

Michael Sellers Cuoco

PhD Student, Bioinformatics and Systems Biology

Curriculum Vitae

August 2020

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Education

May 2016– May 2018	Postbaccalaureate coursework Harvard Extension School	Cambridge, Massachusetts
Sep 2012– May 2016	BS in Cellular and Molecular Biology Trinity College <ul style="list-style-type: none">➤ Minor: Models and Data➤ Major GPA: 3.62	Hartford, Connecticut

Honors and Awards

2017	Spot Award Broad Institute <ul style="list-style-type: none">➤ Awarded to nominees to acknowledge and demonstrate appreciation and recognition for their exceptional contributions.	Cambridge, Massachusetts
2014	TriBeta National Biology Honors Society Trinity College <ul style="list-style-type: none">➤ Dedicated to improving the understanding and appreciation of biological study and extending boundaries of human knowledge through scientific research. Members must meet the national membership criteria.	Hartford, Connecticut
2014	NESCAC Winter All-Academic Team Trinity College <ul style="list-style-type: none">➤ Student-athletes must have reached sophomore academic standing, and be in good standing in their sport with a cumulative grade point average of at least 3.50.	Hartford, Connecticut

Experience

Aug 2016– Aug 2020	Research Associate Aviv Regev Lab, Broad Institute, MIT & Harvard University <ul style="list-style-type: none">➤ Collaborated with teams of physicians and scientists to characterize signatures of cancer drug resistance by single-cell and bulk transcriptome and chromatin profiling of patient, mouse, and cell line samples. Conducted functional investigation by pooled genetic perturbation experiments.	Cambridge, Massachusetts
May 2014– Aug 2015	Undergraduate Student Matthew Meyerson Lab, Dana-Farber Cancer Institute, Harvard Medical School <ul style="list-style-type: none">➤ Undergraduate thesis: Engineered an in vitro model of chromosome arm 8p loss by CRISPR/Cas9 editing and artificial telomere recombination to investigate the functional consequences of the common cancerous alteration.	Boston, Massachusetts
Sep 2012– Dec 2013	Undergraduate Student SEA-PHAGES, Genomics Research Program, Trinity College	Hartford, Connecticut
Jun 2011– Jul 2011	High school Student Alan D'Andrea Lab, Dana-Farber Cancer Institute, Harvard Medical School	Boston, Massachusetts

Professional Training

2018	Harvard Biotech Incubator Harvard Biotech Club <ul style="list-style-type: none"> Worked directly with company founding members and key opinion leaders, performing due diligence and market research to identify clinical indications for therapeutic technology. 	Boston, Massachusetts
2018	Patent Law Short Course Harvard Biotech Club <ul style="list-style-type: none"> Reviewed basic concepts of patent law through weekly case readings and workshops at a local firm. 	Boston, Massachusetts
2017	Healthcare Innovation & Commercialization Short Course Harvard Biotech Club <ul style="list-style-type: none"> Weekly modules addressed various aspects of the commercialization process of biomedical technology including intellectual property, market sizing, clinical paths, and FDA regulation. 	Boston, Massachusetts

Teaching

2018	CodeRATS Broad Institute <ul style="list-style-type: none"> Managed the leadership team for a series of institute-wide introduction to programming workshops. 	Cambridge, Massachusetts
2015-2016	Teaching Assistant Trinity College <ul style="list-style-type: none"> Hosted study sessions on topics in genetics 	Hartford, Connecticut
2015-2016	Tutor Trinity College <ul style="list-style-type: none"> Tutored biology and genetics students one-on-one by request 	Hartford, Connecticut

Publications

Published

Jul 30, 2020	Acquired FGFR and FGF alterations confer resistance to estrogen receptor (ER) targeted therapy in ER+ metastatic breast cancer. P Mao, O Cohen, KJ Kowalski, J Kusiel, JE Buendia-Buendia, MS Cuoco , P Exman, SA Wander, AG Waks, U Nayar, JH Chung, SS Freeman, O Rozenblatt-Rosen, VA Miller, F Piccioni, DE Root, A Regev, EP Winer, NU Lin, N Wagle <i>Clinical cancer research : an official journal of the American Association for Cancer Research</i> doi.org/10.1158/1078-0432.CCR-19-3958	
Jun 24, 2020	A single-cell landscape of high-grade serous ovarian cancer. B Izar, I Tirosh, EH Stover, I Wakiro, MS Cuoco , I Alter, C Rodman, R Leeson, MJ Su, P Shah, M Iwanicki, SR Walker, A Kanodia, JC Melms, S Mei, JR Lin, CBM Porter, M Slyper, J Waldman, L Jerby-Arnon, O Ashenberg, TJ Brinker, C Mills, M Rogava, S Vigneau, PK Sorger, LA Garraway, PA Konstantinopoulos, JF Liu, U Matulonis, BE Johnson, O Rozenblatt-Rosen, A Rotem, A Regev <i>Nature medicine</i> doi.org/10.1038/s41591-020-0926-0	
Dec 5, 2019	IL-33 Signaling Alters Regulatory T Cell Diversity in Support of Tumor Development. A Li, RH Herbst, D Canner, JM Schenkel, OC Smith, JY Kim, M Hillman, A Bhutkar, MS Cuoco , CG Rappazzo, P Rogers, C Dang, L Jerby-Arnon, O Rozenblatt-Rosen, L Cong, M Birnbaum, A Regev, T Jacks <i>Cell reports</i> doi.org/10.1016/j.celrep.2019.10.120	
Dec 12, 2018	Acquired HER2 mutations in ER+ metastatic breast cancer confer resistance to estrogen receptor-directed therapies. U Nayar, O Cohen, C Kapstad, MS Cuoco , AG Waks, SA Wander, C Painter, S Freeman, NS Persky, L Marini, K Helvie, N Oliver, O Rozenblatt-Rosen, CX Ma, A Regev, EP Winer, NU Lin, N Wagle <i>Nature genetics</i> doi.org/10.1038/s41588-018-0287-5	

- Nov 6, 2018 **A Cancer Cell Program Promotes T Cell Exclusion and Resistance to Checkpoint Blockade.**
L Jerby-Arnon, P Shah, **MS Cuoco**, C Rodman, MJ Su, JC Melms, R Leeson, A Kanodia, S Mei, JR Lin, S Wang, B Rabasha, D Liu, G Zhang, C Margolais, O Ashenberg, PA Ott, EI Buchbinder, R Haq, FS Hodi, GM Boland, RJ Sullivan, DT Frederick, B Miao, T Moll, KT Flaherty, M Herlyn, RW Jenkins, R Thummalapalli, MS Kowalczyk, I Cañadas, B Schilling, ANR Cartwright, AM Luoma, S Malu, P Hwu, C Bernatchez, MA Forget, DA Barbie, AK Shalek, I Tirosh, PK Sorger, K Wucherpennig, EM Van Allen, D Schadendorf, BE Johnson, A Rotem, O Rozenblatt-Rosen, LA Garraway, CH Yoon, B Izar, A Regev
Cell doi.org/10.1016/j.cell.2018.09.006
- Sep 14, 2017 **The neuropeptide NMU amplifies ILC2-driven allergic lung inflammation.**
A Wallrapp, SJ Riesenfeld, PR Burkett, RE Abdunour, J Nyman, D Dionne, M Hofree, **MS Cuoco**, C Rodman, D Farouq, BJ Haas, TL Tickle, JJ Trombetta, P Baral, CSN Klose, T Mahlaköiv, D Artis, O Rozenblatt-Rosen, IM Chiu, BD Levy, MS Kowalczyk, A Regev, VK Kuchroo
Nature doi.org/10.1038/nature24029
- Apr 29, 2015 **Whole genome comparison of a large collection of mycobacteriophages reveals a continuum of phage genetic diversity.**
WH Pope, CA Bowman, DA Russell, D Jacobs-Sera, DJ Asai, SG Cresawn, WR Jacobs, RW Hendrix, JG Lawrence, GF Hatfull (**MS Cuoco** listed at co-investigator)
eLife doi.org/10.7554/eLife.06416
- Preprints**
- Jun 23, 2020 **RAAS blockade, kidney disease, and expression of ACE2, the entry receptor for SARS-CoV-2, in kidney epithelial and endothelial cells**
A Subramanian, K Vernon, M Slyper, J Waldman, MD Luecken, K Gosik, D Dubinsky, **MS Cuoco**, K Keller, J Purnell, L Nguyen, D Dionne, O Rozenblatt-Rosen, A Weins, Human Cell Atlas Lung Biological Network, A Regev, A Greka
BioRxiv doi.org/10.1101/2020.06.23.167098
- Jun 5, 2020 **Cycling cancer persister cells arise from lineages with distinct transcriptional and metabolic programs**
Y Oren, M Tsabar, HF Cabanos, **MS Cuoco**, E Zaganjor, PI Thakore, M Tabaka, CP Fulco, SA Hurvitz, DJ Slamon, G Lahav, A Hata, JS Brugge, A Regev
BioRxiv doi.org/10.1101/2020.06.05.136358
- Apr 20, 2020 **Integrated analyses of single-cell atlases reveal age, gender, and smoking status associations with cell type-specific expression of mediators of SARS-CoV-2 viral entry and highlights inflammatory programs in putative target cells**
C Muus, MD Luecken, G Eraslan, A Waghay, G Heimberg, L Sikkema, Y Kobayashi, ED Vaishnav, A Subramanian, C Smillie, K Jagadeesh, ET Duong, E Fiskin, E Torlai Triglia, C Becavin, M Ansari, P Cai, B Lin, J Buchanan, S Chen, J Shu, AL Haber, H Chung, DT Montoro, T Adams, H Aliee, SJ Allon, Z Andrusivova, I Angelidis, O Ashenberg, K Bassler, C Becavin, I Benhar, J Bergenstrahle, L Bergenstrahle, L Bolt, E Braun, LT Bui, M Chaffin, E Chichelnitskiy, J Chiou, TM Conlon, **MS Cuoco**, M Deprez, NA Fisc
BioRxiv doi.org/10.1101/2020.04.19.049254
- Mar 20, 2020 **Transcriptional mediators of treatment resistance in lethal prostate cancer**
MX He, **MS Cuoco**, J Crowdis, A Bosma-Moody, Z Zhang, K Bi, A Kanodia, M-J Su, C Rodman, L DelloStritto, P Shah, KP Burke, B Izar, Z Bakouny, AK Tewari, D Liu, SY Camp, NI Vokes, J Park, S Vigneau, L Fong, O Rozenblatt-Rosen, A Regev, A Rotem, M-E Taplin, EM Van Allen
BioRxiv doi.org/10.1101/2020.03.19.998450
- Oct 21, 2019 **Pan-cancer single cell RNA-seq uncovers recurring programs of cellular heterogeneity**
GS Kinker, AC Greenwald, R Tal, Z Orlova, **MS Cuoco**, JM McFarland, A Warren, C Rodman, JA Roth, SA Bender, B Kumar, JW Rocco, PA Fernandes, CC Mader, H Keren-Shaul, A Plotnikov, H Barr, A Tsherniak, O Rozenblatt-Rosen, V Krizhanovsky, SV Puram, A Regev, I Tirosh
BioRxiv doi.org/10.1101/807552
- Aug 28, 2019 **The enteric nervous system of the human and mouse colon at a single-cell resolution**
E Drokhyansky, CS Smillie, N Van Wittenberghe, M Ericsson, GK Griffin, D Dionne, **MS Cuoco**, MN Goder-Reiser, T Sharova, AJ Aguirre, GM Boland, D Graham, O Rozenblatt-Rosen, RJ Xavier, A Regev
BioRxiv doi.org/10.1101/746743
- Aug 4, 2019 **Opposing immune and genetic forces shape oncogenic programs in synovial sarcoma**
L Jerby, C Neftel, ME Shore, MJ McBride, B Haas, B Izar, HR Weissman, A Volorio, G Boulay, L Cironi, AR Richman, LC Broeye, JM Gurski, CC Luo, R Mylvaganam, L Nguyen, S Mei, Jc Melms, C Georgescu, O Cohen, JE Buendia-Buendia, **MS Cuoco**, D Labes, DR Zollinger, JM Beechem, P Nielsen, I Chebib, G Cote, E Choy, I Letovanec, S Cherix, N Waggle, PK Sorger, AB Haynes, JT Mullen, I Stamenkovic, MN Rivera, C Kadoch, O Rozenblatt-Rosen, ML Suva, N Riggi, A Regev
BioRxiv doi.org/10.1101/724302

- Jan 6, 2019 **Longitudinal single cell profiling of regulatory T cells identifies IL-33 as a driver of tumor immunosuppression**
 A Li, RH Herbst, D Canner, JM Schenkel, OC Smith, JY Kim, M Hillman, A Bhutkar, **MS Cuoco**, CG Rappazzo, P Rogers, CQ Dang, O Rozenblatt-Rosen, L Cong, M Birnbaum, A Regev, T Jacks
 BioRxiv doi.org/10.1101/512905

Publications are updated programmatically each week.

Presentations

Talks

- Apr 2020 **The cellular origins of drug resistance in cancer**
 Regev Lab Staff Meeting; Cambridge, Massachusetts
- Oct 2018 **CRISPR screening for regulators of cancer immune checkpoint inhibitor resistance**
 Regev Lab Science Days Retreat; Cambridge, Massachusetts
- May 2017 **Understanding the mechanisms of drug resistance in melanoma**
 Regev Lab Staff Meeting; Cambridge, Massachusetts
- May 2016 **In vitro modeling and analysis of chromosome 8p arm-level deletion using CRISPR-Cas9.**
 Trinity College Biology Department; Hartford, Connecticut
- Aug 2015 **In vitro modeling and analysis of chromosome 8p arm-level deletion using CRISPR-Cas9.**
 Meyerson Lab Group Meeting; Boston, Massachusetts
- Aug 2014 **Genome engineering to generate models of chromosome arm-level aneuploidies.**
 Meyerson Lab Group Meeting; Boston, Massachusetts
- Nov 2012 **The role of the FANCD2 gene in Fanconi Anemia and DNA repair.**
 Concord-Carlisle High School STEM series; Concord, Massachusetts

Posters

- Dec 2019 **Metabolic switching underlies the ability of cancer persister cells to cycle under drug treatment.**
 Annual Broad Institute Retreat; Boston, Massachusetts
- Feb 2019 **Targeting the root of non-genetic cancer relapse using an expressed barcode library.**
 Annual Klarman Cell Observatory Retreat; Cambridge, Massachusetts
- Dec 2018 **Discovering the master regulators of immune checkpoint inhibitor resistance in melanoma with Perturb-Seq.**
 Annual Broad Institute Retreat; Boston, Massachusetts
- Jul 2018 **Single-cell RNA-Seq of melanoma ecosystems reveals sources of T cell exclusion linked to immunotherapy clinical outcomes.**
 Annual Broad Institute-Israel Science Foundation Symposium; Cambridge, Massachusetts
- Jun 2018 **The Center for Cancer Precision Medicine enables exploration of immunotherapy resistance in melanoma at the single-cell level.**
 Annual Dana-Farber / Harvard Cancer Center Genetics Retreat; Boston, Massachusetts
- May 2016 **In vitro modeling and analysis of chromosome 8p arm-level deletion using CRISPR-Cas9.**
 Trinity College Annual Spring Research Symposium; Hartford, Connecticut
- May 2013 **Review of integrase-mediated site-specific recombination in mycobacteriophage species.**
 Trinity College Annual Spring Research Symposium; Hartford, Connecticut

Service

- 2018 **Patient Ambassador** Boston, Massachusetts
 Dana-Farber Cancer Institute
 ➤ Escorted patients to appointments across the Longwood Medical Area

Skills

statistical modelling, data science, reproducible research
 R (advanced), Bash, Matlab, Python

Analytical
 Programming

tidyverse, Rmarkdown, blogdown	Packages
Git, Docker, Travis	Tools