ALEXANDER FERRENA

Ph.D. Candidate in Cancer Bioinformatics
at Albert Einstein College of Medicine
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EDUCATION

August 2019 – Expected Graduation, May 2024
Ph.D. Candidate, Albert Einstein College of Medicine (AECOM)
Ph.D. in Clinical Investigation, Institute for Clinical and Translational Research
Primary Mentor, Dr. Deyou Zheng (Department of Genetics)
Co-mentor, Dr. Bang Hoang (Department of Orthopedics)

September 2017 – May 2019
M.A. Biotechnology, Columbia University
Department of Biological Sciences, Graduate School of Arts and Sciences
Thesis: *The Impact of Aging on Lung Adenocarcinoma*. Research mentored by Dr. Tuomas Tammela (Memorial Sloan Kettering Cancer Center)

September 2012 – May 2016
B.A. Biology, New York University
College of Arts and Sciences

RESEARCH EXPERIENCE

June 2020 – Present
Ph.D. Candidate
Mentored by Dr. Deyou Zheng & Dr. Bang Hoang, AECOM / Montefiore
Pre-clinical research in targeted therapy for Osteosarcoma. Studying the function of the oncogene *SKP2*, predicting patient response to anti-*SKP2* therapies, and studying clinical correlates of tumor heterogeneity using high throughput sequencing, including bulk and single-cell RNAseq data analysis.

May 2018 – June 2020
Computational Biology Research Assistant
Mentor, Dr. Tuomas Tammela, Memorial Sloan Kettering Cancer Center
Masters thesis titled "The Impact of Aging on Lung Adenocarcinoma". Analyzed high-throughput sequencing data such as single-cell RNAseq, CITE-seq, and others.

June 2016 – September 2017
Bioinformatics Internship
Mentor, Dr. David Gresham, NYU Center for Genomics and Systems Biology
Studied metabolic response of yeast to environment via bulk RNAseq data analysis.

June 2015 – May 2016
Undergraduate Research Assistant
Mentor, Dr. Stephen Small, NYU Department of Genetics
Studied transcription regulation of development in early *Drosophila* embryos.

BIOTECHNOLOGY INDUSTRY EXPERIENCE

August 2022 – March 2023
Singulomics Corporation, Bioinformatics Consultant
Developed an efficient, modular analysis pipeline for spatial transcriptomics data for this biotechnology company that provides genomics services.

TECHNICAL SKILLS

September 2015 – Present

Programming: R, Unix shells, Python
Advanced, daily use of **R** for genomic data; extensive familiarity with software packages for transcriptomic data analysis including Seurat, EdgeR, InferCNV, and others. Daily use of **Unix** for file sorting, directory navigation, etc. Familiarity with **Python** for genomics including libraries such as Scanpy, scVelo, and Cellrank.

June 2016 – Present

Cloud Computing: HPC (SLURM and Sun Grid), AWS
Extensive usage of High-Performance Clusters via the SLURM and Sun Grid Engine schedulers as well as Amazon Web Services for big data analysis.

FELLOWSHIP AWARDS

May 2020

Fellowship Award, PhD program in Clinical Investigation (PCI)
Applied for and was accepted to this highly competitive fellowship and training program offered to PhD students at Einstein with research proposals focused on biostatistics and clinical research.

LEADERSHIP EXPERIENCE

January 2021 – Present

Founder & President, Einstein-Montefiore Omics Club
Founded this student organization to facilitate networking, collaboration, and education around -omics technologies. Organized a regular seminar series focused on cutting edge genomic methods development and biological applications.

September 2019 – Present

Vice-President, Einstein-Biotech Club
Served on the executive board of this club promoting student engagement and education with biotechnology. Organized many networking events.

November 2019 – Present

Elected Councilor, Einstein Diversity and Inclusion (D&I) Council
Elected to serve on this committee on diversity enhancement by the membership of the Graduate Student Council at Albert Einstein College of Medicine.

September 2017 – May 2019

President, Columbia Biotechnology Association (GRO-Biotech CU)
Served as President of this industry-oriented networking group. Organized the 2019 Graduate Research Organizations Conference at Columbia

TEACHING EXPERIENCE

September 2017 – December 2017

Teaching Assistant, Intro to Genomic Information and Technology
Worked as a teaching assistant for this genomic data science course taught by Dr. Dimitris Anastassiou at Columbia

INTERESTS AND HOBBIES

August 2018 – Present

My Aquarium, Founder and Chief Executive Fish-Fanatic
A fun and relaxing pastime is to watch the fish and plants in my tropical aquarium.

HONORS AND AWARDS

September 2019 — **Student Spotlight, Columbia Graduate School of Arts and Sciences**
Received distinction for academic and research performance.

May 2015 — **Best Poster Award, NYU Undergraduate Research Conference**
Awarded best in group for poster presentation titled "Identification and Characterization of *Orthodenticle*-Dependent Enhancers

PRESENTATIONS

October 2023 — **Musculoskeletal Tumor Society (MSTS), Podium presentation**
Gave a talk at this orthopedic oncology-focused meeting titled "Single-cell transcriptomics of osteosarcoma murine models with SKP2 modulation predicts potent synergistic therapies".

April 2023 — **American Association for Cancer Research (AACR), Poster presentation**
Designed and presented a poster at this massive cancer-focused conference titled "SKP2 knockout induces macrophage infiltration in p53/Rb1 null transgenic mouse models of osteosarcoma and drives gene expression correlated with improved survival in patients".

December 2022 — **Musculoskeletal Tumor Society (MSTS), Podium presentation**
Gave a talk at this orthopedic oncology-focused meeting titled "SKP2 knockout in Rb1/p53 deficient transgenic mouse models of osteosarcoma improves survival via induction of macrophage infiltration".

September 2022 — **International Society for Limb Salvage (ISOLS), Podium presentation**
Gave a talk at this orthopedic oncology-focused meeting titled "Knockout of SKP2 in pre-clinical transgenic mouse models of OS induces macrophage infiltration and improves survival".

May 2015 — **NYU Undergraduate Research Conference, Poster presentation**
Designed and presented a poster titled "Identification and Characterization of *Orthodenticle*-Dependent Enhancers." Won an award for best poster in the session.

PUBLICATIONS

October 2023

SKP2 knockout in Rb1/p53 deficient mouse models of osteosarcoma induces immune infiltration and drives a transcriptional program with a favorable prognosis. *Molecular Cancer Therapeutics, October 2023.*
Ferrena A, Wang J, Zhang R, Karadal-Ferrena B, Al-Hardan W, Singh W, Borjihan H, Schwartz E, Zhao H, Oktay M, Yang R, Geller D, Hoang B, and Zheng D.

May 2023
(Preprint)

Six3 and Six6 jointly regulate the identities and developmental trajectories of multipotent retinal progenitor cells in the mouse retina.
Preprint posted to bioRXiv May 2023.
Ferrena A, Zhang X, Shrestha R, Zheng D, Liu W.

March 2023

Single cell transcriptomics uncovers a non-autonomous Tbx1-dependent genetic program controlling cardiac neural crest cell deployment and progression.
Nature Communications, 2023 March.
De Bono C, Liu Y, **Ferrena A**, Valentine A, Zheng D, Morrow B.

October 2022

Systematic comparison of pancreatic ductal adenocarcinoma models identifies a conserved highly plastic basal cell state. *Cancer Research, 2022 October.*
Pitter K, Grbovic-Huezo O, Joost S, Singhal A, Blum M, Wu K, Holm M, **Ferrena A**, Bhutkar A, Hudson A, Lecomte N, de Stanchina E, Chaligne R, Iacobuzio-Donahue C, Pe'er D, and Tammela T.

October 2022
(Under review)

Targeted inhibition of SCF^{SKP2} confers anti-tumor activities resulting in a survival benefit in osteosarcoma. Submitted to *Oncogene* October 2022.
Wang J *, **Ferrena A *,** Singh S, Zhang R, Viscarret V, Al-Harden W, Aldahamsheh O, Borjihan H, Singla A, Yaguare S, Tingling J, Zi X, Yungtai L, Gorlick R, Schwartz L, Zhao H, Yang R, Geller D, Zheng D, and Hoang B.
*** Co-first author**

February 2021

The interaction of SKP2 with p27 enhances the progression and stemness of osteosarcoma. *Annals of the New York Academy of Sciences, 2021 April.*
Wang J, Aldahamsheh O, **Ferrena A**, Borjihan H, Singla A, Yaguare S, Singh S, Viscarret V, Tingling J, Zi X, Lo Y, Gorlick R, Zheng D, Schwartz EL, Zhao H, Yang R, Geller DS, Hoang B.

PROFESSIONAL REFERENCES

Dr. Deyou Zheng (PhD), Primary PhD Thesis Advisor

- **Position**: Professor, Departments of Genetics, Neuroscience, and Neurology
- **Location**: Albert Einstein College of Medicine
- **Contact:** https://www.einsteinmed.edu/faculty/10976/deyou-zheng/
- **Relationship**: Deyou has been my primary advisor during my PhD. He is an expert in genetics, genomics, and bioinformatics. Deyou has a long track record of leading genomics and transcriptomics studies in a variety of contexts from cancer, to embryonic development, to neuroscience, and has mentored many students through the PhD program at Einstein.

Dr. Bang Hoang (MD). Secondary PhD Thesis Advisor

- **Position**: Professor, Department of Orthopedic Surgery
- **Location**: Albert Einstein College of Medicine, Montefiore Medical Center
- **Contact:** https://www.einsteinmed.edu/faculty/14186/bang-hoang/
- **Relationship**: Bang has been my co-mentor during my PhD. He is an orthopedic surgeon and expert in patient care for osteosarcoma and other sarcomas along with directing a research lab. He serves as the Chair of the Research Committee for the Musculoskeletal Tumor Society.