Santa Cruz**, May 2022. (Virtual)
12. Biostatistics seminar series, **USC**, Apr 2022. (Virtual)
11. Biomathematics seminar series, **University of California, Los Angeles**, Los Angeles, CA. Oct 2021. (Virtual)
10. Department of Mathematics, Mathematical Biology Seminar, **Iowa State University**, Ames, IA. Virtual, Apr, 2021. (Virtual)
9. Center for Computational Biology and Bioinformatics, Huck Institute for the Life Sciences, **Penn State University**, State College, PA. Mar, 2020. (In person)
8. Division of Mathematical Oncology, **City of Hope**, Duarte, CA. Nov, 2019.

7. Center for Bioinformatics and Functional Genomics, Department of Biomedical Sciences, **Cedars-Sinai**, Los Angeles, CA. Sep 2019.
6. Single-Cell Profiling and Engineering Center, **Caltech**, Pasadena, CA. May 2019.
5. Frontiers in Quantitative and Systems Biology Seminar, Biomathematics, **University of California, Los Angeles**, Feb 2019.
4. Department of Mathematics, **University of California, Riverside**, May 2018.
3. Institute for the Biology of Stem Cells, **University of California Santa Cruz**, Apr 2017.
2. Mathematics of Reaction Networks Group, **University of Copenhagen**, Denmark, May 2016.
1. Cancer Bioinformatics Seminar, Wellcome Trust Centre for Human Genetics, **University of Oxford**, Apr 2016.

Invited talks at international conferences

13. Society for Mathematical Biology Annual Meeting 2025, MathOnco subgroup mini-symposium, Edmonton, Canada, July 2025.
12. OKO Conference: Mathematical biology from genes to cells to humans, Aug 28-31, 2023, Kyoto University, Japan. (In Person)
11. ICIAM Congress 2023, MS on “Calibration and Validation of Mathematical Models for Biological Systems,” Aug 21-25, Tokyo, Japan (Virtual).
10. “Data-driven multiscale modeling in cancer” minisymposium at the Society for Mathematical Biology annual meeting, The Ohio State University, Jul 17-21, 2023. (In Person)
9. “Computer Algebra Applications in the Life Sciences” Session at the ACA 2023 Meeting, Warsaw, Poland, Jul 17-21, 2023. (Virtual)
8. **Keynote** at BIRS (Banff International Research Station) workshop on “Computational Modelling of Cancer Biology and Treatments”, Banff, Canada, Jan 22-27, 2023. (In Person)
7. ELLIIT (Excellence Center at Linköping—Lund in Information Technology), Workshop on Data-driven modeling and learning for cancer immunotherapy, May 4-6, 2022, Lund University, Skåne, Sweden. (In Person)
6. Society for Mathematical Biology Annual Meeting 2021, CDEV/Methods for Biological Modeling mini-symposium, June 2021. (Virtual)
5. Society for Mathematical Biology Annual Meeting 2019, DevBio subgroup mini-symposium, Montreal, Canada, July 2019.
4. Southern California Systems Biology Annual Conference, Irvine, USA, January 2019.
3. Banff International Research Station workshop on “Mathematical and Statistical Challenges in Bridging Model Development, Parameter Identification and Model Selection in the Biological Sciences”, Banff, Canada, November 2018.
2. Systems Medicine of Leukaemia: StemCellMathLab, Hamburg, Germany, June 2016.
1. Parameter Inference and Identifiability, University of Oxford, Oxford, UK, January 2014.

Contributed talks at international conferences

8. Systems Approaches to Cancer Biology, University of Colorado, Anschutz Medical Campus, Aurora, CO, Feb 2025. (In Person)
8. Virtual Cell and Developmental Biology Conference, Mar 2024. (Virtual)
7. 12th ECMTB Conference of the SMB/ESMTB, Heidelberg, Germany, September 2022. (In Person)
6. ACM-BCB: Machine Learning Methods for Single-Cell Analysis, Virtual, August 1, 2021. **Awarded “Best talk”** at the meeting session. (Virtual)
5. Society for Mathematical Biology, Annual Meeting 2020, contributed talk as chair of mini-symposium, Aug 2020. (Virtual)
4. 7th Annual Winter q-bio Conference, Oahu, Hawaii, USA, February 2019. (In Person)
3. Cancer as an Evolving and Systemic Disease, Memorial Sloan Kettering Cancer Center, New York, NY, USA, March 2016. (In Person)
2. 25th Annual meeting of MASAMB (Mathematical and Statistical Aspects of Molecular Biology), University of Helsinki, Finland, 2015. (In Person)
1. 22nd Annual meeting of MASAMB (Mathematical and Statistical Aspects of Molecular Biology), Berlin, Germany, 2012. (In Person)

Seminars within USC

7. “A window in” series in the TIME Program of the Norris Cancer Center, Keck USC. Mar 2024
7. CEED (Center for Ecological and Evolutionary Dynamics) Seminar, Nov 2023.
6. Norris Comprehensive Cancer Center Joint TIME-ERC-TACS Retreat, Sep 2023.
5. QCB Departmental Retreat, University of Southern California, Ventura, CA, Nov 2022.
4. USC Stem Cell—Quantitative and Computational Biology Virtual Symposium, University of Southern California, Los Angeles, CA, Jun 2020.
3. Tumor Microenvironment Program Retreat, Norris Comprehensive Cancer Center, Keck School of Medicine, University of Southern California, Los Angeles, CA, Nov 2019.
2. Quantitative and Computational Biology Section Retreat, University of Southern California, Ventura, CA, Nov 2019.
1. Multidisciplinary University Research Initiative (MURI) Kickoff Meeting: Investigating Energy Efficiency, Information Processing and Control Architecture of Microbial Community Interaction Networks, University of Southern California, Los Angeles, CA, Aug 2019.

OUTREACH ACTIVITIES

2025	K-12 Teacher Professional Development workshop, hosted at USC in the QCB department in collaboration with USC JEP. March 2025.
2021 - present	Development of K12 curriculum “QStemCell: quantitative stem cell biology,” in collaboration with D. Kast at USC JEP.
Fall 2023	In-person classroom visit to Weemes elementary school (through Wonderkids program) to present our QStemCell curriculum to 3rd grade

Fall 2022	Deployment of QStemCell curriculum co-developed with USC JEP in person (Norwood Elementary) and on Zoom for the Wonderkids program.
2019 - 2021	Volunteer with Skype a Scientist program, connecting with and teaching classrooms about systems biology internationally.
2014	Co-organizer of “Imagining the Future of Medicine”, held at the Royal Albert Hall (2000 delegates), Apr 21, 2014, London, UK.
2013	Curator of Royal Society Summer Science exhibition “Clever Microbes”, clever-microbes.tumblr.com , held at the Royal Society, July 2-7, 2013.
2013	Co-organizer of TEDMEDLive at Imperial College London, held at the Royal Geographical Society (800 delegates), Apr 21, 2013, London, UK.
2011 - 2015	Tutor, Love2Learn, teaching mathematics and STEM core curriculum to UK high school students with refugee status, London, UK.