

# Michael Sellers Cuoco

PhD Student, Bioinformatics and Systems Biology

## Curriculum Vitae

June 2020

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## Education

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

## Honors and Awards

2017	<b>Spot Award</b> Broad Institute <ul style="list-style-type: none"><li>➤ Awarded to nominees to acknowledge and demonstrate appreciation and recognition for their exceptional contributions.</li></ul>	Cambridge, Massachusetts
2014	<b>TriBeta National Biology Honors Society</b> Trinity College <ul style="list-style-type: none"><li>➤ 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.</li></ul>	Hartford, Connecticut
2014	<b>NESCAC Winter All-Academic Team</b> Trinity College <ul style="list-style-type: none"><li>➤ 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.</li></ul>	Hartford, Connecticut

## Experience

Aug 2016– Aug 2020	<b>Research Associate</b> Aviv Regev Lab, Broad Institute, MIT & Harvard University <ul style="list-style-type: none"><li>➤ 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.</li></ul>	Cambridge, Massachusetts
May 2014– Aug 2015	<b>Undergraduate Student</b> Matthew Meyerson Lab, Dana-Farber Cancer Institute, Harvard Medical School <ul style="list-style-type: none"><li>➤ 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.</li></ul>	Boston, Massachusetts
Sep 2012– Dec 2013	<b>Undergraduate Student</b> SEA-PHAGES, Genomics Research Program, Trinity College	Hartford, Connecticut
Jun 2011– Jul 2011	<b>High school Student</b> Alan D'Andrea Lab, Dana-Farber Cancer Institute, Harvard Medical School	Boston, Massachusetts

## Professional Training

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

## Teaching

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

## Publications

### Published

Jun 24, 2020	<b>A single-cell landscape of high-grade serous ovarian cancer.</b> B Izar, I Tirosh, EH Stover, I Wakiro, <b>MS Cuoco</b> , 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> <a href="https://doi.org/10.1038/s41591-020-0926-0">doi.org/10.1038/s41591-020-0926-0</a>	
Dec 5, 2019	<b>IL-33 Signaling Alters Regulatory T Cell Diversity in Support of Tumor Development.</b> A Li, RH Herbst, D Canner, JM Schenkel, OC Smith, JY Kim, M Hillman, A Bhutkar, <b>MS Cuoco</b> , CG Rappazzo, P Rogers, C Dang, L Jerby-Arnon, O Rozenblatt-Rosen, L Cong, M Birnbaum, A Regev, T Jacks <i>Cell reports</i> <a href="https://doi.org/10.1016/j.celrep.2019.10.120">doi.org/10.1016/j.celrep.2019.10.120</a>	
Dec 12, 2018	<b>Acquired HER2 mutations in ER+ metastatic breast cancer confer resistance to estrogen receptor-directed therapies.</b> U Nayar, O Cohen, C Kapstad, <b>MS Cuoco</b> , 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> <a href="https://doi.org/10.1038/s41588-018-0287-5">doi.org/10.1038/s41588-018-0287-5</a>	
Nov 6, 2018	<b>A Cancer Cell Program Promotes T Cell Exclusion and Resistance to Checkpoint Blockade.</b> L Jerby-Arnon, P Shah, <b>MS Cuoco</b> , 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 <i>Cell</i> <a href="https://doi.org/10.1016/j.cell.2018.09.006">doi.org/10.1016/j.cell.2018.09.006</a>	

- 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](https://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](https://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, M 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](https://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](https://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 Waghra, 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](https://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](https://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](https://doi.org/10.1101/807552)
- Aug 28, 2019 **The enteric nervous system of the human and mouse colon at a single-cell resolution**  
E Drokhlinsky, CS Smillie, N Van Wittenberghe, M Ericsson, GK Griffin, D Dionne, **MS Cuoco**, MN Goder-Reiser, T Sharova, AJ Aguirre, GM Bolland, D Graham, O Rozenblatt-Rosen, RJ Xavier, A Regev  
*BioRxiv* [doi.org/10.1101/746743](https://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](https://doi.org/10.1101/724302)
- Apr 12, 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](https://doi.org/10.1101/605436)

*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	Analytical
R (advanced), Bash, Matlab, Python	Programming
tidyverse, Rmarkdown, blogdown	Packages
Git, Docker, Travis	Tools