

# Dennis Gong

Graduate of Johns Hopkins University

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Johns Hopkins Whiting  
School of Engineering

B.S. Biomedical Engineering + Applied  
Mathematics & Statistics

3.88

Winter 2021

## Research Experience

2018 - 2022

Undergraduate Researcher, PI: Jordan Green, JHMI

- Project 1: Harnessed non-viral gene therapy with polymeric biodegradable nanoparticles to transfect human ASCs and promote angiogenesis. Paper below
- Project 2: Engineered properties promoting biomimicry into particle based artificial antigen presenting cells (aAPCs) such as particle stiffness and lipid coating to improve particle immunostimulatory efficiency
- Project 3: Developed machine learning models for prediction of PBAE nanoparticle transfection efficiency to reduce screening burden. Leading two other undergraduates in an independent project.
- Project 4: Developing a macrophage targeted PBAE gene delivery nanoparticle for in-situ genetic engineering of tumor associated macrophages in solid tumor applications.
- Project 5: Characterizing PBAE coating strategies for ligand targeted gene delivery to immune cells in vivo

8/2020 - 8/2021

Research Intern, PI: Stephen Meltzer, Capsulomics

- Developed prognostic risk and diagnostic classification models from biomarker methylation data using machine learning for applications in Esophageal cancers
- Analyzed Nanopore sequencing data for esophageal cancer structural variants and differential methylation

1/2020 - 8/2021

Design Team Leader, PIs: Dr. Youseph Yazdi & Dr. Jake Abernathy, JHH  
Armstrong Institute for Patient Safety

- Recruited a team of 7 other undergraduates through Covid-19 on a collaborative project with nurses and 2 clinicians at the Johns Hopkins Hospital
- Developed a syringe holder to improve intra-operative medication organization that is currently being used in operating rooms at two hospital systems
- Filed IP disclosure and established multi-center collaborations for testing

2020

SENS Summer Fellow, PI: Dr. Michael Snyder, Stanford Genetics

- Analyzed GTE<sub>x</sub> proteomics and transcriptomics data to identify protein complexes related to aging

2019

Summer Research Fellow, CompBio Core, National Institutes of Aging

- Analyzed SardiNIA dataset, a longitudinal clinical health trait study of 7000+ participants to characterize biomarker changes with aging through time

2017 Summer Researcher, PI: Dr. Jonathan Powell, Bloomberg~Kimmel Institute  
· Investigated role of serum and glucocorticoid-regulated kinase 1 (SGK1) in CD8+ T Cell differentiation

## Teaching

Fall 2021 Biomedical Data Science, TA for Dr. Brian Caffo & Raimond Winslow  
Fall 2021 Computational Cardiology, TA for Dr. Natalia Trayanova & Dr. Eileen Haase  
Summer 2021 Biomedical Engineering Practice & Innovation, TA for Dr. Caitlin Torgerson & Dr. Jessica Dunleavy  
Spring 2021 Biological Models & Simulations, TA for Dr. Aleksander Popel  
Spring 2021 Biomedical Engineering Innovation, TA for Dr. Ethan Nyberg  
Fall 2020 Biochemical and Molecular Engineering, TA for Dr. Eileen Haase

## Publications

- [1] Est Witte S, Farris A, Tzeng S, Hutton D, Parikh K, **Gong D**, Calabresi K, Grayson W, Green J. Non-Viral Gene Delivery of HIF-1 $\alpha$  to Adipose-Derived Stem Cells to Promote Angiogenesis. *Acta Biomaterialia*. July 2020.
- [2] **Gong D**, Lunz D, Stover JS, Meltzer SJ. The Clinical Utility of a Genetic Risk Test for Barrett's Esophagus. \*Under review
- [3] Ma K, Tsai HL, Nolet C, **Gong D**, et al. Accurate Detection of Esophageal Squamous Cell Cancer (ESCC) Using Machine Learning with Methylated DNA Biomarkers. \*Under review
- [4] **Gong D**, et al. Machine Learning Guided Structure Function Predictions Enable In-Silico Nanoparticle Screening and Improved Variants for Polymeric Gene Delivery. \*In Preparation
- [5] Sims H, **Gong D**, et al. Development of a Syringe Hub to Improve Operating Room Organization and Reduce Cognitive Burden. \*In Preparation

## Abstracts & Presentations

- [1] Ma K, Tsai HL, Nolet C, **Gong D**, et al. Accurate Detection of Esophageal Squamous Cell Carcinoma (ESCC) Using Machine Learning with Methylated DNA Biomarkers. American College of Gastroenterology. 2021.
- [2] Merz B, Bastakoti I, Kann L, Lu D, **Gong D**, et al. Analytical Validation of a Barrett's Esophagus Risk Stratification Methylation Assay. American College of Gastroenterology. 2021.
- [3] **Gong D**. Machine Guided Structure Function Predictions Enable In-Silico Nanoparticle Screening for Polymeric Gene Delivery. PULSE Seminar. Baltimore, MD. 2021
- [4] Lu D, Merz B, Nguyen C, **Gong D**, et al. Impact of a DNA Methylation-based Assay on Gastroenterologists' Recommendations for Risk-Stratified BE Patients: A Randomized Clinical Utility Study. American College of Gastroenterology Annual Meeting. Virtual Meeting. 2021

- [5] **Gong D**, Jiang L. Aging Related Pathway Discovery Via Whole Body Transcriptomics. BMES. Virtual Meeting. 2020
- [6] **Gong D**, Est Witte S, Green J. Surface and Materials Engineering for Artificial Antigen Presenting Cells. BMES. Philadelphia, PA. 2019
- [7] Est Witte S, **Gong D**, Green J. Surface Engineering of a Biomimetic, Soft, Lipid-Coated, Biodegradable Artificial Antigen Presenting Cell. BMES. Philadelphia, PA. 2019
- [8] **Gong D**, Kim YR, Patel C, Powell J. An Association Between SGK1 Gene Expression and CD8+ T Cell Differentiation. Maryland Junior Science Symposium. College Park, MD. 2018

## Honors and Awards

- 2021
- Dean's list (11/11 semesters)
  - Election to Tau Beta Pi
  - David T. Yue Memorial Teaching Award
  - Provost's Undergraduate Research Award
  - Johns Hopkins Business Plan Competition, Finalist
- 2020
- Summer Research Fellowship, SENS Research Foundation
  - Technology Fellow, Center for Educational Resources
  - Design Team Video Competition, 1<sup>st</sup> Place
- 2019
- Bisciotti Prize for Student Entrepreneurship, Fast Forward JHU
- 2018
- President's Environmental Youth Award, U.S. EPA
  - Recognition of Commitment to Public Service, Baltimore Board of School Commissioners

## Skills

Computational	Python {sklearn, NumPy, Pandas, PyTorch, Matplotlib, Seaborn}, R {shiny, lme4, ggplot2, tidyverse}, bash, Git, ImageJ, Galaxy, HPC, PyMol, UGene
Molecular Biology	Mammalian cell culture, PCR, Blotting, ELISA, Flow Cytometry, RNA/DNA Harvest, transfection, cell viability assays
Particle Chemistry	Synthesis {PBAE, PEG, PLGA, LNP}, Surface chemistry and coating {lipopolyplex, electrostatic coatings (PGA), Mal-Thiol, EDC/NHS, biotin-avidin}, Characterization {DLS, NTA, TEM}
Animal Models	Mice handling and dissection, particle biodistribution studies, T-cell isolation

## Professional Experiences

- 2022 - present
- Vaccitech (Avidea Technologies), Research Intern
- Epitope prediction analysis for immunogen design using bioinformatics
  - Target identification and screening for cancer vaccine program
- 2021 - present
- Longitude Capital, Consultant
- All stages venture fund focused on healthcare and life sciences with \$1.8 B AUM
  - Ad hoc consulting on therapeutics deals. Delivered concise insights in days

- 2021 - present      Compound Venture Partners, Biotech Diligence and Research Consultant
  - Seed stage VC firm investing in cutting edge technology. Delivered insights to partners and advised on bio and health-tech deals
  
- 2021              Zafrens, Research and Operations Associate
  - Seed stage startup focusing on RNA binding protein biology and interactions.
  - Conducted literature search for target ID and competitive landscaping
  
- 2020              Alix Ventures, Summer Venture Fellow
  - Seed stage biotech VC firm based in San Francisco. Sourced deals, organized a podcast, and wrote articles. Gained an appreciation of investment preferences and trends and developments in biotech/biopharma.
  - Mentored by Chas Pulido, General Partner.
  
- 2019-20         Johns Hopkins Technology Ventures, Senior Fellow
  - Patent and licensing office of Johns Hopkins. Managed a team of undergraduates, MBA candidates, and PhD students and wrote IP and market recommendations for licensing attorneys.
  
- 2018-19         Kubanda Cryotherapy, Business Development Intern
  - Seed stage startup focusing on veterinary cryosurgery. Conducted 25 stakeholder interviews and built partnerships with local hospitals for Phase 1 clinical study.
  - Wrote testing protocols and automated data collection with a real-time Arduino based visualization tool.

## Service & Outreach

- 2022 - present      Gilchrist, Hospice Volunteer
  - Certified end of life care specialist
  
- 2019-20         MedHacks, President & Co-Director
  - Organized an online design competition during Covid-19 for 1000+ participants with 50+ judges and volunteers and 25k in prizes
  
- 2020-21         JHU Biomedical Engineering Society, Group Mentor
  
- 2019              SNF Agora Institute for Global Democracy, Founding Student Board Member
  
- 2017-18         Baltimore Beyond Plastic, Head of Community Engagement
  - Youth led grassroots environmental advocacy initiative to ban polystyrene food service containers in Maryland. Testified at city and state council hearings and talked to 1000s of stakeholders. Legislation was successfully passed