Youyun Zheng

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PROFESSIONAL PROFILES

Google Scholar: Youyun Zheng
LinkedIn: https://www.linkedin.com/in/youyun-peter-zheng-970777106/

EDUCATION

Emory University Aug. 2014 – May. 2018
BS in Biology, BA in Computer Science *GPA 3.91/4*

Harvard Medical School Aug. 2020 – Present
MD/PhD Program (Pathways track, Bioinformatics and Integrative Genomics PhD Program)

RESEARCH EXPERIENCE

Dana Farber Cancer Institute Dec. 2022 - Present
Rotation Student
Department of Cancer Biology
(Principal Investigator: Dr. Rameen Beroukhim)

- Leveraging large cohort of cancer whole genome sequencing data to study the mechanism of insertions in structural variant breakpoints
- Exploring the role of intra-tumoral pathogens in immune checkpoint blockade response in glioblastoma using patient derived samples

Boston Children's Hospital Sept. 2022 –Nov. 2022
Rotation Student
Department of Pediatric Oncology
(Principal Investigator: Dr. Vijay Sankaran)

- Leveraged findings from previous large scale population genetics studies to identify cell types of interest for over 40 diseases in single cell RNA sequencing data sets
- Using machine learning models for cell type prediction in various state of the art large scale single cell tissue atlases

Dana Farber Cancer Institute Jun. 2020 – May 2021
Rotation Student
Department of Medical Oncology
(Principal Investigator: Dr. Eliezer Van Allen)

- Using LSTM models to predict chronological sequence of occurrence for single

nucleotide variations in a cohort of 1k melanoma whole exome sequencing data
- Identify alternative approaches to formatting training data to reduce sparsity for better performance and interpretability of prediction results

Massachusetts General Hospital Sept. 2020 – Jun. 2022
Student Researcher
MESH Incubator
(Principal Investigator: Dr. Marc Succi)

- Leveraging natural language processing to predict radiology utilization based on ER nurse triage notes for operation efficiency
- Investigate differential imaging utilization rates and their socioeconomic impact in patients with and without limited English proficiency

Memorial Sloan Kettering Cancer Center Jun. 2018– Jun. 2020
Bioinformatics Technician
Center for Molecular Oncology
(Principal Investigator: Dr. Michael Berger)

- Leveraged cerebrospinal fluid (CSF) cell-free DNA (cfDNA) sequencing to capture the real-time mutational landscape of gliomas, thereby providing a minimally invasive genomic testing alternative that allows for longitudinal disease monitoring and treatment guidance.
- Analyzed mutation data to confirm that our rectal cancer organoids reflect not only the mutational spectrum of their paired derivation cancer tissue but also a cohort of 291 rectal cancer specimens collected at Memorial Hospital.
- Led the effort in identifying genomic correlates of response in a phase II clinical trial on the usage of pembrolizumab in patients with advanced adrenocortical carcinoma.
- Contributed to the development and calibration of a genomics based machine learning tumor type classifier and implemented the classifier on the web sign-out portal of the MSKCC pathology department.
- Currently leading the analysis on two similar projects using ultra-deep sequencing plasma cfDNA liquid biopsy to track disease progression and identify treatment resistance mechanisms in ongoing clinical trials.
- Led the development of the rearrangement and fusion calling pipelines for our prospective ultra-deep plasma cfDNA and targeted FFPE RNA sequencing assay

MD Anderson Cancer Center Jun. 2017 – Aug. 2017
Summer Research Student
Department of Genomic Medicine
(Principal Investigator: Dr. Andrew Futreal)

- Categorized genomic subtypes of osteosarcoma leveraging machine learning algorithms and whole genome and transcriptome sequencing data
- Conducted artifact filtering and consensus calling utilizing rearrangement (Breakdancer, Lumpy, BRASS) and fusion (MapSplice, Tophat-Fusion, FusionCatcher) calling algorithms
- Performed detailed analysis on structural variation profiles of osteosarcoma samples

Emory University Rollins School of Public Health *(Principal Investigator: Dr. Zhengjia Chen)*
Undergraduate Researcher
Department of Biostatistics and Bioinformatics

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Aug. 2016 – May. 2018

- Examined and calculated key operating characteristics of Phase I cancer clinical trial with standard 3+3 and EWOC-NETS design
- Implemented back end code using Markov Chain Monte Carlo and other probability calculations
- Built front end of two software for displaying simulation and calculation results using Rshiny
- Achieved sufficiency in R language and various packages through self-learning utilizing various online resources

MD Anderson Cancer Center Jun. 2016 – Aug. 2016
Summer Research Student
Department of Bioinformatics and Computational Biology
(Principal Investigator: Dr. Arvind Rao)

- Identified associations between MRI imaging features and protein expression levels in breast cancer for imaging guided diagnostics
- Expedited research projects by automating chart review of over 2,000 MRI scans and other related patient information
- Performed high-dimensional regression and multiple testing correction analysis

Emory University School of Medicine Jan. 2015 – May. 2016
Undergraduate Researcher
Department of Pharmacology
(Principal Investigator: Dr. Haian Fu)

- Validated and gained insights into oncologic protein-protein interaction (PPI) between phosphatidylinositol-4,5-bisphosphate 3-kinase catalytic subunit alpha (PIK3CA) hotspot mutant E545K and insulin receptor substrate 1 (IRS1) as target for personalized therapies
- Interpreted and illustrated experimental results through a 15-page progress report and poster presentation

HONORS AND AWARDS

MD Anderson Cancer Center CPRIT-CURE Summer Research Scholar Jun. 2017 – Aug. 2017

MD Anderson Cancer Center Summer Undergraduate Research Program (SURP) Jun. 2016 – Aug. 2016

Emory Civic Scholar Program May. 2016 – May. 2017

Phi Beta Kappa Honor Society Sept. 2017

PUBLICATIONS

Youyun Zheng

- Rosen, E. Y., Won, H. H., **Zheng, Y.**, Cocco, E., Selcuklu, D., Gong, Y., ... & Drilon, A. The evolution of RET inhibitor resistance in RET-driven lung and thyroid cancers. Nat Commun 13, 1450 (2022). https://doi.org/10.1038/s41467-022-28848-x

- Raj, N., **Zheng, Y.**, Hauser, H., Chou, J., Rafailov, J., Bou-Ayache, J., Sawan, P., Chaft, J., Chan, J., Perez, K., Rudin, C., Tang, L., & Reidy-Lagunes, D. (2021). Ribociclib and everolimus in well-differentiated foregut neuroendocrine tumors, Endocrine-Related Cancer, 28(4), 237-246. https://doi.org/10.1530/ERC-20-0446

- Wu, C.-C., Beird, H.C., Andrew Livingston, J., Advani, S., Mitra, A., Cao, S., Reuben, A., Ingram, D., Wang, W.-L., Ju, Z., Hong Leung, C., Lin, H., **Zheng, Y.**, Roszik, J., Wang, W., Patel, S., Benjamin, R.S., Somaiah, N., Conley, A.P., Mills, G.B., Hwu, P., Gorlick, R., Lazar, A., Daw, N.C., Lewis, V., Futreal, P.A., 2020. Immuno-genomic landscape of osteosarcoma. Nat. Commun. 11, 1008. https://doi.org/10.1038/s41467-020-14646-w

- Penson, A., Camacho, N., **Zheng, Y.**, Varghese, A.M., Al-Ahmadie, H., Razavi, P., Chandarlapaty, S., Vallejo, C.E., Vakiani, E., Gilewski, T., Rosenberg, J.E., Shady, M., Tsui, D.W.Y., Reales, D.N., Abeshouse, A., Syed, A., Zehir, A., Schultz, N., Ladanyi, M., Solit, D.B., Klimstra, D.S., Hyman, D.M., Taylor, B.S., Berger, M.F., 2019. Development of Genome-Derived Tumor Type Prediction to Inform Clinical Cancer Care. JAMA Oncology. https://doi.org/10.1001/jamaoncol.2019.3985

- Raj, N., **Zheng, Y.**, Kelly, V., Katz, S.S., Chou, J., Do, R.K.G., Capanu, M., Zamarin, D., Saltz, L.B., Ariyan, C.E., Untch, B.R., O'Reilly, E.M., Gopalan, A., Berger, M.F., Olino, K., Segal, N.H., Reidy-Lagunes, D.L., 2019. PD-1 Blockade in Advanced Adrenocortical Carcinoma. J. Clin. Oncol. JCO.19.01586. https://doi.org/10.1200/JCO.19.01586

- Ganesh, K., Wu, C., O'Rourke, K.P., Szeglin, B.C., **Zheng, Y.**, Sauvé, C.-E.G., Adileh, M., Wasserman, I., Marco, M.R., Kim, A.S., Shady, M., Sanchez-Vega, F., Karthaus, W.R., Won, H.H., Choi, S.-H., Pelossof, R., Barlas, A., Ntiamoah, P., Pappou, E., Elghouayel, A., Strong, J.S., Chen, C.-T., Harris, J.W., Weiser, M.R., Nash, G.M., Guillem, J.G., Wei, I.H., Kolesnick, R.N., Veeraraghavan, H., Ortiz, E.J., Petkovska, I., Cercek, A., Manova-Todorova, K.O., Saltz, L.B., Lavery, J.A., DeMatteo, R.P., Massagué, J., Paty, P.B., Yaeger, R., Chen, X., Patil, S., Clevers, H., Berger, M.F., Lowe, S.W., Shia, J., Romesser, P.B., Dow, L.E., Garcia-Aguilar, J., Sawyers, C.L., Smith, J.J., 2019. A rectal cancer organoid platform to study individual responses to chemoradiation. Nat. Med. 25, 1607–1614. https://doi.org/10.1038/s41591-019-0584-2

- Miller, A.M., Shah, R.H., Pentsova, E.I., Pourmaleki, M., Briggs, S., Distefano, N., **Zheng, Y.**, Skakodub, A., Mehta, S.A., Campos, C., Hsieh, W.-Y., Selcuklu, S.D., Ling, L., Meng, F., Jing, X., Samoila, A., Bale, T.A., Tsui, D.W.Y., Grommes, C., Viale, A., Souweidane, M.M., Tabar, V., Brennan, C.W., Reiner, A.S., Rosenblum, M., Panageas, K.S., DeAngelis, L.M., Young, R.J., Berger, M.F., Mellinghoff, I.K., 2019. Tracking tumour evolution in glioma through liquid biopsies of cerebrospinal fluid. Nature 565, 654–658. https://doi.org/10.1038/s41586-019-0882-3

- Chen, Z.*, **Zheng, Y.***, Wang, Z., Kutner, M., Curran, W.J., Kowalski, J., 2018. Interactive calculator for operating characteristics of phase I cancer clinical trials using standard 3+3 designs. Contemp. Clin. Trials Commun. 12, 145–153. https://doi.org/10.1016/j.conctc.2018.10.006 (Co-first author)

- Lehrer, M., Bhadra, A., Aithala, S., Ravikumar, V., **Zheng, Y.**, Dogan, B., Bonaccio, E., Burnside, E.S., Morris, E., Sutton, E., Whitman, G.J., Net, J., Brandt, K., Ganott, M., Zuley, M., Rao, A., 2018. High-dimensional regression analysis links magnetic resonance imaging features and protein expression and signaling pathway alterations in breast invasive carcinoma. Oncoscience 5, 39–48. https://doi.org/10.18632/oncoscience.397

TEACHING AND MENTORSHIP

Class Mentor and TA for Emory Emergency Medical Service training course May. 2016 – Aug. 2017

Rotation Student (Ola Oni) Tri-I CBM PhD student Jul. 2019 – Nov. 2019

COMMUNICATIONS AND PRESENTATIONS

POSTER COMMUNICATION

Clinical validation of a genomics-based classifier to predict tissue of origin from targeted tumor sequencing.
American Association for Cancer Research Annual Conference
Atlanta, GA, USA - 04/2019

Identifying Patterns in Rearrangement Profiles in Osteosarcoma Patients.
MD Anderson Cancer Center Summer Undergraduate Research Symposium
Houston, TX, USA - 08/2017

Calculation of 5 Key Statistical Properties for Phase I Cancer Clinical Trial Designs.
Emory University Undergraduate Research Symposium
Atlanta, GA, USA - 05/2017

MR Images and Proteomics Data Predicting Diseases, Functions and Canonical Pathways.
MD Anderson Cancer Center Summer Undergraduate Research Symposium
Houston, TX, USA - 08/2016

Screening of Anti-cancer Drug Based on the Tumor Specific Interaction Between p110α-E545K and IRS1.
Emory University Undergraduate Research Symposium
Atlanta, GA, USA - 05/2016

ORAL PRESENTATION

Interactive Software for Dose Calculation and Simulation of Phase I Cancer Clinical Trial Using EWOC-NETS Design.

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Emory University Department of Biology Honors Thesis Defense
Atlanta, GA, USA - 05/2018

CONFERENCE ABSTRACTS

Association of Language with Image Utilization in an Emergency Department.
Radiological Society of North America (1st author)
Chicago, IL, USA - 11/2021

Next-level Imaging Triage: Predicting Imaging Utilization based on Emergency Department Initial Triage Notes using Machine Learning and Natural Language Processing.
American Society Emergency Radiology (1st author)
Tempa, FL, USA - 09/2021

Say it on Rounds: Association of Limited English Proficiency (LEP) with Increased Imaging Utilization in an Emergency Department.
American Society Emergency Radiology (2nd author)
Tempa, FL, USA - 09/2021

Association of Language with Length of Stay in an Emergency Department.
American Society Emergency Radiology (1st author)
Tempa, FL, USA - 09/2021

Efficacy and safety of pembrolizumab in patients with advanced adrenocortical carcinoma.
American Society of Clinical Oncology Annual Conference (2nd author)
Baltimore, MD, USA - 05/2019

Clinical validation of a genomics-based classifier to predict tissue of origin from targeted tumor sequencing.
American Association for Cancer Research Annual Conference (1st author)
Atlanta, GA, USA - 04/2019

A bioinformatics framework for high-sensitivity detection and monitoring of oncogenic gene fusions in plasma cfDNA.
American Association for Cancer Research Annual Conference (7th author)
Atlanta, GA, USA - 04/2019

Parallel genomic and immune profiling of relapsed and metastatic osteosarcoma to reveal bases of low immunogenicity.
American Society of Clinical Oncology Annual Conference (12th author)
Chicago, IL, USA - 05/2018

Genome and transcriptome profiling of relapsed and metastatic osteosarcoma.
American Society of Clinical Oncology Annual Conference (12th author)
Chicago, IL, USA - 05/2018

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TECHNICAL SKILLS

- **Programming**: R, Bash, Python, Java, MySQL and PHP *(ordered by expertise)*.
- **Analysis**: variant calling (SNVs, SCNA, SVs), MSI calling, RNAseq, capture RNAseq, enrichment analysis, sequencing analysis.
- **Software**: Vardict, FACETS, Manta, Delly, MSISensor, LOHHLA, Arriba, FusionCatcher, STAR, samtools, IGV, R studio, GitHub, VSCode, Microsoft Works, illustrator, GIMP
- **Operative systems:** Linux, OS X, Windows.

CERTIFICATIONS AND COURSES

Data mining
Emory University, Department of Computer Science
Atlanta, USA - 01/2018.

Data structures and algorithms
Emory University, Department of Computer Science
Atlanta, USA - 01/2015.

Database systems
Emory University, Department of Computer Science
Atlanta, USA - 01/2016.

Genetics: a human perspective
Emory University, Department of Biology
Atlanta, USA - 01/2018.

Advanced Emergency Medical Technician (AEMT)
Emory Emergency Medical Service, Emory University Division of Public Safety
Atlanta, USA - 08/2017.

SERVICE AND LEADERSHIP EXPERIENCES

Emory Emergency Medical Service Aug. 2015 – May. 2018
Supervisor Advanced EMT, Field Training Officer
Emory University Division of Public Safety

- Attained Georgia and national license after completing one year of medical training
- Managed patient care as an Advanced Emergency Medical Technician in prehospital setting
- Mentored the incoming EMT class acting as instructor in lab sessions to facilitate teaching
- Trained and evaluated new members for quality assurance and improvements in patient care
- Supervised primary unit in 24 hour shifts and provided administrative and medical support

Center for Black Women Wellness *Medical Volunteer*

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Safety Net Clinic Sep. 2016 – Dec. 2017

- Facilitated patient care in free clinic by taking vitals and medical history of incoming patients
- Developed patient rapport through communication and lessened workload of physicians

Winship Cancer Institute Sep. 2016 – May. 2017
Medical Volunteer
Infusion Pharmacy

- Accelerated inventory process by restocking equipment for making chemo-treatments
- Simplified lab technicians' working processes in a sterile working environment