

Taibo Li

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EDUCATION

Johns Hopkins School of Medicine

M.D./Ph.D. Candidate

PhD Co-advisors: Alexis Battle, Ph.D., and Carl Wu, Ph.D.

Baltimore, MD, USA

Entering Class of 2017

Massachusetts Institute of Technology (MIT)

M.Eng. in Electrical Engineering and Computer Science, GPA 5.0/5.0

S.B. in Electrical Engineering and Computer Science, GPA 5.0/5.0

Cambridge, MA, USA

Sept. 2016–June 2017

Sept. 2012–June 2015

University of Cambridge

Exchange Student in Engineering, Part IIA Tripos, Top First Class Honours

Cambridge, UK

Oct. 2013–June 2014

The University of Hong Kong

Candidate for B.Eng. in Medical Engineering and B.B.A in Finance, GPA 4.16/4.30

Transferred to MIT

Hong Kong

Sept. 2011–July 2012

SIGNIFICANT RESEARCH EXPERIENCES

Department of Cell Biology, Johns Hopkins School of Medicine

Rotation Student

Baltimore, MD, USA

Apr. 2018–Nov. 2019

Advisors: Rong Li, Ph.D., and Alexis Battle, Ph.D.

- Developed a robust computational pipeline to analyze copy number changes at the chromosomal level based on single-cell transcriptomic data
- Analyzed 212K single neurons and glial cells from three species (mouse, macaque, and human) and identified cell-type-specific prevalence of neuronal aneuploidy signatures

Massachusetts General Hospital / Broad Institute of MIT and Harvard

Research Assistant, Associate Computational Biologist, Master's Student

Boston, MA, USA

Apr. 2013–May 2017

Advisors: Kasper Lage, Ph.D. and Guoping Feng, Ph.D.

- Performed an integrative analysis of single-cell transcriptomics data of mouse thalamic reticular nucleus (TRN), revealing distinct subnetworks of thalamocortical signaling (master's thesis)
- Analyzed functional brain networks perturbed by genetics of psychiatric disorders from quantitative proteomic and RNA-Seq data on Ngn-differentiated human neurons
- Designed an integrated pipeline to analyze single-cell RNA-Seq data of mouse thalamic reticular nucleus
- Developed and benchmarked InWeb, a globally scored human protein-protein interaction network (PPIN) that contains 585,843 interactions from 43,021 publications, which achieved consistently better biological signals than existing resources
- Developed and tested novel computational methods, including Quack and Network Mutation Burden (NMB), that can learn pathway structure and detect novel gene associations based on biological networks

Integrative Neuromonitoring and Critical Care Informatics Group, MIT
MIT EECS – Wertheimer Undergraduate Research and Innovation Scholar

Cambridge, MA, USA
Sept. 2014–Apr. 2016

Advisor: Thomas Heldt, Ph.D.

- Categorized sources and prevalence of critical care alarms from 1,277 adult patients and 917 neonatal patients; identified relationship between alarm frequency and postmenstrual age for babies between 25-40 weeks of age in neonatal ICU
- Designed a general computational framework to parse and match electronic medical records and bedside monitoring data for 9,708 patients
- Developed a random forest model that can predict the occurrence of clinically irrelevant threshold alarms

Wellcome Trust – Medical Research Council Cambridge Stem Cell Institute
Genetics Society Summer Research Studentship

Cambridge, UK
Dec. 2013–Aug. 2014

Advisor: Bon-Kyoung Koo, Ph.D.

- Identified three groups of genes which revealed five distinct subtypes of colorectal cancer patients using microarray data from 1,080 patients; confirmed classification results with Kaplan-Meier analysis
- Optimized cloning conditions for vectors with up to 4 concatamers to simultaneously knock out paralog genes using CRISPR/Cas9 technology; performed mouse intestinal organoid culturing

WORK EXPERIENCE

EndoLayers
Developer

Boston, MA, USA
Sept. 2015–Sept. 2017

- Developed a deep neural network model that can help physicians identify adenomatous polyps during colonoscopy procedures

Quantopian, Inc.
Intern

Boston, MA, USA
Dec. 2012–Aug. 2013

- Wrote trading algorithms in Python, one of which was featured in the front page of Hacker News and got 15,600 views
- Organized company outreach events in Beijing, and presented machine learning trading algorithms

China Affairs Office, The University of Hong Kong
Assistant Officer

Hong Kong
July 2012–Aug. 2012

- Managed communications with more than 1,500 applicants to the University and provided timely feedback on admission information and decisions; arranged interviews in 10 cities across China

Microsoft China
Marketing Intern

Beijing, China
Dec. 2011–Jan. 2012

- Tested three online applications, and suggested alternative designs to improve user experience
- Monitored and analyzed hourly website traffic to help prioritize the company's online marketing strategies

PUBLICATIONS AND PRESENTATIONS

Selected Journal Articles

- Fan G, Zeng Q, Feng Y, Hu Y, An Q, **Li T**, et al. (2020) X-chromosome dosage compensation dynamics in human early embryos. *bioRxiv* (in review).
- International Multiple Sclerosis Genetics Consortium, et al. (2019). Multiple sclerosis genomic map implicates peripheral immune cells and microglia in susceptibility. *Science*, **365**(6460), eaav7188.
- Li T***, Kim A*, Mercer J, et al. (2018). A unified web platform for network-based analyses of genomic data. *Nat Methods*, **15**(7), 543-46.
- Li T**, Matsushima M, Timpson W, et al. (2018). Epidemiology of bedside monitoring alarms in the neonatal intensive care unit. *J Perinatol*, **38**(8), 1030-38.
- Li D, **Li T**, Paschalis E, et al. (2017) Optic nerve head characteristics in chronic angle closure glaucoma detected by swept-source OCT. *Curr Eye Res*, **42**, 1450-57.
- Li T***, Wernersson R*, Hansen RB*, et al. (2017). A scored human protein-protein interaction network to catalyze genomic interpretation. *Nat Methods*, **14**, 61-64.
- Li J, Zhang C, Huang P, Kuru E, Forster-Benson E, **Li T**, Church G. (2017) Dissecting limiting factors of the Protein synthesis Using Recombinant Elements (PURE) system. *Translation* **5**, e1327006.
- Andersson-Rolf A, Merenda A, Mustata RC, **Li T**, Dietmann S, Koo B-K. (2016). Simultaneous paralogue knockout using a CRISPR-concatemer in mouse small intestinal organoids. *Dev Biol*, **420**(2), 271-277.

Conference Presentations

- Li T**, Zhu J, Li R. Single-cell RNA-sequencing reveals cell-type-specific levels of aneuploidy in mammalian nervous system. (Program #56.) Presented at the 72nd Annual Meeting of The American Society of Human Genetics; 2019 October 16; Houston, TX.
- Li T**, Kim A, Battle A, Lage K. Single-cell co-expression network demonstrated superior biological signal in tissue-specific network analyses. (Program #344.) Presented at the 71st Annual Meeting of The American Society of Human Genetics; 2018 October 20; San Diego, CA.
- Li T**, Kim A, Malolepsza E, Nacu E, Tanenbaum B, Ripke S, Daly M, Schenone M, Jaffe J, Eggan K, Lage K. Human brain networks perturbed by genetics and targeted by therapeutics in psychiatric disorders. Poster session presented at: Fourth Annual Broad-ISF Cell Circuits Symposium; 2016 June 28; Cambridge, MA.
- Li T**, Cohen J, Craig M, Tsourides K, Mahmud N, Berzin T. The next endoscopic frontier: a novel computer vision program accurately identifies colonoscopic colorectal neoplasia. Poster session presented at: Endoscopy – new imaging technology. Digestive Disease Week; 2016 May 23; San Diego, CA.
- Li T**, Matsushima M, Timpson W, Young S, Gupta M, Heldt T. Epidemiology of bedside monitoring alarms in the neonatal ICU. Poster session presented at: Neonatology (NICU quality improvement). Pediatric Academic Societies Meeting; 2016 April 30; Baltimore, MD.

TEACHING EXPERIENCE

Cambridge Street Upper School

Volunteer

Cambridge, MA, USA

Jan. 2016–May. 2017

- Designed classroom activities to teach genetics to 70 eighth-grade students
- Mentored one seventh-grade student with bi-weekly email correspondence and lab visits at the Broad Institute of MIT and Harvard

The Perse School for Girls

Assistant Instructor

Cambridge, UK

Oct. 2013–Mar. 2014

- Provided weekly tutoring for 30 students in Year 9 math class, and lectured trigonometry using real-life examples to stimulate student interest; advised the school math Olympiad team

MIT Global Startup Labs

Technical Instructor

Accra, Ghana

June 2013–July 2013

- Taught entrepreneurship and web app development (Django/Heroku) to 30 college freshmen at Ashesi University College
- Helped launch five startups and organized networking events to promote entrepreneurship in the local community

Massachusetts Institute of Technology

Lab Assistant, Teaching Assistant

Cambridge, MA, USA

Jan. 2013–May 2013

- Provided weekly laboratory instructions and evaluations for 80 students in 6.01: Introduction to Electrical Engineering and Computer Science I (Course Director: Professor Dennis Freeman)
- Prepared problem set and recitation materials for the edX course 6.041x: Probabilistic Systems Analysis (Course Director: Professor John N. Tsitsiklis)

INSTITUTIONAL SERVICE

Johns Hopkins University School of Medicine

Sept. 2018–Now

- *MD/PhD Program*: organizing annual program retreats
- *Member of the Student Committee on Admissions (2020-2021)*: interviewing applicants to the MD program at the Johns Hopkins University School of Medicine
- *Medical Student Research Symposium (2018,2019)*: organized annual student research symposium for 400+ MD candidates; coordinated faculty judging and logistics
- *MD student groups*: Student Interest Group in Neurology (SIGN), Genetics in Medicine Interest Group, Asian Pacific American Medical Student Association

MIT Department of Electrical Engineering and Computer Science (EECS)

Sept. 2014–June 2015

- *Member of the Undergraduate Student Advisory Group in EECS (USAGE)*: provided feedback on student workload, curriculum reform, and faculty advising to the department administration
- *Member of the Student Sub-Committee on Faculty Search*: interviewed four electrical engineering faculty candidates and compiled student ratings to the faculty search committee
- *Peer Advising Chair of the IEEE/ACM club*: trained 15 peer counselors and held panel discussions to address questions and concerns from underclassmen; organized orientation sessions for exchange and special students in the Department
- *Member of the Eta Kappa Nu honor society*: collected and compiled student evaluation from 16 EECS courses which provided feedback for faculty and department administration

MIT Global Education and Career Development (GECD) Go Abroad Program Sept. 2014–June 2015

Peer Mentor

- Helped plan and organize Go Abroad info sessions, orientations, and booths at the MIT International Fair, encouraging interested students to explore Go Abroad opportunities and addressing their questions

COMMUNITY SERVICE

Student Wellness Initiative at Johns Hopkins School of Medicine, Co-Chair Feb. 2018–Feb. 2019

- Organized monthly events to promote student physical and mental health
- Member of University Healthy Services (UHS) Wellness Committee: provided input to optimize wellness resources for students on the East Baltimore Campus

Boston Children's Hospital, Cultural Navigator Volunteer Sept. 2015–Sept. 2016

- Assisted patients and families from China to communicate with caregivers, navigate through hospital resources, and adapt to the new cultural environment; supporting patient discharge

MyH2O, Developer June 2014–July 2016

- Developed online platform myh2o.org and associated Android applications where people can share water quality information across China
- Assisted with funding applications (winner of MIT Ideas Global Challenge '13, the National Geographic Air and Water Conservation Fund '14, Harvard SEED for Social Innovation '15, and MIT Water Innovation Prize '16)

MIT China Care Club, Membership Chair Oct. 2012–Apr. 2016

- Planned and participated in monthly playgroup meetings for more than ten families with adopted Chinese children between 5-10 years old in the Boston area; co-organized on-campus recruitment and fundraising events

St John Ambulance Cambridge LINKS (UK), First Aider Oct. 2013–June 2014

- Attended weekly first aid seminars and became a licensed first aider; covered four major duties in the Cambridge area and treated more than 50 casualties

ACTIVITIES AND INTERESTS

Professional Associations: American Medical Association, American College of Physicians, American Academy of Neurology, American Society of Human Genetics, Association of Chinese Geneticists in America, Asian Pacific American Medical Student Association

Programming: Python, R, MATLAB, C, C++, Android

Languages: Mandarin Chinese (native), Cantonese (professional), and Spanish (basic)

Social Activities: Alpha Delta Phi Fraternity; Magdalene Boat Club Cambridge; St. John's College, the University of Hong Kong

Performing: MIT Jewish and Israeli a cappella group *Techiya* (Bass)

Other Hobbies: Avid traveler; Fan of the Baltimore Symphony Orchestra; MIT "Pirate Certified": archery, fencing, pistol, and sailing

ACADEMIC HONORS AND AWARDS

Association of Chinese Geneticists in America Outstanding Graduate Presentation Award (2018)
Johns Hopkins School of Medicine Daniels Scholar (2017)
MIT School of Engineering Henry Ford II Scholar Award (2015)
MIT Peter J. Eloranta Research Fellowship (2015)
Member of Tau Beta Pi Honor Society (2015)
Genetics Society (UK) Summer Studentship (2013)
Cambridge Consultants Prize for Bioengineering (2013)

OTHER AWARDS

MIT School of Humanities, Arts, and Social Sciences Burchard Scholarship (2014)
The Hong Kong Jockey Club Scholarship (2012)