Tarun Kamath

tarunk@mit.edu

EDUCATION

Harvard Medical School **2020-Present**
Candidate for M.D. in the Harvard-MIT Health Sciences and Technology Program *Boston, MA*

Massachusetts Institute of Technology **2016-2020**
M.Eng. in Biomedical Engineering *Cambridge, MA*
Thesis Advisor: Douglas A. Lauffenburger; *GPA: 4.3/5.0*
S.B. in Brain and Cognitive Sciences and minor in Biomedical Engineering
GPA: 5.0/5.0

Thomas Jefferson High School for Science and Technology **2012-2016**
Advanced Studies Diploma; GPA: 4.51/4.0 *Alexandria, VA*

EXPERIENCE

Hyman Lab, Massachusetts General Hospital/Harvard Medical School **05/2017 - 05/2020**
- Used an assay for aggregated tau protein as a model for Alzheimer's to determine the kinetics of tau aggregation.
- Developed a machine learning based data analysis workflow for analyzing cytation images of fluorescent proteins.

Thilly Lab, MIT Department of Biological Engineering **08/2014 - 12/2019**
- Investigated the changes in mortality rates in the last 100 years due to pediatric solid tumors.
- Used a MATLAB based program to model the age-specific mortality rates of pediatric cancers.

Gurdon Lab, The Gurdon Institute, University of Cambridge **06/2019 - 08/2019**
- Investigated droplet formation that occurs from binding of transcription factors to DNA.
- Researched the competition between transcription factors binding to the same DNA site to better understand nervous system development.

U.S. House of Representatives Committee on Ways and Means **05/2018 - 08/2018**
Chairman Kevin Brady
- Analyzed bills, drafted memos, and wrote questions and scripts for the Subcommitte on Oversight's Hearing on methods to reduce fraud, waste, and abuse in Medicare.
- Took on the daily responsibilities of the Legislative Assistant for the second half of the summer.

Callicott Lab, National Institute of Mental Health **09/2015 - 08/2016**
- Researched the effect of childhood environmental and genetic factors on the risk of developing schizophrenia.
- Used functional magnetic resonance imaging data to link schizophrenia with the regional brain activation.

Hatsopoulos Microfluids Lab, MIT Department of Mechanical Engineering **06/2015 - 10/2015**
- Used fractional Brownian motion concepts to model the microfluidics of non-Newtonian biological fluids.
- Developed a MATLAB based modeling platform for non-Newtonian fluids using fractional derivative based equations.

PEER-REVIEWED PUBLICATIONS

- **Kamath T.V.**, Klickstein N., Commins C., Fernandes A., Oakley D., Frosch M.P., Hyman B.T., Dujardin S. Kinetics of tau aggregation reveals patient specific tau characteristics among Alzheimer's cases (2020). Submitted to *Brain*.
- Bennett R.E., Hu M., Fernandes A., Perez-Rando M., Robbins A., **Kamath T.**, Dujardin S., Hyman B.T. Tau reduction in aged mice does not impact Microangiopathy (2020). *Acta Neuropathologica Communications*. doi: 10.1186/s40478-020-01014-4.
- Dujardin S., Commins C., Lathuiliere A., Beerepoot P., Fernandes A.R., **Kamath T.V.**, De Los Santos M.B., Klickstein N., Corjuc D.L., Corjuc B.T., Dooley P.M., Viode A., Oakley D.H., Moore B.D., Mullin K., Jean-Gilles D., Clark R., Atchison K., Moore R., Chibnik L.B., Tanzi R.E., Frosch M.P., Serrano-Pozo A., Elwood F., Steen J.A., Kennedy M.E., Hyman B.T. Tau molecular diversity contributes to clinical heterogeneity in Alzheimers disease (2020). *Nature Medicine* doi:10.1038/s41591-020-0938-9.

- Busche M.A., Wegmann S., Dujardin S., Commins C., Schiantarelli J., Klickstein N., **Kamath T.V.**, Carlson G.A., Nelken I., Hyman B.T. Tau impairs neural circuits, dominating amyloid-beta effects, in Alzheimer models *in vivo* (2018). *Nature Neuroscience* doi:10.1038/s41593-018-0289-8
- Wegmann S., Eftekharzadeh B., Tepper K., Zoltowska K.M., Bennett R.E., Dujardin S., Laskowski P.R., MacKenzie D., **Kamath T.**, Commins C., Vanderburg C., Roe A.D., Fan Z., Molliex A.M., Hernandez-Vega A., Muller D., Hyman A.A., Mandelkow E., Taylor J.P., Hyman B.T. Tau protein liquid-liquid phase separation can initiate tau aggregation (2018). *The EMBO Journal* doi:10.15252/embj.201798049.

ABSTRACTS AND POSTERS

- **Kamath T.V.**, Commins C., Klickstein N., Oakley D., Hyman B.T., Dujardin S. Employing an in vitro biosensor assay to investigate tau seeding kinetics within cases of sporadic Alzheimer disease and in a model of tauopathy (2020). Presentation at *Alzheimer's Association International Conference*.
- Dujardin S., Commins C., **Kamath T.V.**, de los Santos M., Dooley P.M., Moore B.D., Jean-Gilles D., Clark R., Kennedy M., Hyman B.T. Relevance of tau seeding for the clinical heterogeneity of Alzheimer's disease: Implication for therapeutic perspectives (2019). Abstract in *Alzheimer's & Dementia* (doi: 10.1016/j.jalz.2019.06.4854) and Presentation at *Alzheimer's Association International Conference*, Los Angeles, CA.
- Dujardin S., Commins C., **Kamath T.V.**, Corjuc D., Gonzalez J., Dooley P., DeVos S., Moore B., Hyman B.T. Heterogeneity of tau seeding in the human brain Toward understanding the molecular signature of tau seeds? (November, 2018) Presentation at the *Society for Neuroscience*, San Diego, CA.
- Busche M., Wegmann S., Dujardin S., Schiantarelli J., **Kamath T.V.**, Nelken I., Hyman B.T. Tau silences neural circuits and blocks the effects of amyloid-beta in vivo (November, 2018) Presentation at the *Society for Neuroscience*, San Diego, CA.
- Dujardin S., Commins C., **Kamath T.V.**, Corjuc D., Gonzalez J., Dooley P., DeVos S., Moore B., Hyman B.T. Heterogeneity and predictability of Tau seeding in the human brain - relevance for diagnosis and immunotherapy of Alzheimer's disease. Abstract at *EuroTau*, Lille, France (April, 2018) and poster presentation at the *JPB Consortium Meeting*, New York City, New York (February, 2018).
- **Kamath T.V.**, de Albuquerque D., Vargas T., Grunnagle M., Apud J., Berman K.F., Callicott J.H. (April, 2017) Childhood Urbanicity affects the fMRI response of the dlPFC in schizophrenic patients and unaffected siblings. Poster presentation at *Boston Childrens Hospital Translational Neuroscience Center Symposium*, Boston, Massachusetts
- **Kamath T.V.**, Wagner C., McKinley G.H. (October, 2015) Modeling the rheological response of common food products using fractional constitutive equations. Poster and abstract at *87th Annual Society of Rheology Conference*, Baltimore, Maryland

EXTRACURRICULAR ACTIVITIES

President, Active Minds at MIT **01/2017 - 05/2019**
- President of the MIT Chapter of Active Minds, a national mental health organization.
- Organized events to increase the conversation surrounding mental health in the MIT community.

Brotherhood Development Director, Zeta Beta Tau Fraternity **05/2018 - 05/2019**
- Introduced a new class of freshmen into the fraternity and helped them acclimate to life at MIT.
- Planned events to increase brotherhood bonding and wellness.

Volunteer, Krishna Institute of Medical Sciences (KIMS), Karad, India **05/2019 - 06/2019**
- Worked at KIMS, a tertiary care hospital serving the rural population of West Maharashtra, India.
- Assisted in taking basic vitals as well as observed physicians in a number of unique specialties.

Counselor, Camp Kesem at MIT **10/2016 - 03/2019**
- Worked at Camp Kesem, an organization founded for children whose parents have been affected by cancer.
- Raised money to send children to Camp Kesem for free as well as for cancer research.

Member, MIT Bhangra Dance Team **09/2016 - 05/2020**
- Performed at dance competitions around the nation.
- Taught summer lessons and workshops for the greater Boston community.

HONORS AND AWARDS

- Finalist, Rhodes Scholarship **11/2019**

- Cambridge Trust Scholarship **04/2019**
- Hans Lukas Teuber Award for Outstanding Academics in Brain and Cognitive Sciences **04/2018, 04/2019**
- Semifinalist, Intel Science Talent Search **02/2016**
- Finalist, Poster competition at 87th Annual Society of Rheology Conference **10/2015**

SKILLS AND HOBBIES

Laboratory Techniques: Cell Culture, Chromatin Immunoprecipitation, Cytation Imaging, Flow Cytometry, Functional Magnetic Resonance Imaging (fMRI) image analysis, Immunocytochemistry/Immunohistochemistry, Primary Neuron Preparation, Western Blot
Programming Languages: Python, MATLAB, ImageJ/Fiji, HTML, Java, AFNI, Mathematica
Hobbies: Weightlifting, biking