TAMARA JAFAR

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EDUCATION

University of Southern California Present
PhD in Computational Neuroscience
Advisors: Dr. Andrei Irimia

UC Berkeley May 2021
BS in Biology
BA in Public Health
Minor in Human Centered Design; Certificate in Science, Technology, and Society

SKILLS

- Python, Matlab, Rstudio, SQL, C#, Juptyer Notebook, SAS, Redcap Database, SevenBridges, Excel
- CAD, Unity, Fusion 360, EPIC, 3D Slicer, BrainSuite, Figma, Adobe Illustrator, Photoshop
- Languages: English and Arabic

PROFESSIONAL EXPERIENCE

Graduate Research Fellow, University of Southern California Present
- Computational neuroscience doctoral student in the Irimia Lab integrating interpretable deep learning, genomics, and neuroimaging to study risk factors of Alzheimer's disease.
- Committee advisors: Dr. Paul Thompson, Dr. Jeiran Choupan, Dr. Meredith Braskie, Dr. Neda Jahanshad.

Bioinformatics Scientist and Business Development West Coast Lead, AtlasXomics Inc. 2022-2023
- Yale Bioengineering spin-out of Dr. Ron Fang's research.
- Developing novel discovery platform to provide clinicians and researchers multi-omics tissue atlases.
- Create multi-omic maps (proteomics, transcriptomics, and epigenomics) in tissue at cellular resolution using our AtlasBrowser and AtlasXplorer technology.
- Analyze data and create bioinformatics reports to communicate findings to clinicians and researchers.
- Met with clients, potential customers, investors, and research labs.

Neurosurgery Research Fellow, Yale School of Medicine 2021-2023
- Yale Clinical Neuroscience Neuroanalytics Laboratory
- PI: Dr. Dennis Spencer, Dr. Robert Duckrow, Dr. Mani Ratnesh Sandhu
- Full-time researcher involved in basic, translational, computational, and clinical projects
- Led daily research meetings and communicated technical results to team, managed undergraduate researchers.
- Translational:
    - Developed a high resolution anatomical human brain atlas with localized multimodal data
    - Built the Yale Epilepsy Surgery Research Database in Redcap; clinical data integration with EMR
    - Functional stimulation mapping: Studied language lateralization in adult TLE patients
    - Created virtual and augmented reality visualizations for epilepsy surgery conference using C#
    - Built python code to reduce fMRI image processing time by 90%.
    - Multimodal seizure spread analysis using R.
    - Developed neuroimaging analytics methods for quantification and integrating python for faster throughput.
    - Data manipulation and cleaning of large datasets in Python, R, and SQL.
- Clinical
    - Observe resection surgeries, intracranial electrode implantations, and brain stimulation mapping.
    - Attend neurosurgery and neurology grand rounds.
    - Record and work up patients in weekly epilepsy surgery conference.
- Basic science:
    - PI: Dr. Tore Eid, Dr. Mani Ratnesh Sandhu
    - Mechanisms behind circadian and multi-day rhythms in animal models of epilepsy
    - Role of glutamine synthetase in epileptogenesis
    - Role of glutamate and GABA in network formation in epilepsy

- Clinical Outcomes
    - PI: Dr. Aladine Elsamadicy, Dr. Mani Ratnesh Sandhu
    - Use SQL and python to study spine oncology & deformity to improve patient care throughout the healthcare system.

Research Assistant, Poly-Pedal Integrative Biology Lab, UC Berkeley, CA 2018-2021
- Wrote and developed a grant proposal for 800K for discovery biology research.
- Designed and pitched new prototypes and mockups and presented to Professor Full.
- Developed and launched 4+ new projects and lead UC Berkeley engineering team in creating prototypes, user interviews, research, and product feedback.
- "Squirrel School" Cognitive Biomechanics Project
- Studied and trained wild squirrels on UC Berkeley's campus to determine what factors influence innovation and how motor development impinges on cognitive development.
- Developed instrumentation to study squirrel locomotion and apply squirrel locomotion to a robot.
- Helped design & manufacture fixtures, collect data in the field by studying wild squirrels, and set up prototypes that test squirrel jumps, movement, and balance.

Research Assistant, Neuronal Signal Integration Lab**,** Irvine, CA 2018-2019
- Stress Induced Cognitive Impairment Project: Investigated the effect of exposure to repeated multiple concurrent stressors on the posterior parietal cortex of adolescent mice.
- Stressed mice in the vivarium and analyzed videos of their behavior.
- Sliced and stained the mice brains to visualize individual neurons projecting to the PPC.
- Imaged slides I made under a confocal microscope and performed neuron reconstruction using Neutube.
- Quantified neuronal dendritic complexity of each neuron through sholl analysis, one-way ANOVA with Bonferroni's multiple-comparison test, two-way ANOVA test, t-test.
- Constructed the final data visualizations for our findings and revised manuscripts.

Nucleate SF Activator, Technology and Business Fellow 2022-2023
- Dinya DNA, Duke University spin-out, with Dr. Michael D. Lynch
- Our unique approach to DNA synthesis reduces the cost of synthetic DNA by >10x, while providing high fidelity, read-to-use DNA in a matter of hours from a benchtop device.

Collegium Research Fellow, Berkeley Interdisciplinary Migration Initiative 2018-2020
- Built an interactive web app which enables users to visualize the health and legal services for immigrants. Present findings to local policy makers.
- Web app link: https://bimi.berkeley.edu/mapping-spatial-inequality
- Conducted field research on immigrant-serving clinics to develop an organizational database.
- Analyzed and coded data collected, developed training materials on how to conduct field-research, and mentored students with their respective field-research projects.
- Organized a symposium to share research findings with local government and nonprofit organizations.

Independent Research Project, Fish Speciation Lab, UC Berkeley, CA 2020-2021
- Analyzed characiforms and bird morphology CT scans and datasets using visualization and analytics tools in R.
- Studied the morphology of the keel and pectoral fin of flying fish to address gaps in literature on how these anatomical features contribute to true flight.

Wellness Retention Director, UC Berkeley MENA Recruitment and Retention Center 2020-2021
- Create programs to support the wellbeing of students by creating Flu Shot clinics, medical bill refunds, etc.
- Oversaw interns and researched academic policies, resources, and retention rates at UC Berkeley.
- Maintain relationships and partnerships with the Cal campus community.

Marketing and Social Media Manager, Berkeley, CA 2019-2020
- Marketed ResLife "BigGive" Fundraising Campaign generating over $10 million.
- Lead team responsible for strategic planning, digital marketing, analytics, and fundraising campaigns.

Thermosilk Biotech, Founder, Berkeley, CA 2019-2021

- Bioengineered a thermoelectric and thermoregulatory textile, a synthetic hornet silk, that shields from fluctuating temperatures and generates electricity.
- NSF Innovation-Corps Fellow 2020.
- Led research team to top 6 finalists in an International BioDesign competition.
- Presented and shared pitch decks with potential investors.
- Conducted in-depth market and financial research, competitive analysis on funding, revenue, and market share.

National Science Foundation Innovation-Corps Fellow, Berkeley-HAAS Entrepreneurship 2020

- Start-up launchpad. Conducted user interviews, identified and prioritized key problems.

TEACHING EXPERIENCE

Creator and Instructor of BioDesign Class, UC Berkeley Biology 2018 - 2021

- Taught a 2-unit UC Berkeley BioDesign class to undergraduate students for 3 academic years.
- Developed, researched, planned, and wrote all course materials, lectures, and labs.
- Developed and tested labs such as 3D printed hand prosthetics, each student 3D printed a prosthetic finger designed for children affected by symbrachydactyly. Each finger was then used in the collaborative, team-based assembly of all parts of the 3D printed prosthetic hand, resulting in a fully functional final product. This project is now used every year in a 200 student class at Cal.
- Organize and lead workshops such as Adobe Illustrator, Fusion 360, entrepreneurship, laser cutting, etc.

Teaching Assistant, UC Berkeley Sociology 2019 - 2020

- Field research course, Contemporary Immigration in a Global Perspective. Professor Irene Bloemraad.

Master Mentor, UC Berkeley Integrative Biology 2018-2021

- Coordinated a hierarchical peer mentoring program within the IBc32 Bioinspired Design course.

Student Community Director and Recruitment Coordinator, UC Berkeley HHMI 2019 - 2021

- Howard Hughes Medical Institute - Eyes Towards Tomorrow Program
- Organized and led weekly Bioinspired Design Executive and Community Meetings.
- Coordinated and planned a two-day Design-A-Thons every semester for 50-75 undergraduate students.
- Led the development and curriculum for a second advanced project-based Democratizing Cal class.

Camp Alima, UC Berkeley 2020-2021

- Created an intensive Women in STEM summer camp for high-school girls in Morocco.
- Designed a hands-on curriculum in Medicine, Computer Science, Physics, and Math with other Cal students.

LEADERSHIP & MENTORING

Jumpstart PhD Mentor, USC 2024 – Present

- Mentor underrepresented undergraduate students interested in pursuing a PhD.

Co-Director of Curriculum, Nucleate Los Angeles Chapter 2024 – Present

- Conduct due diligence on technologies from trainee-led teams for commercialization potential, taking into account product vision and innovation, team dynamics, technology, and IP.
- Lead tech-sourcing and a team of 20+ PhD students to manage the Activator program, a course for academic trainees tackling the biggest challenges in human health and sustainability who aim to translate their research into startups.
- Facilitate relationships between biotech trainees and experienced entrepreneurs, executives, and investors.

Director of Programming AI in Biotech, Nucleate HQ 2023 - 2024

- Organize AI in Biotech lecture series with experts in different domains.

Director of Insights, Nucleate HQ 2021 - 2023

- Nonprofit organization building infrastructure for life science biotech founders and investors.

- Director of Nucleate Insights, a biotech research study group for select PhD students nationwide that investigates the scientific papers underlying today's most innovative biotechnology companies.
- Each session features a founder, CEO, and/or professor responsible for advancing an innovative biotechnology.

VP of Communications, Nucleate HQ 2022 - 2024

- Directed all communications and managed the Communications team of the HW chapter of Nucleate, a student-led
- organization aiming to facilitate venture creation of pioneering life science companies.
- Wrote all promotional and professional materials advertising Nucleate programming to biotech community.

President and Founder, Yale Postgraduate Association 2021 - 2022

- Created YPGA sponsored by the Yale Postdoctoral Affairs office, since there was a lack of community and resources for postgraduates. We now have over 180 members.
- Organized annual Yale Postgraduate Trainee Symposium for postgrads to present and share their research findings.
- Created bi-weekly Research-In-Progress journal club for YPGs to share, learn, and discuss other research on campus.
- Organized monthly community events for postgrads.
- Worked with Yale Postdoctoral Affairs office to generate more resources and accessibility for YPGA members.

Student and Postdoc Committee, Yale Wu Tsai Neuroscience Institute 2021 - 2022

- Helped create distinguished speaker series to cater to all academic disciplines.
- Invited speakers to organize career development and pathways workshops.

Resident Assistant, UC Berkeley Residential Life 2019 - 2020

- Handled emergency and crisis response for 1000+ residents. Report and respond to urgent situations.
- Council residents through difficult experiences. Direct students to campus resources.
- Organize monthly community engagement, diversity and inclusiveness, and academic wellness events.
- Work regular duty shifts 20+ hours a week; on call for 12+ hours.

Residential Student Experience Coordinator, UC Berkeley Residential Life 2018 - 2019

- Created a weekly Newsletter for 17,000+ students using Mailchimp.
- Managed the Official Social Media and marketing campaigns for UC Berkeley ResLife.
- Marketed ResLife "Big Give" Fundraising Campaign, over $10mm

JOURNAL PUBLICATIONS

- McGrath, H., Zaveri, H., Collins, E., **Jafar, T**. Chishti, O., Obaid, S., Ksendzovsky, A., Wu, K., Papademetris, X., Spencer, D.D. High-resolution cortical parcellation based on conserved brain landmarks for localization of multimodal data to the nearest centimeter. Sci Rep 12, 18778 (2022). https://doi.org/10.1038/s41598-022-21543-3
- Elsamadicy AA, Sandhu MRS, Reeves BC, **Jafar T,** Craft S, Sherman JJZ, Hersh AM, Koo AB, Kolb L, Lo SL, Shin JH, Mendel E, Sciubba DM. Impact of Affective Disorders on Inpatient Opioid Consumption and Hospital Outcomes Following Open Posterior Spinal Fusion for Adult Spine Deformity. World Neurosurg. 2023 Feb;170:e223-e235. doi: 10.1016/j.wneu.2022.10.114. Epub 2022 Nov 2. PMID: 36332777.
- Ibrahim LI, Obetz K, Mackenzie ES, **Jafar T,** Kyoung I, Leininger K, Yudien MA, Shulkin JM, Sandoval A Jr, Uba A, Barrie U, Tissot MIJ, Detchou D, Howard SD. Louise Eisenhardt (1891-1967): World Renowned Neuropathologist, Brain Tumor Registry Director, First Editor-In-Chief of Journal of Neurosurgery, and President of Harvey Cushing Society. World Neurosurg. 2023 Feb;170:219-225. doi: 10.1016/j.wneu.2022.10.062. Epub 2022 Oct 21. PMID: 36280045.
- Libovner Y, Fariborzi M, Tabba D, Ozgur A, **Jafar T,** Lur G. Repeated Exposure to Multiple Concurrent Stresses Induce Circuit Specific Loss of Inputs to the Posterior Parietal Cortex. J Neurosci. 2020 Feb 26;40(9):1849-1861. doi: 10.1523/JNEUROSCI.1838-19.2020. Epub 2020 Jan 16. PMID: 31949108; PMCID: PMC7046453.
- Robert J Full, H A Bhatti, P Jennings, R Ruopp, **T Jafar,** J Matsui, L A Flores, M Estrada, Eyes Toward Tomorrow Program Enhancing Collaboration, Connections, and Community Using Bioinspired Design, Integrative and Comparative Biology, Volume 61, Issue 5, November 2021, Pages 1966–1980, https://doi.org/10.1093/icb/icab187
- Barnett, J., Sotudeh, N., Rao, P., Silverman, J., **Jafar, T.,** Wang, L. AtlasXplore: a web platform for visualizing and sharing spatial epigenome data, Bioinformatics, Volume 39, Issue 8, August 2023, btad447, https://doi.org/10.1093/bioinformatics/btad447

- Sandhu MRS, **Jafar T,** Dhaher, R., Zaveri, H., Eid, T. "Circadian-like gamma-aminobutyric acid oscillations and seizure periodicity in epilepsy." *Science Advances,* 3 Mar. 2022. In review.
- Sandhu MRS, Gruenbaum, B., **Jafar T.,** et al. "The association between female sex and depression following traumatic brain injury: A systematic review and meta-analysis" Submitted August 2024.

CONFERENCE PRESENTATIONS

- **Jafar, T.,** McGrath, H., Spencer, D.D.S., Zaveri, H. (2021). A multimodal cortical atlas for clinical decision making and function-structure hypotheses in epilepsy surgery. Presented at Society for Neuroscience SFN 2021
- **Jafar, T**., Aljishi, A., Sandhu, M.R.S., Huberdeau, D., . . . Damisah, E. (2021). Assessment of Statistical Learning and Episodic Memory in Temporal Lobe Epilepsy. Presented at AES 2021 Annual Meeting.
- **Jafar, T.,** McGrath, H., Spencer, D.D.S., Zaveri, H. (2021). A Multimodal Cortical Atlas for Epilepsy Surgery and Function-Structure Hypotheses. Presented in Yale 2021 Postgraduate Research Symposium.
- Sandhu, M.R.S., **Jafar, T.**, . . . Spencer, D.D.S., Eid, T. (2021). The Ratio of Glutamate to GABA Oscillates in a Circadian Fashion in the Epileptic Human Brain. Presented at AES 2021 Meeting.
- Chishti, O., **Jafar, T.**, McGrath, H., Spencer, D.D.S., Zaveri, H. (2021). Investigating White Matter Connectivity in a Novel Brain Atlas. Presented at Yale Wu Tsai Institute Summer Symposium.
- Collins E., McGrath., Zaveri H., **Jafar, T**., … Spencer, D.D.S. (2021). Systematic Anatomical Parcellation of the Human Cortex. Presented at AES 2021 Annual Meeting.
- Full, R., Bhatti, A., Jennings, P., Ruopp, R., **Jafar, T**., … Estrada, M. (2021). Biology Beyond the Classroom: Experiential Learning through Authentic Research, Design & Community Engagement. Presented at SICB 2021 Annual Meeting.
- **Jafar, T.**, Sandhu, M.R.S., Aljishi, A., . . . Damisah, E. (2022). Assessment of Statistical Learning and Episodic Memory in Temporal Lobe Epilepsy. Presented at Yale BDIC 2022 Annual Symposium.
- Gruenbaum, B., Sandhu, MRS, **Jafar T.**, et al. Influence of Gender on Depression Following Traumatic Brain Injury: Systematic Review and Meta-Analysis. (2023) Accepted at American Society of Anesthesiologists 2023.
- **Jafar. T.,** Sandhu M., Gruenbaum B., Eid T., Duckrow R., Spencer DDS., Zaveri H. The Impact of Neurostimulation on Seizures and Psychiatric Comorbidities in Patients with Drug-Resistant Epilepsy. Presented at AES 2023.
- **Jafar. T.,** Kriukova K., Alba C., Sharma A., Duncan D. (2024) Exploring the Relationship Between High-Frequency Oscillations and Lesion Location in Post-Traumatic Epilepsy. Presented at Winter Conference on Brain Research 2024
- **Jafar. T.,** Chowdhury, N., Chaudhari, N., Irimia, A. (2024) Genetic Influences on Cortical Thickness and Curvature: A Comprehensive Analysis using UK Biobank Data and Transcriptomics. Presented at USC Keck School of Medicine Research Symposium.
- Chowdhury, N., **Jafar. T.,** Irimia, A. (2024) Investigating cellular correlates of cortical neuroimaging with transcriptomics. Presented at USC Keck School of Medicine Research Symposium.
- **Jafar. T.,** Alba C., Bennett A., La Rocca M., Barisano G., Duncan D. (2024) A Comprehensive Evaluation of Manual and Automated Lesion Segmentation for Traumatic Brain Injury Characterization T1- and T2-weighted MRI data Presenting at Neuromodulation NYC 2024.

GRANTS AND AWARDS

- USC Graduate Student Fellowship Award
- UC Berkeley Marian Diamond Commencement Award for Leadership in Research and Teaching
- Berkeley Discover Grant. Discovery for All: Empowering Inclusive Communities in Integrative Biology
- Nucleate Bay Area Activator Finalist
- Biodesign Challenge Summit Finalist for ThermoSilk
- Jacobs COVID-19 Design Challenge Finalist

INVITED TALKS

- MACSIE: *Yale Brain Atlas,* Yale Comprehensive Epilepsy Center, Neurosurgery Dept., Yale School of Medicine (11 Nov. 2021).
- *A Multimodal Cortical Atlas for Epilepsy Surgery and Function-Structure Hypotheses,* Yale Postgraduate Research Symposium, Yale School of Medicine (19 Aug. 2021).
- *Systematic review and meta-analysis: How gender impacts depression following TBI,* Yale Postgraduate Research Symposium, Yale School of Medicine (4 Nov. 2022).