DJUNA VON MAYDELL

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DOB: September 5th, 1996

DOCTORAL STUDIES

09/2019 - present • PHD STUDENT • MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT)
MIT Department of Brain and Cognitive Sciences & MIT Computer Science and Artificial Intelligence Lab
Cumulative Graduate GPA: 5.0
Primary Fields of Interest: Neuroscience, Genomics, Computational Biology

DISSERTATION ADVISORS & REFERENCES

Professor Li-Huei Tsai
MIT Department of Brain and Cognitive Sciences
43 Vassar St. 46-4325A
Cambridge, MA 02139
617-324-1660
lhtsai@mit.edu

Professor Manolis Kellis
MIT Department of Computer Science
32 Vassar St. Stata Center - 32D.524
Cambridge, MA 02139
617-253-2419
manoli@mit.edu

PRIOR EDUCATION

2014 - 2018
King's College London, United Kingdom
Hon B.Sc. Biomedical Science with Extra Mural Year
First Class Honors, Overall Score 80% (A+)

2001 - 2014
John F. Kennedy School, Berlin, Germany
Abitur, Grade 1.0 (A+)
High School Diploma, Honor Graduate

CITIZENSHIP

USA & GERMANY

AWARDS AND FELLOWSHIPS

2020-21
BROSHY GRADUATE FELLOWSHIP, MIT BCS departmental award

2018
FINAL YEAR BIOMEDICAL SCIENCE PRIZE FOR THE BEST ACADEMIC PERFORMANCE, awarded to the best 2 students out of the 200+ students on the Biomedical Science program at King's College London. Selection is based on the highest overall degree scores and performance at the prize *viva* with an external examiner.

2015
MARY CLARK TRAVEL AWARD, awarded to successful applicants from King's College London to financially support travel to the U.S. or Commonwealth country during the summer vacation for a study-related project.

PUBLICATIONS

PEER-REVIEWED ARTICLES

Kwak SS *, Washicosky KJ *, Brand E, **von Maydell D**, Aronson J, Kim S, Capen DE, Cetinbas M, Sadreyev R, Ning S, Bylykbashi E, Xia W, Choi SJ, Tanzi RE and Kim DY. (2020) Amyloid-β42/40 ratio drives tau pathology in 3D human neural cell culture models of Alzheimer's disease. (* = contributed equally). *Nat Commun* 11, 1377. view paper

von Maydell D*, Jorfi M.* (2019) The interplay between microglial states and major risk factors in Alzheimer's disease through the eyes of single- cell RNA-sequencing: beyond black and white. *J Neurophysiol* 122(4), 1291- 1296. (* = contributed equally). view paper

BOOK CHAPTER

von Maydell, D.; Jorfi, M. A synergistic engineering approach to build human brain spheroids; In Programmed Morphogenesis: Methods and Protocols; Ebrahimkhani, M.; Ed.; Springer Nature, 2020.

RESEARCH EXPERIENCE

09/2019 - present • PhD STUDENT

TSAI AND KELLIS LABS, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, using machine learning, single-cell RNA-sequencing data derived from human brains, and matched genomic data from human patients to dissect polygenic cell-type-specific effects in Alzheimer's disease (AD), with the aim of using these results to systematically classify AD heterogeneity.

10/2018 - 07/2019 • RESEARCH TECHNICIAN II

MASSACHUSETTS GENERAL HOSPITAL & HARVARD MEDICAL SCHOOL, GENETICS & AGING RESEARCH UNIT, explored pathogenic cascades of Alzheimer's disease (AD) by transcriptomic analysis in a 3D cell culture model of AD

08/2018 - 09/2018 • COMPUTATIONAL BIOLOGY INTERN

BROAD INSTITUTE OF HARVARD AND MIT, GTEX GROUP OF THE GETZ LAB, COMPUTATIONAL BIOLOGY INTERN, implemented differential gene expression (DGE) analysis using DESeq2 and Limma+Voom R packages to integrate DGE analysis into the GTEx portal gene expression analysis pipeline, evaluated package biases and susceptibility to GTEx data heterogeneity

09/2017 – 12/2017 • UNDERGRADUATE RESEARCHER

KINGS COLLEGE LONDON, INSTITUTE OF PHARMACEUTICAL SCIENCE, PHARMACEUTICAL BIOPHYSICS GROUP

HONORS THESIS: Stratification of Cervico-Vaginal ^{1}H NMR Metabolomics Data Reveals Biomarkers of Spontaneous Preterm Birth, Final mark: 82% (A+)

08/2016 - 07/2017 • EXTRA MURAL YEAR STUDENT

MASSACHUSETTS GENERAL HOSPITAL & HARVARD MEDICAL SCHOOL, GENETICS & AGING RESEARCH UNIT

EXTRA MURAL YEAR THESIS: Exploring Pathogenic Cascades in Alzheimer's Disease (AD) by Transcriptomic Analysis of 3D Cultured Human Neurons & Dissecting the Role of Individual Aβ Species on AD Pathogenesis in a 3D Culture Model of AD, Final mark: 90% (A++)

07/2015 - 08/2015 • BIOINFORMATIC RESEARCH INTERN

MASSACHUSETTS GENERAL HOSPITAL & HARVARD MEDICAL SCHOOL, GENETICS & AGING RESEARCH UNIT, analyzed data acquired from family-based association studies to identify genetic variants, which contribute to the risk of developing Alzheimer's disease, performed a series of bioinformatic analyses to elucidate the role of these novel genetic variants in gene regulation

TEACHING EXPERIENCE

09/2020 - present • TEACHING ASSISTANT

9.014 Quantitative Methods and Computational Models in Neuroscience Teaching Assistant to Professor Mehrdad Jazayeri. We cover linear systems and operations, dimensionality reduction, Bayesian approaches, descriptive and generative models, classification and clustering, and dynamical systems. As a whole, the class provides theoretical and practical skills to analyze and model neurobiological data collected at multiple levels in neuroscience: molecular, systems and cognitive levels.

05/2020 - 08/2020 • UNDERGRADUATE MENTOR

I mentored MIT undergraduate student Liane Xu in computational analysis of single-cell RNA-sequencing data from human brain to identify mechanisms of cellular vulnerability to SARS-COV-2 viral infection.

OTHER RESEARCH WORKS

- The impact of APP TMD mutations on Aβ42/40 ratio and Aβ/tau pathology in 3D human neural cell culture model of Alzheimer's disease. E. BRAND, **D. MAYDELL**, K. BRENNER, S. KWAK, K. J. WASHCOSKY, R. E. TANZI, D. KIM. Society for Neuroscience, 2018, San Diego, CA. *(Abstract)*
- Aβ42/40 ratio regulates tau pathology in 3D human neural cell culture models of AD. D. KIM, S. KWAK, E. BRAND, K. J. WASHICOSKY, J. PARK, **D. VON MAYDELL**, K. BRENNER, J. L. ARONSON, E. BYLYKBASHI, S. CHOI, R. E. TANZI. Society for Neuroscience, 2018, San Diego, CA. *(Abstract)*
- A 3D model of Alzheimer's disease using clonal human neural progenitor cells. K. J. WASHICOSKY, J. L. ARONSON, S. KWAK, J. PARK, **D. VON MAYDELL**, K. BRENNER, S. CHOI, R. E. TANZI, D. KIM. Society for Neuroscience, 2018, San Diego, CA. *(Abstract)*
- Characterization of pathological cascades in a single-clonal 3D cell culture model of Alzheimer's disease. J. ARONSON, KJ. WASHICOSKY, S. KWAK, **D. MAYDELL**, C. D'AVANZO, E. BYLYKBASHI, S. HARTMANN, K.C. ROET, I. KIM, S. NING, S.H. CHOI, C.J. WOOLF, R.E. TANZI, D.Y. KIM. 13th International Conference on Alzheimer's & Parkinson's Diseases; 2017 March 29 April 2; Vienna, Austria. *(Poster)*

- Stratification of Cervico-Vaginal 1H NMR Metabolomics Data Reveals Biomarkers of Spontaneous Preterm Birth. Honors thesis research presented to the Lübeck Interdisciplinary Platform for Genome Analytics, University of Lübeck; 2018 July 10; Lübeck, Germany. *(Invited Talk)*
- Immunology and Immunotherapy of Cancer (6BBI0305): Anti-PD1/PDL1 Therapy: Reactivating the Anti-Cancer Immune Response, final grade: 90% (A++) *(BSc Coursework, literature review)*
- Epigenetics (6BBG0302): Deregulation of Neurod6 is Associated with Cerebellar Hypoplasia in CHARGE Syndrome, final grade: 90% (A++) *(BSc Coursework, data handling paper focused on analysis of ATAC-seq, ChIP-seq, and HiC datasets)*

GRADUATE COURSES

- Machine Learning for Genomics / Advanced Computational Biology (*present*)
- Computational Systems Neuroscience Core, PE
- Synaptic Mechanisms of Learning and Memory, PE
- Quantitative Methods and Computational Models in Neuroscience, A+
- Molecular and Cellular Neuroscience, A+
  N.B. PE = reflects performance at any of the levels A, B, or C, under the circumstance of an Institute emergency closure (COVID-19 pandemic)

OTHER REFERENCES

Rudolph E. Tanzi, Ph.D.
Professor of Neurology, Harvard Medical School
tanzi@helix.mgh.harvard.edu

A. James Mason, DPhil
Reader in Membrane Biochemistry
King's College London
james.mason@kcl.ac.uk

Lars Bertram, MD
Professor of Genome Analytics
University of Lübeck
lars.bertram@uni-luebeck.de

Kristin Ardlie, Ph.D.
Director of GTEx
Broad Institute of Harvard and MIT
kardlie@broadinstitute.org

LANGUAGES

COMPUTER LANGUAGES

- R, Python, and Matlab (very proficient)
- HTML and CSS (intermediate)

SPOKEN LANGUAGES

- German and English (mother tongue bilingual)
- French (advanced)

OTHER ACTIVITIES

- Resource for Easing Friction and Stress student peer mediator (bcsrefs.mit.edu), 09/2020-present
- MIT cycling team treasurer (elected position), 06/2020 - present
- MIT cycling racing team member, 2019 - present
- King's College London GKT Orchestra (Flute), 2014 - 2016
- King's College Athletics and Cross Country Club, 2014 - 2015