

Michael Sellers Cuoco

PhD Student, Bioinformatics and Systems Biology

Curriculum Vitae

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📍 University of California, San Diego
📞 (978) 505-0993
✉️ mcuoco@ucsd.edu
🐦 @cuoco_michael
🔗 mikecuoco
📞 0000-0003-2163-5120

Education

- May 2016–May 2018 **Postbaccalaureate coursework** Cambridge, Massachusetts
Harvard Extension School
- Sep 2012–May 2016 **BS, Cellular and Molecular Biology** Hartford, Connecticut
Trinity College
- Minor: Models and Data
 - Major GPA: 3.62

Honors and Awards

- 2017 **Spot Award** Cambridge, Massachusetts
Broad Institute
- Awarded to nominees to acknowledge and demonstrate appreciation and recognition for their exceptional contributions.
- 2014 **TriBeta National Biology Honors Society** Hartford, Connecticut
Trinity College
- 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.
- 2014 **NESCAC Winter All-Academic Team** Hartford, Connecticut
Trinity College
- 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.

Experience

- Aug 2016–Aug 2020 **Research Associate** Cambridge, Massachusetts
Aviv Regev Lab, Broad Institute, MIT & Harvard University
- 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.
- May 2014–Aug 2015 **Undergraduate Student** Boston, Massachusetts
Matthew Meyerson Lab, Dana-Farber Cancer Institute, Harvard Medical School
- 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.
- Sep 2012–Dec 2013 **Undergraduate Student** Hartford, Connecticut
SEA-PHAGES, Genomics Research Program, Trinity College
- Jun 2011–Jul 2011 **High school Student** Boston, Massachusetts
Alan D'Andrea Lab, Dana-Farber Cancer Institute, Harvard Medical School

Professional Training

2018	Harvard Biotech Incubator Harvard Biotech Club ► 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 ► 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 ► 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 ► Managed the leadership team for a series of institute-wide introduction to programming workshops.	Cambridge, Massachusetts
2015-2016	Teaching Assistant Trinity College ► Hosted study sessions on topics in genetics	Hartford, Connecticut
2015-2016	Tutor Trinity College ► Tutored biology and genetics students one-on-one by request	Hartford, Connecticut

Authored Publications

Published

Mar 6, 2021	Transcriptional mediators of treatment resistance in lethal prostate cancer. MX He, <u>MS Cuoco</u> , J Crowdis, A Bosma-Moody, Z Zhang, K Bi, A Kanodia, MJ Su, SY Ku, MM Garcia, AR Sweet, C Rodman, L Del- IoStritto, R Silver, J Steinharter, P Shah, B Izar, NC Walk, KP Burke, Z Bakouny, AK Tewari, D Liu, SY Camp, NI Vokes, K Salari, J Park, S Vigneau, L Fong, JW Russo, X Yuan, SP Balk, H Beltran, O Rozenblatt-Rosen, A Regev, A Rotem, ME Taplin, EM Van Allen <i>Nature medicine</i> doi.org/10.1038/s41591-021-01244-6	
Mar 4, 2021	Single-cell meta-analysis of SARS-CoV-2 entry genes across tissues and demographics. C Muus, MD Luecken, G Eraslan, L Sikkema, A Waghray, G Heimberg, Y Kobayashi, ED Vaishnav, A Subramanian, C Smillie, KA Jagadeesh, ET Duong, E Fiskin, ET Triglia, 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 Bécavin, I Benhar, J Bergensträhle, L Bergensträhle, L Bolt, E Braun, LT Bui, S Callori, M Chaffin, E Chichelnitskiy, J Chiou, TM Conlon, <u>MS Cuoco</u> , ASE Cuomo, M Deprez, G Duclos, D Fine, DS Fischer, S Ghazanfar, A Gillich, B Giotti, J Gould, M Guo, AJ Gutierrez, AC Habermann, T Harvey, P He, X Hou, L Hu, Y Hu, A Jaiswal, L Ji, P Jiang, TS Kapellos, CS Kuo, L Larsson, MA Leney-Greene, K Lim, M Litviňuková, LS Ludwig, S Lukassen, W Luo, H Maatz, E Madisson, L Mamanova, K Manakongtreecheep, S Leroy, CH Mayr, IM Mbano, AM McAdams, AN Nabhan, SK Nyquist, L Penland, OB Poirion, S Poli, C Qi, R Queen, D Reichart, I Rosas, JC Schupp, CV Shea, X Shi, R Sinha, RV Sit, K Slowikowski, M Slyper, NP Smith, A Sountoulidis, M Strunz, TB Sullivan, D Sun, C Talavera-López, P Tan, J Tantivit, KJ Travaglini, NR Tucker, KA Vernon, MH Wadsworth, J Waldman, X Wang, K Xu, W Yan, W Zhao, CGK Ziegler <i>Nature medicine</i> doi.org/10.1038/s41591-020-01227-z	
Mar 3, 2021	Multimodal pooled Perturb-CITE-seq screens in patient models define mechanisms of cancer immune evasion. CJ Frangieh, JC Melms, PI Thakore, KR Geiger-Schuller, P Ho, AM Luoma, B Cleary, L Jerby-Arnon, S Malu, <u>MS Cuoco</u> , M Zhao, CR Ager, M Rogava, L Hovey, A Rotem, C Bernatchez, KW Wucherpfennig, BE Johnson, O Rozenblatt-Rosen, D Schadendorf, A Regev, B Izar <i>Nature genetics</i> doi.org/10.1038/s41588-021-00779-1	

- Jan 27, 2021 **Opposing immune and genetic mechanisms shape oncogenic programs in synovial sarcoma.**
L Jerby-Arnon, C Neftel, ME Shore, HR Weisman, ND Mathewson, MJ McBride, B Haas, B Izar, A Volorio, G Boulay, L Cironi, AR Richman, LC Broye, JM Gurski, CC Luo, R Mylvaganam, L Nguyen, S Mei, JC Melms, C Georgescu, O Cohen, JE Buendia-Buendia, A Segerstolpe, M Sud, MS Cuoco, D Labes, S Gritsch, DR Zollinger, N Ortogero, JM Beechem, G Petur Nielsen, I Chebib, T Nguyen-Ngoc, M Montemurro, GM Cote, E Choy, I Letovanec, S Cherix, N Wagle, PK Sorger, AB Haynes, JT Mullen, I Stamenkovic, MN Rivera, C Kadoch, KW Wucherpennig, O Rozenblatt-Rosen, ML Suvà, N Riggi, A Regev
Nature medicine doi.org/10.1038/s41591-020-01212-6
- Sep 6, 2020 **The Human and Mouse Enteric Nervous System at Single-Cell Resolution.**
E Drokhyansky, CS Smillie, N Van Wittenberghe, M Ericsson, GK Griffin, G Eraslan, D Dionne, MS Cuoco, MN Goder-Reiser, T Sharova, O Kuksenko, AJ Aguirre, GM Boland, D Graham, O Rozenblatt-Rosen, RJ Xavier, A Regev
Cell doi.org/10.1016/j.cell.2020.08.003
- 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, JG Kusieli, JE Buendia-Buendia, MS Cuoco, P Exman, SA Wander, AG Waks, U Nayar, J Chung, S Freeman, O Rozenblatt-Rosen, VA Miller, F Piccioni, DE Root, A Regev, EP Winer, NU Lin, N Wagle
Clinical cancer research : an official journal of the American Association for Cancer Research
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
Nature medicine doi.org/10.1038/s41591-020-0926-0
- Nov 1, 2020 **Pan-cancer single-cell RNA-seq identifies 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, PACM Fernandes, CC Mader, H Keren-Shaul, A Plotnikov, H Barr, A Tsherniak, O Rozenblatt-Rosen, V Krizhanovsky, SV Puram, A Regev, I Tirosh
Nature genetics doi.org/10.1038/s41588-020-00726-6
- 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
Cell reports 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
Nature genetics 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 Margola, 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

Preprint

- Feb 2, 2021 **Multicellular immune hubs and their organization in MMRd and MMRp colorectal cancer**
K Pelka, M Hofree, J Chen, S Sarkizova, JD Pirl, V Jorgji, A Bejnood, D Dionne, WH Ge, KH Xu, SX Chao, DR Zollinger, DJ Lieb, JW Reeves, CA Fuhrman, ML Hoang, T Delorey, LT Nguyen, J Waldman, M Klapholz, I Wakiro, O Cohen, CS Smillie, [MS Cuoco](#), J Wu, M-j Su, J Yeung, B Vijaykumar, AM Magnuson, N Asinovski, T Moll, MN Goder-Reiser, AS Applebaum, LK Brais, LK DelloStritto, SL Denning, ST Phillips, EK Hill, JK Meehan, DT Frederick, T Sharova, A Kanodia, EZ Todres, NA J
bioRxiv doi.org/10.1101/2021.01.30.426796
- Sep 13, 2020 **Multi-modal pooled Perturb-CITE-Seq screens in patient models define novel mechanisms of cancer immune evasion**
CJ Frangieh, JC Melms, PI Thakore, KR Geiger-Schuller, P Ho, AM Luoma, BR Cleary, S Malu, [MS Cuoco](#), M Zhao, M Rogava, L Hovey, A Rotem, C Bernatchez, KW Wucherpennig, BE Johnson, O Rozenblatt-Rosen, D Schadendorf, A Regev, B Izar
bioRxiv doi.org/10.1101/2020.09.01.267211
- Aug 25, 2020 **Single-nucleus and spatial transcriptomics of archival pancreatic cancer reveals multi-compartment reprogramming after neoadjuvant treatment**
WL Hwang, KA Jagadeesh, JA Guo, HI Hoffman, P Yadollahpour, R Mohan, E Drokhllyansky, N Van Wittenberghe, O Ashenberg, S Farhi, D Schapiro, JW Reeves, DR Zollinger, G Eng, JM Schenkel, WA Freed-Pastor, C Rodrigues, J Gould, C Lambden, C Porter, A Tsankov, D Dionne, D Abbondanza, J Waldman, [MS Cuoco](#), L Nguyen, T Delorey, D Phillips, D Ciprani, M Kern, A Mehta, K Fuhrman, R Ropf, JM Beechem, JS Loeffler, DP Ryan, CD Weekes, DT Ting, CR Ferrone, JY Wo, TS Hong, AJ Aguirre, NA Rozen
bioRxiv doi.org/10.1101/2020.08.25.267336
- Jul 1, 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 21, 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
- Oct 7, 2019 **Acquired FGFR and FGF alterations confer resistance to estrogen receptor (ER) targeted therapy in ER+ metastatic breast cancer**
P Mao, O Cohen, KJ Kowalski, JG Kusiel, JE Buendia-Buendia, [MS Cuoco](#), P Exman, SA Wander, AG Waks, U Nayar, J Chung, S Freeman, O Rozenblatt-Rosen, VA Miller, F Federica Piccioni, DE Root, A Regev, EP Winer, NU Lin, N Wagle
bioRxiv doi.org/10.1101/605436
- Sep 4, 2019 **The enteric nervous system of the human and mouse colon at a single-cell resolution**
E Drokhllyansky, 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 Wagle, 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 and preprints are updated programmatically.

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 Dana-Farber Cancer Institute <ul style="list-style-type: none">➤ Escorted patients to appointments across the Longwood Medical Area	Boston, Massachusetts
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Skills

R (advanced), Bash, Matlab, Python	Programming
tissue dissociation, cell line culture, flow cytometry	Cellular biology
plasmid cloning, CRISPR gene editing, RNA-seq, ATAC-seq	Molecular biology