Kevin Tu

(443) 741-0151, ktu@umd.edu
Depts. of Biology, Economics, and Education
University of Maryland, College Park, MD 20740

Summary: My research interests are in the molecular genetics of cancer and their applications in creating accessible early diagnostics and precision medicines. I also have research interests in education and rural health. Outside of research, I am actively involved in harm reduction, sustainability, and DEI initiatives through social entrepreneurship and policy.

Education

2019 - 2023 **University of Maryland (UMD)**, GPA: 3.95
Bachelor of Science, Biological Sciences: Physiology and Neurobiology
Bachelor of Science, Economics
Minor: Nonprofit Leadership and Social Innovation

Selected Honors & Awards

Churchill Scholarship	Fully funded MPhil at the University of Cambridge, awarded to 16 STEM student researchers in the US	2023
National Science Foundation, I-Corps Accelerator	Experiential training program to accelerate research projects toward commercialization	2023
Rhodes Scholarship, Finalist	Recognizes outstanding scholarly achievements, character, commitment to the common good, and leadership	2022
Gates-Cambridge Scholarship, Finalist	Recognizes academic excellence, leadership potential, and commitment to improving the lives of others	2023
Marshall Scholarship, Finalist	Distinction of intellect and character as evidenced by scholastic attainments, activities, and achievements	2022
Barry M. Goldwater Scholarship	Recognizes top undergraduate STEM researchers in the US	2022
Departmental Diversity, Equity, Inclusion Award	For furthering DEI at the UMD, in particular increasing visibility of LGBTQ+ scientists	2022
Governor's Service Award, Emerging Leader	Recognizes outstanding volunteerism, citizenship, and initiative within Maryland	2020
Banneker/Key Scholarship	Covers tuition and room/board at the UMD. Distinction of intellect and character as evidenced by academic leadership	2019

Research Experience

Duke University Durham, NC
Amgen Scholar, Research Assistant; Advisor: Zachary J. Reitman May 2022 - Present

- Project 1: Used R to assess multi-omic (mutational sequencing, expression) and CRISPR genetic screening data of 1,073 cancer cell lines and 500 primary glioblastoma tumors for therapeutic vulnerabilities of telomerase promoter mutations
- Project 2: Used R to systematically screen 43 million cancer mutations in the COSMIC database to predict change-of-function mutations that may be used to design novel biocatalysts
- Project 3: Determined the mechanisms by which FLASH radiotherapy mitigates normal tissue radiation toxicity in a transgenic mouse model of pediatric medulloblastoma

University of Iowa Carver College of Medicine Iowa City, IA
Research Assistant; Advisor: Nicholas Mohr March 2022 - Present

- Project 1: Systematically reviewed and critiqued the literature surrounding the use of telemedicine in sepsis treatment, as well as quantified the impact that consultative tele-ED has on sepsis patient mortality and bundle adherence
- Project 2: Used Stata to derive a multivariate model to predict the use and benefit of consultative ED telemedicine in rural hospitals for sepsis care

University of Maryland School of Medicine Baltimore, MD
Research Assistant; Advisors: Hem D. Shukla and Amit Sawant January 2021 - Present

- Project 1: Genetically engineered a pancreatic cancer cell line to deplete HIF1α and investigated the protein's role in promoting tumor survival in the face of radiation-induced DNA strand breaks and apoptotic stress induced from KRAS inhibition.
- Project 2: Reviewed the epigenomic markers that drive chordoma progression and recurrence, identifying potential avenues for therapeutic development
- Project 3: Used R to identify the pathways and mechanisms that are involved in regulating thermal therapy induced radiosensitivity within metastatic breast cancer
- Project 4: Discovered docetaxel radiosensitizes castration resistant prostate cancer *in vitro* and used R to analyze RNA-seq data to explore potential mechanisms of radiosensitization

University of Maryland, Higher Education Research Assistant College Park, MD
Research Assistant; Advisor: Daniel Levin December 2020 - Present

- Project 1: Measured the efficacy of multiple novel active learning applications to limit misconceptions and promote student outcomes within student-initiated courses.
- Project 2: Studied the origin of students' explanations of scientific and mathematical phenomena in regard to the epistemology of their respective fields

University of Maryland, Research Assistant College Park, MD
Research Assistant; Advisor: Jonathan Dinman August 2019 - January 2021

- Project 1: Investigated the effect of the JAK2 V617F mutation's ablation of a programmed -1 ribosomal frameshift signal, resulting in JAK2 overexpression and subsequent myeloproliferative neoplasms transformation
- Project 2: Examined termination codon readthrough within four alphaviruses in promoting viral pathogenesis in order to determine potential targets for small molecule inhibitors

Johns Hopkins University, Research Assistant Baltimore, MD
Research Intern; Advisor: Tong Li June 2016 - July 2019

- Project 1: Developed a transgenic Alzheimer's disease mouse model that accurately replicates sex differences and tau pathology
- Project 2: Dissected the role of the mTOR pathway in Alzheimer's disease sex differences

Teaching

University of Maryland		**College Park, MD**
Undergraduate Teaching Assistant	BSCI410: Molecular Genetics	Spring 2023 - Present
Course Creator & Lecturer	BSCI238D: A Primer on Research Techniques in Molecular Biology	Spring 2020 - Present
Undergraduate Teaching Assistant	BSCI222: Introductory Genetics	Spring 2021

Clinical Experience

Appelbaum Vision Bethesda, MD
Medical Assistant May 2021 - May 2022

- Engaged pediatric and adult patients in weekly visual therapy exercises to improve visual accommodation, binocular processing, peripheral awareness, etc.
- Conducted visual work-ups assessing patient visual processing using a variety of diagnostic tests.

Washington Adventist Hospital Silver Spring, MD
Neuro-oncology Ward Volunteer May 2021 - May 2022

- Collaborated with nurses to provide comfort and care to long-term hospitalized cancer patients.
- Recorded progress of patients towards meeting processes of care milestones following discharge

Leadership/Extracurriculars

Combating Overdoses in Rural Areas, Founder and President June 2020-Present

- A 501(c)(3) nonprofit providing free drug treatment and harm reduction to rural communities
- Managing 8 chapters spanning 3 states, with ~150 members. Reached 4,000+ people with our educational modules, trained 1500+ in overdose response and naloxone administration, raised $30,000, and testified to the Maryland Legislature to increase access to substance use treatment
- Created the Maryland Harm Reduction Database, which contains 2000+ local, vetted harm reduction resources (~100 users/month) and organized the annual Maryland Opioid Awareness Symposium, a public meeting to connect clinicians and policymakers

University of Maryland, Green Labs Coordinator January 2022-Present

- Coordinating sustainability engagement programs within UMD STEM departments, which has reduced the university's annual carbon footprint by 1000 tons and lowered costs by $150,000
- Engineering new fume hood position sensors to enable scalability of Green Lab programs in research institutions globally through an international sash competition

The UMD Hare Satirical Magazine, Founder and Editor in Chief August 2019-Present

- Obtain and manage an annual budget of $20,000 through grants and donations, which goes towards publishing the print and maintaining the online versions of our magazine
- Manage a staff of ~30 to write and publish articles, run social media, and acquire funding

National Suicide Prevention and TREVOR Lifelines, Crisis Counselor August 2019- Present

- Volunteer 3 hr/wk to provide support to callers in suicidal crisis or emotional distress
- Taken over 1000+ calls and diffused an active suicide on my campus
- Write Op-eds to destigmatize mental health and address misinformation surrounding the 988-crisis line for local newspapers and blogs.

UMD Student Government Association, Legislator August 2021-May 2022

- Passed bills to provide access to free overdose response trainings and naloxone to all 40,000 students in the university
- Revitalized the 50 Queer Scientists Project at UMD to increase LGBTQ+ visibility in STEM
- Restarted and obtained $2,000 in funding to restart the university's Green Lab program

UMD University Senate, Senator August 2020-May 2021

- Passed bills to support summer housing for LGBT students with unsafe home situations
- Passed bill to change university's general education diversity requirement to include discussions of systemic and structural racism throughout history and across the world

Lean On Me, Co-Founder and Training Coordinator January 2020 - September 2021

- An anonymous, peer-to-peer emotional support textline for UMD students.

- Worked with the university counseling center to develop our training materials and personally trained over 70 supporters, who have taken 450+ conversations with fellow students.

Professional Service

2021-Present *Ad Hoc* Reviewer, *Current Cancer Drug Targets (3x/yr)*
2020-Present Quantitative Sciences Research Editor, *Journal of Young Investigators*

Conference Presentations

Society Conferences

Tu KJ, Wymore C, Tchangalova N, Fuller B, Mohr N. Telehealth In Sepsis Care: A Scoping Review and Meta-analysis. American Journal of Respiratory and Critical Care Medicine. Poster presentation, American Thoracic Society Annual Meeting, Washington, DC, May 2023.

Tu KJ, Roy S, Sawant A, Shukla H. HIF1α is involved in radiation-induced DNA damage repair and anti-apoptotic pathways in pancreatic ductal adenocarcinoma. Cancer Research. Poster presentation, American Association for Cancer Research Annual Meeting, Orlando, FL, April 2023.

Tu KJ, Diplas B, Regal D, Waitkus M, Pirozzi C, Reitman Z. A bioinformatic pipeline for identifying change-of-metabolic-function cancer mutations. Cancer Research. Poster presentation, American Association for Cancer Research Annual Meeting, Orlando, FL, April 2023.

Tu KJ, Zhang H, Molitoris J, Rodrigues D, Sawant A, Shukla H. Gene expression profile analysis of hyperthermia-induced radiosensitivity in breast cancer. Cancer Research. Poster presentation, American Association for Cancer Research Annual Meeting, Orlando, FL, April 2023.

Tu KJ, Roy S, Gartia M, Shukla H, Biswal N. The effectiveness of docetaxel and radiation combination therapy on castration-resistant prostate cancer cells. Poster presentation, Radiation Research Society Meeting Annual Meeting, Waikoloa Village, HI, October 2022.

Tu KJ, Roy S, Bhandary B, Sawant A, Shukla H. Loss of HIF1A decreases resistance to radiation and invasiveness in pancreatic ductal adenocarcinoma. Cancer Research. Poster presentation, AACR Special Conference on Pancreatic Cancer, November 2021.

Tu KJ, Wei A, Lau A, Chen L, Li T. Sex differences in tau pathological development in mouse models of Alzheimer's Disease. Society for Neuroscience Abstracts. Poster presentation, Society for Neuroscience Annual Meeting, Chicago, IL, November 2019.

Local Conferences

Tu KJ, Wymore C, Tchangalova N, Fuller B, Mohr N. The use of consultative telemedicine on sepsis patient outcomes. Oral presentation, University of Iowa Department of Emergency Medicine Research Day, Iowa City, IA, April 2023.

Tu KJ, Reitman Z. Mechanisms of FLASH-RT in Pediatric Medulloblastoma. Oral Presentation, Amgen Scholar Conference, Durham, NC, July 2022.

Tu KJ, Roy S, Sawant A, Shukla H. HIF1A acts as a molecular switch to promote radioresistance and aggression in pancreatic ductal adenocarcinoma. Oral Presentation, University of Maryland Department of Radiation Oncology Research Day, Baltimore, MD, March 2022.

Tu KJ, Dinman J. The JAK2 V617F Mutation Disrupts a Frameshift Sequence That May Disrupt Gene Expression. Poster Presentation, University of Maryland Undergraduate Research Day, College Park, MD, April 2021.

Tu KJ, Li T. The mTOR Pathway is Associated with the Gender Difference in an Alzheimer's Disease Mouse Model. Oral presentation, Johns Hopkins Intern Research Day, Columbia, MD, April 2019.

Peer-Reviewed Publications

Published/In Press

Tu KJ, Wymore C, Tchangalova N, Fuller BM, Mohr NM. The impact of telehealth in sepsis care: A systematic review. Journal of Telemedicine and Telecare. 2023 Apr 24;1357633X2311700.

Tu KJ, Sun A, Levin D. Design and Outcomes of a Student-Initiated Course on Research Methodologies in Molecular Biology. Journal for College Science Teaching. 2023. In Press.

Tu KJ, Sun A, Levin D. A Sweet Method of Modeling Restriction Endonuclease-Based Molecular Cloning. The American Biology Teacher. 2023 Jan 1;85(1):52–4.

Tu KJ, Lee S, Roy S, Sawant A, Shukla H. Dysregulated Epigenetics of Chordoma: Prognostic Markers and Therapeutic Targets. Current Cancer Drug Targets. 2022 Sep;22(8):678–90.

Tu KJ, Sun A, Levin DM. Using memes to promote student engagement and classroom community during remote learning. Biochem Molecular Bio Educ. 2022 Dec 7;bmb.21700.

Tu KJ, Levin D. Learning to Troubleshoot Experiments: Flipped Classrooms Activities for PCR and Western Blot. The American Biology Teacher. 2022 May 1;84(5):315–6.

Kim DW, **Tu KJ**, Wei A, Lau AJ, Gonzalez-Gil A, Cao T, et al. Amyloid-beta and tau pathologies act synergistically to induce novel disease stage-specific microglia subtypes. Molecular Neurodegeneration. 2022 Dec 17;17(1):83.

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Roy S, Dukic T, Bhandary B, **Tu KJ**, Molitoris J, Ko YH, et al. 3-Bromopyruvate inhibits pancreatic tumor growth by stalling glycolysis, and dismantling mitochondria in a syngeneic mouse model. Am J Cancer Res. 2022;12(11):4977–87.

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Singh P, Eley J, Mahmood N, Bhandary B, Dukic T, **Tu KJ**, et al. Therapeutic Efficacy of Variable Biological Effectiveness of Proton Therapy in U-CH2 and MUG-Chor1 Human Chordoma Cell Death. Cancers. 2021 Dec 4;13(23):6115.

Under Review

Tu KJ, Stewart C, Regal J, Kim S, Waitkus M, Reitman Z. Pooled genetic screens to identify vulnerabilities in TERT-promoter-mutant glioblastoma. Submitted to *Nature Oncogene*.

Tu KJ, Roy S, Sawant A, Shukla H. HIF1A promotes radioresistance through DNA damage repair and works synergistically with KRAS to prevent apoptosis in pancreatic ductal adenocarcinoma. Submitted to *Nature Scientific Reports*.

Tu KJ, Diplas B, Regal D, Waitkus M, Pirozzi C, Reitman Z. Mining Cancer Genomes for Gain-of-Metabolic-Function Mutations. Submitted to *Nature Communications Biology*.

Tu KJ, Roy SK, Sawant A, Shukla H, Biswal N. Docetaxel sensitizes castration resistant prostate cancer cells to radiotherapy. Submitted to *International Journal of Radiation Biology*.

Tu KJ, Stewart CE, Williams NT, Fan Y, Widenhammer L, Kirsch DG, Regal JA, Reitman ZJ. Radiation-dose response in a transgenic mouse model of pediatric medulloblastoma. Submitted to *Radiation Research*.

Working Manuscripts
Tu KJ, Vakkalanka P, Okoro U, Mohr N. Evaluating social vulnerability and provider-level predictors of consultative telemedicine for sepsis in rural areas.

Tu KJ, Roy SK, Biswal N, Shukla H. Molecular biomarkers for prostate cancer outcome disparities in African American males.

Tu KJ, Zhang H, Molitoris J, Rodrigues D, Sawant A, Shukla H. Breast and pan-cancer gene expression analysis following thermal therapy with differential thermal doses.