

# Michael Sellers Cuoco

PhD Student, Bioinformatics and Systems Biology

## Curriculum Vitae

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## Education

- May 2016–May 2018 **Postbaccalaureate coursework** Cambridge, Massachusetts  
Harvard Extension School
- Sep 2012–May 2016 **BS in 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	<b>Harvard Biotech Incubator</b> 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	<b>Patent Law Short Course</b> Harvard Biotech Club ► Reviewed basic concepts of patent law through weekly case readings and workshops at a local firm.	Boston, Massachusetts
2017	<b>Healthcare Innovation &amp; Commercialization Short Course</b> 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	<b>CodeRATS</b> Broad Institute ► Managed the leadership team for a series of institute-wide introduction to programming workshops.	Cambridge, Massachusetts
2015-2016	<b>Teaching Assistant</b> Trinity College ► Hosted study sessions on topics in genetics	Hartford, Connecticut
2015-2016	<b>Tutor</b> Trinity College ► Tutored biology and genetics students one-on-one by request	Hartford, Connecticut

## Authored Publications

### Published

Sep 6, 2020	<b>The Human and Mouse Enteric Nervous System at Single-Cell Resolution.</b> E Drokhlyansky, CS Smillie, N Van Wittenberghe, M Ericsson, GK Griffin, G Eraslan, D Dionne, <u>MS Cuoco</u> , MN Goder-Reiser, T Sharova, O Kuksenko, AJ Aguirre, GM Boland, D Graham, O Rozenblatt-Rosen, RJ Xavier, A Regev <i>Cell</i> <a href="https://doi.org/10.1016/j.cell.2020.08.003">doi.org/10.1016/j.cell.2020.08.003</a>	
Jul 30, 2020	<b>Acquired FGFR and FGF Alterations Confer Resistance to Estrogen Receptor (ER) Targeted Therapy in ER+ Metastatic Breast Cancer.</b> P Mao, O Cohen, KJ Kowalski, JG Kusiel, JE Buendia-Buendia, <u>MS Cuoco</u> , 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 <i>Clinical cancer research : an official journal of the American Association for Cancer Research</i> <a href="https://doi.org/10.1158/1078-0432.CCR-19-3958">doi.org/10.1158/1078-0432.CCR-19-3958</a>	
Jun 24, 2020	<b>A single-cell landscape of high-grade serous ovarian cancer.</b> B Izar, I Tirosh, EH Stover, I Wakiro, <u>MS Cuoco</u> , 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>	
Nov 1, 2020	<b>Pan-cancer single-cell RNA-seq identifies recurring programs of cellular heterogeneity.</b> GS Kinker, AC Greenwald, R Tal, Z Orlova, <u>MS Cuoco</u> , 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 <i>Nature genetics</i> <a href="https://doi.org/10.1038/s41588-020-00726-6">doi.org/10.1038/s41588-020-00726-6</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, <u>MS Cuoco</u> , 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 **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](https://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](https://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](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)
- Preprint**
- 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](https://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 Drokhyansky, 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 Fropf, 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](https://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](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 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 Waghray, 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)
- 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](https://doi.org/10.1101/605436)
- Sep 4, 2019 **The enteric nervous system of the human and mouse colon at a single-cell resolution**  
E Drokhylyansky, 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 Broyle, 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 Riggì, A Regev  
*bioRxiv* [doi.org/10.1101/724302](https://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](https://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**      Boston, Massachusetts  
Dana-Farber Cancer Institute  
    ➤ Escorted patients to appointments across the Longwood Medical Area

## Skills

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