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## EDUCATION

<b>Stanford University School of Medicine</b> Ph.D. Candidate in Cancer Biology	Stanford, CA 2017-Present
<b>Harvard College</b> A.B. in Biophysics. High Honors, <i>magna cum laude</i> . GPA 3.88	Cambridge, MA 2015

## RESEARCH EXPERIENCE

<b>Stanford University School of Medicine</b> Angelo Lab Computational Team Lead	Stanford, CA 2020-Present
<ul style="list-style-type: none"><li>• Conceptualized and supervised the creation of the open-source image analysis pipeline which forms the backbone for all imaging projects in the Angelo lab. [<a href="#">GitHub</a>]</li><li>• Managed and directed team of computational research assistants, undergraduate interns, and high school students to design algorithms for image processing, clustering, and spatial analyses.</li></ul>	
<b>Stanford University School of Medicine</b> Graduate Researcher	Stanford, CA 2017-Present
Advisors: <a href="#">Dr. Michael Angelo</a> and <a href="#">Dr. Christina Curtis</a> Thesis Committee: Dr. Edgar Engleman, Dr. Andrew Gentles, Dr. Nima Aghaeepour	
<ul style="list-style-type: none"><li>• Developed a novel deep-learning algorithm to identify the location of cells in image data across a range of tissue types and microscope platforms. [<a href="#">Nature Biotechnology</a>]</li><li>• Integrated genomics with multiplexed imaging to predict response to immunotherapy in triple negative breast cancer.</li></ul>	
<b>Harvard Medical School</b> Research Assistant	Boston, MA 2015-2017
Advisors: <a href="#">Dr. Rameen Beroukhim</a> and <a href="#">Dr. Ian Dunn</a>	
<ul style="list-style-type: none"><li>• Profiled large cohort of pituitary adenomas with whole-exome sequencing to define landscape of mutations and copy-number alterations. [<a href="#">Clinical Cancer Research</a>]</li><li>• Investigated the driver alterations which distinguish low- and high-grade meningiomas by integrating whole-genome, whole-exome, and targeted sequencing. [<a href="#">Genomic Medicine</a>]</li></ul>	

**Harvard University Department of Chemistry**

Cambridge, MA

Undergraduate Research Assistant

2014

Advisor: [Dr. George Whitesides](#)

- Explored the hydrophobic effect in protein-ligand binding through bacterial production of proteins followed by analysis of binding kinetics.
- Investigated whether nanofabrication of antennas by photolithography could aid in detection of binding events of immobilized proteins through signal amplification.

**Vaxess Technologies**

Cambridge, MA

Summer Intern

2014

- Implemented, ran, and optimized potency assay to measure vaccine activity after long-term storage, then scaled up from bench scale.
- Researched and presented competitive analysis of other vaccine preservation companies.

**Chilean Ministry of Energy**

Santiago, Chile

Summer Intern

2013

- Helped draft preliminary analytical framework for assessing volatility in fuel storage levels.
- Revamped template for subsequent analysis of entire energy sector to guide creation of federal storage level minimums.

**HONORS AND AWARDS****Best Poster Award**

2023

Stanford Pathology Department Retreat

**Best Talk Award**

2022

Stanford Cancer Biology Program Retreat

**Lucille P. Markey Biomedical Research Fellow**

2017-2020

Stanford Graduate Fellowship Program

**RESEARCH FUNDING****NIH/NCI F99/K00 CA264307 (PI Greenwald)**

2021-2028

“Comprehensive profiling of the tumor microenvironment to predict patient response to immunotherapy.”

Role: PI.

Summary: Using sequencing, multiplexed imaging, and experimental models to better understand the mechanism of immunotherapy in breast cancer.

**DOD W81XWH2110143 (PI Angelo)**

2021-2025

“Relating the interplay of tumor function and host response to clinical outcome in triple negative breast cancer.”

Role: Co-wrote Aims.

Summary: Identifying the underlying features of the tumor microenvironment which modulate response to therapy in breast cancer across disease subtypes and treatment regimes.

**NIH/NCI F31 CA246880 (PI Greenwald)**

2020-2021

“Predicting response to anti-PD-1 therapy in triple negative breast cancer by comprehensive profiling of the tumor microenvironment.”

Role: PI.

Summary: Integrated analysis of the tumor microenvironment by combining sequencing and multiplexed imaging to better understand response to immunotherapy.

**NIH/NCI UH3 CA24663301 (PI Angelo)**

2019-2022

“A robust platform for multiplexed, subcellular proteomic imaging in human tissue.”

Role: Co-wrote Aim 1.

Summary: Develop robust analytical pipelines and reagents to enable large-scale adoption of MIBI technology across a wide range of normal and diseased tissue types.

**MENTORSHIP****Post-doctoral fellow**

2023-present

Guided analysis of imaging data to predict breast cancer patient outcome

**Post-doctoral fellow**

2023-present

Guided analysis of sequencing and imaging data to understand breast cancer evolution

**Visiting PhD student**

2022-present

Supervised design of deep learning algorithm for cell classification

**Computational research associate**

2022-present

Supervised implementation of algorithms for spatial analysis

**Computational research associate**

2022-present

Supervised creation of tools for reproducible computational analysis

**Rotation student**

2022

Supervised segmentation and phenotyping of cells in pre-invasive breast cancer

**Computational research associate**

2021

Supervised optimization of spatial algorithms

**Rotation student**

2020

Guided analysis of sequencing data to predict patient outcome

**High school student**

2020

Supervised creation of user-friendly image data visualizations

**Undergraduate student**

2020

Supervised optimization of spatial analysis code

**Computational research associate**

2020-present

Supervised creation of user-friendly image analysis pipelines

Noah F. Greenwald	<i>Curriculum Vitae</i>	4
<b>Computational research associate</b>		2020-2022
Supervised design of algorithms for spatial analysis		
<b>High school students</b>		2019
Supervised creation of ground-truth data for training deep learning models		
<b>Rotation student</b>		2019
Supervised application of denoising algorithms to MIBI data		
<b>Rotation student</b>		2019
Supervised optimization of segmentation algorithm parameters		

## TEACHING

### Stanford University

<b>CBIO 275: Tumor Immunology</b>	2021
Teaching Assistant	
<b>“Profiling the tumor microenvironment with high-dimensional imaging”</b>	2021
CBIO 275 Guest Lecture	
<b>“How to analyze multiplexed imaging data”</b>	2021
Immunology 206 Guest Lecture	

## PROFESSIONAL DEVELOPMENT

### Stanford University

<b>Coaching High Performance Teams</b>	2022
A week-long workshop on how to effectively coach and manage teams	
<b>LAW 7807: Facilitation</b>	2021
A three-day workshop introducing key techniques for effective facilitation	
<b>SGSI: Negotiation</b>	2021
A week-long workshop detailing how to approach multi-party negotiations	
<b>Effective Negotiation</b>	2020
A full-day workshop on structuring productive negotiations	
<b>Alda Science Communication Workshop</b>	2019
A half-day workshop on delivering dynamic and engaging presentations	
<b>Grant Writing Academy</b>	2018
An eight-week class to develop core grant writing skills	

**PEER REVIEW****Journals**

IEEE Transactions on Medical Imaging.

**Conferences**

Neural Information Processing Systems (NeurIPS) LMRL Workshop (2022).

**SERVICE AND LEADERSHIP****Skype a Scientist Volunteer** 2023

- Gave presentations to elementary and middle school students about what it's like to be a scientist and answered questions about cancer research, genetics, and science.

**Spatial Biology Workshop Co-Chair** 2022 & 2023

- Conceptualized the idea, designed the agenda, and invited external speakers for the first two years of our [annual workshop](#) dedicated to the spatial analysis of biological data.
- Ran the sessions and moderated Q&A from the over 1,100 registered participants.

**Stanford Cancer Biology Seminar Series Co-organizer** 2021

- Solicited program input to create schedule of external faculty speakers.
- Worked with the Cancer Biology Racial Justice group to add talks from post-docs from historically under-represented populations.

**Advance Undergraduate Institute Mentor** 2021

- Provided guidance on applying to graduate school for students from under-represented backgrounds via panel discussions and mock interviews, as well as one-on-one mentoring.

**SSRP Admissions Committee Member** 2020 & 2021

- Reviewed applications for Stanford's summer undergraduate research program, which is geared towards preparing members of historically under-represented groups for STEM PhD programs.

**EPATT Tutor** 2019-2022

- Met one-on-one twice a week with students from East Palo Alto Middle School to help with specific coursework, as well as establish good academic habits and study skills.

**Stanford Cancer Biology Recruitment, Social Committee Chair** 2018-2020

- Organized and ran activities for prospective graduate students during interview week.

**Stanford Biosciences Student Association Grants Committee Co-Chair** 2018

- Planned and ran informational workshops with grant writing tips and advice on applications.
- Organized peer-to-peer advising to provide feedback on NSF and NIH fellowships.

**PRESENTATIONS****Invited Talks**

**Greenwald NF**, Rumberger L, Angelo M. An integrated toolkit for analyzing high-dimensional imaging data. **Quantitative Bioimaging Society MIA Workshop**. October 2023; San Diego, California.

**Talks**

**Greenwald NF**, Nederlof I, Ding D, Houlahan K, Horlings H, Kok M, Curtis C, Angelo M. The temporal influence of the tumor microenvironment in response to checkpoint blockade. **Computational Systems Immunology Symposium**. October 2023; Stanford, California.

**Greenwald NF**, Nederlof I, Houlahan K, Kagel A, Kong A, Horlings H, Kok M, Curtis C, Angelo M. Mapping the evolution of the tumor microenvironment in triple-negative breast cancer. **Stanford Cancer Biology Program Retreat**. October 2022; San Jose, California.

**Greenwald NF\***, Miller G\*, Moen E, Dougherty T, Singh J, Fong M, Chaudhry G, Abraham Z, Mosely J, Soon E, Greenbaum S, Keren L, Graf W, Angelo M<sup>§</sup>, Van Valen D<sup>§</sup>. Accurate whole-cell segmentation by combining convolutional neural networks and high-dimensional imaging. **Keystone Symposia: Single Cell Biology**. March 2020; Virtual.

Bi WL, Horowitz P, **Greenwald NF**, Abedalthagafi M, Agarwalla PK, Schumacher S, Mei Y, Brastianos P, Santagata S, Laws ER Jr., Beroukhim R, Dunn IF. Landscape of genomic alterations in pituitary adenoma. **New England Neurosurgical Society Annual Meeting**. June 2016; Cape Cod, MA.

Bi WL, **Greenwald NF**, Abedalthagafi M, Agarwalla PK, Horowitz P, Gibson WJ, Al-Mefty O, Santagata S, Beroukhim R, Dunn IF. Landscape of genomic alterations in high-grade meningioma. **Society for Neuro-Oncology Conference on Meningioma**. June 2016; Toronto, Canada.

**Posters**

**Greenwald NF**, Nederlof I, Ding D, Houlahan K, Horlings H, Kok M, Curtis C, Angelo M. The temporal influence of the tumor microenvironment in response to checkpoint blockade. **Stanford Pathology Department Retreat**. November 2023; Stanford, California.

**Greenwald NF**, Keren L, Greenbaum S, Fong M, Chaudry G, Abraham Z, Moseley J, Van Valen D, Angelo M. Accurate whole-cell segmentation in clinical tissue samples by combining convolutional neural networks and multiplexed imaging. **Allen Institute Bioimage Informatics**. October 2019; Seattle, WA.

**Greenwald NF**, Keren L, Angelo M. Harnessing deep learning to enable multiplexed in situ cellular segmentation and morphological characterization. **Stanford Cancer Biology Program Retreat**. September 2018; San Jose, CA.

Bi WL, Coroller T, **Greenwald NF**, Beroukhim R, Dunn IF, Huang R, Aerts H. Radiographic prediction of meningioma grade and genotype. **Broad Cancer Program Retreat**. December 2016; Cambridge, MA.

**Greenwald NF**, Bi WL, Beroukhir R. Liquid Biopsies: Circulating Tumor DNA as a Clinical Marker. **Broad Research Assistants and Technicians Poster Session**. November 2015; Cambridge, MA.

## PUBLICATIONS

\* indicates equal contribution | § indicates co-corresponding

### Selected Articles

**Greenwald NF\***, Miller G\*, Moen E, Kong A, Kagel A, Fullaway CC, McIntosh BJ, Leow K, Schwartz MS, Dougherty T, Pavelchek C, Cui S, Camplisson I, Bar-Tal O, Singh J, Fong M, Chaudhry G, Abraham Z, Mosely J, Warshawsky S, Soon E, Greenbaum S, Risom T, Hollmann T, Keren L, Graf W, Angelo M<sup>§</sup>, Van Valen D<sup>§</sup>. Whole-cell segmentation of tissue images with human-level performance using large-scale data annotation and deep learning. **Nature Biotechnology** (2021).

DOI: [10.1038/s41587-021-01094-0](https://doi.org/10.1038/s41587-021-01094-0)

- Preprint: bioRxiv (2021). DOI: [10.1101/2021.03.01.431313](https://doi.org/10.1101/2021.03.01.431313)

Bi WL\*, **Greenwald NF\***, Abedalthagafi M\*, Wala J, Gibson WJ, Agarwalla PK, Horowitz P, Schumacher S, Artomov M, Esaulova E, Chevalier A, Ducar M, Thorner A, van Hummelin P, Brastianos P, Al-Mefty O, Dunn GP, Santagata S<sup>§</sup>, Dunn IF<sup>§</sup>, Beroukhir R<sup>§</sup>. Genomic landscape of high-grade meningioma. **npj Genomic Medicine** (2017). DOI: [10.1038/s41525-017-0014-7](https://doi.org/10.1038/s41525-017-0014-7)

Bi WL\*, Horowitz P\*, **Greenwald NF\***, Abedalthagafi M, Agarwalla PK, Gibson WJ, Mei Y, Schumacher S, Ben-David U, Chevalier A, Carter S, Tiao G, Brastianos P, Ligon AH, Laws ER Jr., Santagata S, Beroukhir R<sup>§</sup>, Dunn IF<sup>§</sup>. Landscape of genomic alterations in pituitary adenoma. **Clinical Cancer Research** (2016). DOI: [10.1158/1078-0432.CCR-16-0790](https://doi.org/10.1158/1078-0432.CCR-16-0790)

### Research Articles

Ferrian S, Cao A, McCaffrey EF, Saito T, **Greenwald NF**, Nicolls MR, Bruce T, Zamanian RT, Del Rosario P, Rabinovitch M, Angelo M. Single-Cell Imaging Maps Inflammatory Cell Subsets to Pulmonary Arterial Hypertension Vasculopathy. **American Journal of Respiratory and Critical Care Medicine** (2023). DOI: [10.1164/rccm.202209-1761OC](https://doi.org/10.1164/rccm.202209-1761OC)

Liu CC, **Greenwald NF**, Kong A, McCaffrey EF, Leow KX, Mrdjen D, Cannon BJ, Rumberger JL, Varra SR, Angelo M. Robust phenotyping of highly multiplexed tissue imaging data using pixel-level clustering. **Nature Communications** (2023). DOI: [10.1038/s41467-023-40068-5](https://doi.org/10.1038/s41467-023-40068-5)

- Preprint: bioRxiv (2022). DOI: [10.1101/2022.08.16.504171](https://doi.org/10.1101/2022.08.16.504171)

Greenbaum S\*, Averbukh I\*, Soon E\*, Rizzuto G, Baranski A, **Greenwald NF**, Kagel A, Bosse M, Jaswa EG, Khair Z, Kwok S, Warshawsky S, Piyadasa H, Goldston M, Spence A, Miller G, Schwartz M, Graf W, Van Valen D, Winn VD, Hollmann T, Keren L, van de Rijn M, Angelo M. A spatially resolved timeline of the human maternal-fetal interface. **Nature** (2023). DOI: [10.1038/s41586-023-06298-9](https://doi.org/10.1038/s41586-023-06298-9)

- Preprint: bioRxiv (2022). DOI: [10.1101/2021.09.08.459490](https://doi.org/10.1101/2021.09.08.459490)
- Related coverage: [Nature](#), [Nature](#)



Bai Y, Zhu B, Oliveria JP, Cannon BJ, Feyaerts D, Bosse M, Vijayaragavan K, **Greenwald NF**, Phillips D, Schürch CM, Naik SM, Ganio EA, Gaudilliere B, Rodig SJ, Miller MB, Angelo M, Bendall SC, Rovira-Clavé X<sup>§</sup>, Nolan GP<sup>§</sup>, Jiang S<sup>§</sup>. Expanded vacuum-stable gels for multiplexed high-resolution spatial histopathology. **Nature Communications** (2023). DOI: [10.1038/s41467-023-39616-w](https://doi.org/10.1038/s41467-023-39616-w)

Vijayaragavan K\*, Cannon BJ\*, Tebaykin D, Bossé M, Baranski A, Oliveria JP, Bukhari SA, Mrdjen D, Corces MR, McCaffrey EF, **Greenwald NF**, Sigal Y, Marquez D, Khair Z, Bruce T, Goldston M, Bharadwaj A, Montine KS, Angelo RM, Montine TJ, Bendall SC. Single-cell spatial proteomic imaging for human neuropathology. **Acta Neuropathologica Communications** (2022). DOI: [10.1186/s40478-022-01465-x](https://doi.org/10.1186/s40478-022-01465-x)

- Preprint: bioRxiv (2022). DOI: [10.1101/2022.03.02.482730](https://doi.org/10.1101/2022.03.02.482730)

Rovira-Clavé X\*, Drainas AP\*, Jiang S\*, Bai Y, Baron M, Zhu B, Dallas AE, Lee MC, Chu TP, Holzem A, Ayyagari R, Bhattacharya D, McCaffrey EF, **Greenwald NF**, Markovic M, Coles GL, Angelo M, Bassik MC, Sage J<sup>§</sup>, Nolan GP<sup>§</sup>. Spatial epitope barcoding reveals clonal tumor patch behaviors. **Cancer Cell** (2022). DOI: [10.1016/j.ccell.2022.09.014](https://doi.org/10.1016/j.ccell.2022.09.014)

- Preprint: bioRxiv (2022). DOI: [10.1101/2021.06.29.449991](https://doi.org/10.1101/2021.06.29.449991)

Dubois FPB, Shapira O, **Greenwald NF**, Zack T, Wala J, Tsai JW, Crane A, Baguette A, Hadjadj D, Harutyunyan AS, Kumar KH, Blattner-Johnson M, Vogelzang J, Sousa C, Kang KS, Sinai C, Wang DK, Khadka P, Lewis K, Nguyen L, Malkin H, Ho P, O'Rourke R, Zhang S, Gold R, Deng D, Serrano J, Snuderl M, Jones C, Wright KD, Chi SN, Grill J, Kleinman CL, Goumnerova LC, Jabado N, Jones DTW, Kieran MW, Ligon KL<sup>§</sup>, Beroukheim R<sup>§</sup>, Bandopadhyay P<sup>§</sup>. Structural variants shape driver combinations and outcomes in pediatric high-grade glioma. **Nature Cancer** (2022). DOI: [10.1038/s43018-022-00403-z](https://doi.org/10.1038/s43018-022-00403-z)

- Related coverage: [Nature Cancer](#)

Ghahremani P, Li Y, Kaufman A, Vanguri R, **Greenwald NF**, Angelo M, Hollmann TJ, Nadeem S. Deep learning-inferred multiplex immunofluorescence for immunohistochemical image quantification. **Nature Machine Intelligence** (2022). DOI: [10.1038/s42256-022-00471-x](https://doi.org/10.1038/s42256-022-00471-x)

Jiang S\*, Chan CN\*, Rovira-Clavé X\*, Chen H, Bai Y, Zhu B, McCaffrey E, **Greenwald NF**, Liu C, Barlow GL, Weirather JL, Oliveria JP, Nakayama T, Lee IT, Matter MS, Carlisle AE, Philips D, Vazquez G, Mukherjee N, Busman-Sahay K, Nekorchuk M, Terry M, Younger S, Bosse M, Demeter J, Rodig SJ, Tzankov A, Goltsev Y, McIlwain DR, Angelo M, Estes JD<sup>§</sup>, Nolan GP<sup>§</sup>. Combined protein and nucleic acid imaging reveals virus-dependent B cell and macrophage immunosuppression of tissue microenvironments. **Immunity** (2022). DOI: [10.1016/j.immuni.2022.03.020](https://doi.org/10.1016/j.immuni.2022.03.020)

- Preprint: bioRxiv (2021). DOI: [10.1101/2021.05.21.444548](https://doi.org/10.1101/2021.05.21.444548)

Khadka P\*, Reitman ZJ\*, Lu S, Buchan G, Gionet G, Dubois F, Carvalho DM, Shih J, Zhang S, **Greenwald NF**, Zack T, Shapira O, Pelton K, Hartley R, Bear H, Georgis Y, Jarmale S, Melanson R, Bonanno K, Schoolcraft K, Miller PG, Condurat AL, Gonzalez EM, Qian K, Morin E, Langhnoja J, Lupien LE, Rendo V, Digiacoio J, Wang D, Zhou K, Kumbhani R, Guerra Garcia ME, Sinai CE, Becker S, Schneider R, Vogelzang J, Krug K, Goodale A, Abid T, Kalani Z, Piccioni F, Beroukheim R, Persky NS, Root DE, Carcaboso AM, Ebert BL, Fuller C, Babur O, Kieran MW, Jones C, Keshishian H, Ligon KL, Carr SA, Phoenix TN<sup>§</sup>, Bandopadhyay P<sup>§</sup>. PPM1D mutations are oncogenic drivers of de novo diffuse midline glioma formation. **Nature Communications** (2022). DOI: [10.1038/s41467-022-28198-8](https://doi.org/10.1038/s41467-022-28198-8)



Risom T, Glass DR, Averbukh I, Liu CC, Baranski A, Kagel A, McCaffrey EF, **Greenwald NF**, Rivero-Gutiérrez B, Strand SH, Varma S, Kong A, Keren L, Srivastava S, Zhu C, Khair Z, Veis DJ, Deschryver K, Vennam S, Maley C, Hwang ES, Marks JR, Bendall SC, Colditz GA, West RB, Angelo M. Transition to invasive breast cancer is associated with progressive changes in the structure and composition of tumor stroma. **Cell** (2022). DOI: [10.1016/j.cell.2021.12.023](https://doi.org/10.1016/j.cell.2021.12.023)

- Preprint: bioRxiv (2021). DOI: [10.1101/2021.01.05.425362](https://doi.org/10.1101/2021.01.05.425362)

McCaffrey EF, Donato M, Keren L, Chen Z, Delmastro A, Fitzpatrick MB, Gupta S, **Greenwald NF**, Baranski A, Graf W, Kumar R, Bosse M, Fullaway CC, Ramdial PK, Forgó E, Jojic V, Van Valen D, Mehra S, Khader SA, Bendall SC, van de Rijn M, Kalman D, Kaushal D, Hunter RL, Banaei N, Steyn AJC, Khatri P, Angelo M. The immunoregulatory landscape of human tuberculosis granulomas. **Nature Immunology** (2022). DOI: [10.1038/s41590-021-01121-x](https://doi.org/10.1038/s41590-021-01121-x)

- Preprint: bioRxiv (2020). DOI: [10.1101/2020.06.08.140426](https://doi.org/10.1101/2020.06.08.140426)

**Greenwald NF\***, Miller G\*, Moen E, Kong A, Kagel A, Fullaway CC, McIntosh BJ, Leow K, Schwartz MS, Dougherty T, Pavelchek C, Cui S, Camplisson I, Bar-Tal O, Singh J, Fong M, Chaudhry G, Abraham Z, Mosely J, Warshawsky S, Soon E, Greenbaum S, Risom T, Hollmann T, Keren L, Graf W, Angelo M<sup>§</sup>, Van Valen D<sup>§</sup>. Whole-cell segmentation of tissue images with human-level performance using large-scale data annotation and deep learning. **Nature Biotechnology** (2021). DOI: [10.1038/s41587-021-01094-0](https://doi.org/10.1038/s41587-021-01094-0)

- Preprint: bioRxiv (2021). DOI: [10.1101/2021.03.01.431313](https://doi.org/10.1101/2021.03.01.431313)

Driver J, Hoffman SE, Tavakol S, Woodward E, Maury EA, Bhavé V, **Greenwald NF**, Nassiri F, Aldape K, Zadeh G, Choudhury A, Vasudevan HN, Magill ST, Raleigh DR, Abedalthagafi M, Aizer AA, Alexander BM, Ligon KL, Reardon DA, Wen PY, Al-Mefty O, Ligon AH, Dubuc AM, Beroukheim R, Claus EB, Dunn IF, Santagata S<sup>§</sup>, Bi WL<sup>§</sup>. A molecularly integrated grade for Meningioma. **Neuro Oncology** (2021). DOI: [10.1093/neuonc/noab213](https://doi.org/10.1093/neuonc/noab213)

Bannon D, Moen E, Schwartz M, Borba E, Kudo T, **Greenwald NF**, Vijayakumar V, Chang B, Pao E, Osterman E, Graf W, Van Valen D. DeepCell Kiosk: Scaling deep learning-enabled cellular image analysis with Kubernetes. **Nature Methods** (2021). DOI: [10.1038/s41592-020-01023-0](https://doi.org/10.1038/s41592-020-01023-0)

- Preprint: bioRxiv (2020). DOI: [10.1101/505032](https://doi.org/10.1101/505032)

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- Preprint: bioRxiv (2019). DOI: [10.1101/2020.01.17.909796](https://doi.org/10.1101/2020.01.17.909796)
- Related coverage: [Nature Methods](#)

Jaimes C, Vajapeyam S, Brown D, Kao PC, Ma C, Greenspan L, Gupta N, Goumnerova L, Bandopahayay P, Dubois F, **Greenwald NF**, Zack T, Shapira O, Beroukheim R, Ligon KL, Chi S, Kieran MW, Wright KD, Poussaint TY. MR Imaging Correlates for Molecular and Mutational Analyses in Children with Diffuse Intrinsic Pontine Glioma. **American Journal of Neuroradiology** (2020). DOI: [10.3174/ajnr.A6546](https://doi.org/10.3174/ajnr.A6546)

Peter Brown P, **RELISH Consortium**, Zhou Y. Large expert-curated database for benchmarking document similarity detection in biomedical literature search. **Database** (2019). DOI: [10.1093/database/baz085](https://doi.org/10.1093/database/baz085)

Keren L\*, Bosse M\*, Thompson S, Risom T, Vijayaragavan K, McCaffrey E, Marquez D, Angoshtari R, **Greenwald NF**, Fienberg H, Wang J, Kambham N, Kirkwood D, Nolan G, Montine TJ, Galli SJ, West R, Bendall SC, Angelo M. MIBI-TOF: A multiplexed imaging platform relates cellular phenotypes and tissue structure. **Science Advances** (2019). DOI: [10.1126/sciadv.aax5851](https://doi.org/10.1126/sciadv.aax5851)

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