

Grace Jaeyoon Kim

6th year MD-PhD Graduate Student

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Education

M.D-Ph.D. Program

MD Jul 2019 – Present

PhD in Genetics

March 2020 – May 2025

M.S. in Medical Genetics and Genomics

Aug 2017 - June 2018

B.A. in Biology

Minor in Studio Art

Aug 2010 - June 2014

Louisiana State University Health Sciences Center

Ph.D. Thesis: “Examining the Influence of Host and Viral Genetics on SARS-CoV-2 Disease Severity in Local and National Clinical Datasets”

Advisor: Lucio Miele, MD, PhD

Tulane University School of Medicine

Master’s Thesis: “The Effects of the Microbiome and Metabolome in Mismatch Repair Deficient Patients”

Advisor: Zachary Pursell, PhD

New York University

Honor’s Thesis: “The Effects of Complete Nutrient Depletion, Nitrogen, Phosphorous, and Potassium, in Arabidopsis”

Advisor: Gloria Coruzzi, PhD

Research Experience

LSU Health Sciences New Orleans, LA

Graduate (Ph.D.) Experience

Apr 2021 – Present

Advisor: Lucio Miele, M.D., Ph.D.

Department of Genetics, Director of Louisiana Cancer Research Center

- Bioinformatically analysed T cell epitope diversity between Covid-19 variants of concern, generating a manuscript in preparation, 2 first authors, multiple awards and presentations
- Transcriptomic analysis of T2DM associated Triple Negative Breast Cancer clinical samples

LSU Health Sciences New Orleans, LA

Graduate Rotation

May 2019 – Aug 2020

Advisor: Sunyoung Kim, Ph.D. (no relation)

Department of Biochemistry

- Prepared and analysed clinical neonatal fecal samples for shotgun proteomic analysis with a focus on altered carbohydrate metabolism
- Helped develop an IRB for adult IBD fecal biobank

Tulane University School of Medicine New Orleans, LA

Graduate (M.S.) Experience

Aug 2017 – Jun 2018

Advisor: Zachary Pursell, Ph.D.

Department of Biochemistry

- Masters thesis on the effects of high glycaemic index diets and the microbiome/metabolome on colorectal cancer in hereditary nonpolyposis colorectal cancer (HNPCC) aka Lynch syndrome

New York University New York, NY

Post-undergraduate

Apr 2016 – May 2017

Advisor: Gloria Coruzzi, Ph.D.

Carroll and Milton Petrie Professor in Biology, Member of National Academy of Sciences

- Managed several projects on nitrogen use efficiency in Zea mays, Oryza sativa, and Arabidopsis thaliana, resulting in co-authorship on 2 publications
- Managed project funded by DOE (DE-SC0014377) and collaborations with Cold Spring Harbor and the New York Botanical Garden

Memorial Sloan Kettering Cancer Center New York, NY

Post-undergraduate

May 2014- Apr 2016

Advisor: Eric Pamer, M.D.

Department of General Medicine and Infectious Disease

- Prepared samples in a clinical trial for autologous fecal microbiota transplantation to lower incidence of *C. difficile*
- Optimized protocols for RNA shotgun sequencing of microbiome
- Genotyping of microbiota via V4-V5 for various microbiome projects

Publications

1. **Kim GJ**, Dos Santos NB, Chu S, Crabtree JS, Horswell R, Vince N, Miele L. *HLA Associated COVID-19 Clinical Outcomes in the All of Us Dataset*. (Manuscript in progress)
2. Chu S, Horswell RL, Miele L, **Kim GJ**, Fort D, Zhang J. Using a nonamer-based methods to estimate epidemic control. The American Journal of the Medical Sciences, Volume 371, S176 - S177. DOI: 10.1016/j.amjms.2025.12.290
3. **Kim GJ**, Alam MA, Crabtree JS, et al. Long COVID incidence across SARS-CoV-2 lineages and identification of conserved spike targets for multivalent vaccines. *Journal of Clinical and Translational Science*. 2025;9(1):e288. doi:10.1017/cts.2025.10226
4. **Kim GJ**, Elnaggar J, Varnado M, Feehan A, Tauzier D, Rose R, Lamers S, Sevalia M, Nicholas N, Gravois E, Fort D, Crabtree J, Miele L. A bioinformatic analysis of T-cell epitope diversity in SARS-CoV-2 variants: association with COVID-19 clinical severity in the United States population. *Frontiers in Immunology*. 2024 May; 15. doi: <https://doi.org/10.3389/fimmu.2024.1357731>. PMID: 38784379
5. Cheng CY, Li Y, Varala K, Bubert J, Huang J, **Kim GJ**, Halim J, Arp J, Shih HS, Levinson G, Park SH, Cho HY, Moose SP, Coruzzi GM. Evolutionarily informed machine learning enhances the power of predictive gene-to-phenotype relationships. *Nat Commun*. 2021 Sep 24;12(1):5627. PMID: 34561450
6. Varala K, Marshall-Colón A, Cirrone J, Brooks MD, Pasquino AV, Léran S, Mittal S, Rock TM, Edwards MB, **Kim GJ**, Ruffel S, McCombie WR, Shasha D, Coruzzi GM. Temporal transcriptional logic of dynamic regulatory networks underlying nitrogen signaling and use in plants. *Proc Natl Acad Sci U S A*. 2018 Jun 19;115(25):6494-6499. PMID: 29769331
7. Caballero S, Kim S, Carter RA, Leiner IM, Sušac B, Miller L, **Kim GJ**, Ling L, Pamer EG. Cooperating Commensals Restore Colonization Resistance to Vancomycin-Resistant *Enterococcus faecium*. *Cell Host Microbe*. 2017 May 10;21(5):592-602.e4. PMID: 28494240
8. Lee YJ, Arguello ES, Jenq RR, Littmann E, **Kim GJ**, Miller LC, Ling L, Figueroa C, Robilotti E, Perales MA, Barker JN, Giralt S, van den Brink MRM, Pamer EG, Taur Y. Protective Factors in the Intestinal Microbiome Against *Clostridium difficile* Infection in Recipients of Allogeneic Hematopoietic Stem Cell Transplantation. *J Infect Dis*. 2017 Apr 1;215(7):1117-1123. PMID: 28498996
9. Ristova D, Carré C, Pervent M, Medici A, **Kim GJ**, Scalia D, Ruffel S, Birnbaum KD, Lacombe B, Busch W, Coruzzi GM, Krouk G. Combinatorial interaction network of transcriptomic and phenotypic responses to nitrogen and hormones in the *Arabidopsis thaliana* root. *Sci Signal*. 2016 Oct 25;9(451):rs13. PMID: 27811143
10. Caballero S, Carter R, Ke X, Sušac B, Leiner IM, **Kim GJ**, Miller L, Ling L, Manova K, Pamer EG. Distinct but Spatially Overlapping Intestinal Niches for Vancomycin-Resistant *Enterococcus faecium* and Carbapenem-Resistant *Klebsiella pneumoniae*. *PLoS Pathog*. 2015 Sep;11(9):e1005132. PMID: 26334306
11. Harris B, Littmann E, Ling L, Morjaria S, Miller L, **Kim G**, Siriratsivawong R, Singh A, Giralt S, Stover D, Taur Y, Pamer E. Serial Changes in Oral and Respiratory Microbiota in Patients Undergoing Hematopoietic Stem Cell Transplantation: A Pilot Study. A47. CLINICAL ASPECTS AND DIAGNOSIS OF RESPIRATORY TRACT INFECTIONS [Internet] American Thoracic Society; 2015. A1787-A1787p. DOI: doi:10.1164/ajrccm-conference.2015.191.1_MeetingAbstracts.A1787
12. Rosas U, Cibrian-Jaramillo A, Ristova D, Banta JA, Gifford ML, Fan AH, Zhou RW, **Kim GJ**, Krouk G, Birnbaum KD, Purugganan MD, Coruzzi GM. Integration of responses within and across *Arabidopsis* natural accessions uncovers loci controlling root systems architecture. *Proc Natl Acad Sci U S A*. 2013 Sep 10;110(37):15133-8. PMID: 23980140

Abstracts

National Oral Presentations

1. **Kim GJ**, Dos Santos NB, Chu S, Crabtree JS, Horswell R, Vince N, Miele L. *Host HLA Allelic Variation Shapes Risk of Severe SARS-CoV-2 Infection and Long COVID*. 2026 American Association for Immunology Conference. 2026 American Association of Immunology

2. **Kim GJ**, Elnaggar J, Sevalia M, Nicholas N, Crabtree JS, Miele L. Predicting Clinical Severity for the United States Population: Bioinformatic analysis of COVID-19 CD8+ T cell Epitope Diversity. 2024 William Schnaper Visiting Scientist TL1 Minisymposium; 2024 March 27.

Regional Oral Presentations

1. (LSUHSC 3MT Representative) **Kim GJ**, Elnaggar J, Varnado M, Tauzier D, Gravois E, Sevalia M, Nicholas N, Crabtree JS, Miele L. Preventing severe COVID-19 infection: A game of cops and robbers. Conference of Southern Graduate Schools 2024; 2024 Mar 13.
2. **Kim GJ**, Elnaggar J, Sevalia M, Nicholas N, Crabtree JS, Miele L. Estimating Clinical Severity in the United States Population from Predicted CD8+ T cell Epitope Diversity. 2024 Southeast Regional Clinical and Translational Science Alliance Conference; 2024 Feb 28. (Plenary Speaker)
3. **Kim GJ**, Elnaggar J, Sevalia M, Nicholas N, Crabtree JS, Miele L. Effects of SARS-CoV-2 variants on CD8+ T cell epitope diversity: estimating clinical severity in the United States Population. 2024 Southern Society for Clinical Investigation Regional Meeting; 2024 Feb 23.

Local Oral Presentations

4. **Kim, GJ**, Alam MA, Chu S, Crabtree JS, Rose R, Lamers SS, Horswell R, Miele L, and Fort D. "Connecting SARS-CoV-2 Variant Sequences to Patient Records: Analyzing Viral Determinants of PASC Incidence" (2024). Graduate Research Day. 7. https://digitalscholar.lsuhs.edu/grad_rs/2024grd/presentations/7
5. **Kim GJ**, Elnaggar J, Sevalia M, Nicholas N, Crabtree JS, Miele L. Kim, Grace J., "Effects of SARS-CoV-2 Variants on CD8+ T cell Epitope Diversity: Estimating Clinical Severity in the United States Population" (2023). Graduate Research Day. 10. https://digitalscholar.lsuhs.edu/grad_rs/2023grd/poster2/10
6. **Kim GJ**, Crabtree JS, Miele L. Kim, Grace J.; Crabtree, Judy S.; and Miele, Lucio, "A Bioinformatics Analysis Exploring the Impact of Delta and Omicron Variants on T Cell Reactivity" (2022). Graduate Research Day. 15. https://digitalscholar.lsuhs.edu/grad_rs/2022grd/abstracts/15

National Poster Presentations

7. **Kim GJ**, Brito NJ, Chu SJ, Horswell RJ, Vince NJ, Miele LJ. Human Leukocyte Antigen (HLA) Alleles Associated with Severe COVID-19 Outcomes in the All of Us Cohort. Association for Clinical and Translational Science 2025. 2025; Washington, D.C, United States.
8. **Kim GJ**, Crabtree JS, Miele L. Approximating Clinical Severity of Influenza Infection for the 27 Most Common HLA Class I Alleles During the 2024-2025 Flu Season. 9th National IDeA Symposium of Biomedical Research Excellence (NISBRE). 2024 June; Washington, DC, United States.
9. Chu S, Horswell R, Miele L, **Kim G**, Fort D, Zhang J. Predicting Upturns in COVID-19 Incidence Based on Changes in Nonamers. 9th National IDeA Symposium of Biomedical Research Excellence. 2024 June; Washington DC, United States.
10. **Kim GJ**, Elnaggar J, Varnado M, Tauzier D, Gravois E, Sevalia M, Nicholas N, Crabtree JS, Miele L. Predicting Clinical Severity of SARS-CoV-2 Variants for the 27 Most Common HLA Class I Alleles. Association for Clinical and Translational Science 2024 Meeting; 2024 Apr 2.
11. **Kim GJ**, Crabtree JS, Miele L. A bioinformatics analysis exploring the impact of Delta and Omicron variants on T cell epitope diversity. 2023 Association of American Physicians, the American Society for Clinical Investigation, and the American Physician Scientists Association Joint Meeting (AAP/ASCI/APSA Joint Meeting); 2023 Apr 21.
12. Crosby C, Horswell R, Chu S, **Kim GJ**, Miele L. Ocular and Systemic Complications of Type II Diabetes: Sociodemographic Predictors of Emergency Department Utilization. 2025 Winn CIPP Symposium; 2025 July 18; Seattle, WA, United States.

Regional Poster Presentations

13. **Kim GJ**, Alam MA, Chu S, Crabtree JS, Rose R, Lamers SS, Horswell R, Miele L, and Fort D. Investigating the Relationship of Variant Sequences and Post-acute Sequelae of SARS-CoV-2 Infection. 2024 CCTS Translational Science Symposium; 2024 Sept 25.
14. **Kim GJ**, Alam MA, Chu S, Crabtree JS, Rose R, Lamers SS, Horswell R, Miele L, and Fort D. Linking SARS-CoV-2 Genomic Variants to Patient Records: Investigating the Relationship of Variant Sequences and Post-acute Sequelae of SARS-CoV-2 Infection. 2025 Southern Society for Clinical Investigation Regional Meeting; 2025 Feb 23.
15. S Chu, RL Horswell, L Miele, **GJ Kim**, D Fort, J Zhang. Predicting upturns in COVID19 incidence based on changes in nonamers. The American Journal of the Medical Sciences, 2025

16. Crosby C, Horswell R, Chu S, **Kim GJ**, Miele L. Ocular and Systemic Complications of Type II Diabetes: Sociodemographic Predictors of Emergency Department Utilization. Louisiana State University Health Sciences Center Research Symposium. 2025 Jul; New Orleans, LA, United States
17. S Chu, RL Horswell, L Miele, **GJ Kim**, D Fort, J Zhang. *Using a Nonamer-based Methods to Estimate Epidemic Control*. 2026 Southern Society for Clinical Investigation Regional Meeting; 2026 Feb 26.

Local Poster Presentations

18. **Kim GJ**, Buckley R, Heath M, Guidry J, Kim SY. *Shotgun and quantitative proteomics characterization of altered carbohydrate metabolism in preterm infants*. 2020 LSUHSC Medical Student Research Day; 2020 Oct 10.
19. **Kim GJ**, Crabtree JS, Miele L. *Predicting Common HLA Class I Alleles that may be Unprotected during the 2024-2025 Flu Season*. 2024 LSUHSC MD PhD Retreat; 2024 June.
20. Martinez A, **Kim GJ**, Aguilar VH, Knecht M. *Before the First Breath: A Severe and Life-Threatening Case of Congenital Toxoplasmosis*. 2026 LSUHSC Pediatric Research Day; 2026 May 15.

Honors and Awards

- 2026 American Association of Immunology Trainee Abstract Award
- 2025 LSUHSC Medical Student Research Enhancement Program Grant, \$10,000
- 2nd Place Southern Society for Clinical Investigation Young Investigator Award at the 2025 Southern Society for Clinical Investigation Southern Regional Meeting
- Blue Ribbon Awardee of the 2025 Association for Clinical and Translational Science (ACTS) Conference
- Inaugural Speaker for William Schnaper TL1 Visiting Scholar In Person Grand Rounds at Georgetown-Howard GHUCCTS, June 2024, Washington D.C.
- 2024-2025 NIH Ruth L. Kirschstein National Research Service Award (NRSA) Pre-doctoral Research Training Program (T32) Award, University of Alabama Birmingham Center for Clinical and Translational Sciences
- Blue Ribbon Awardee of the 2024 Association for Clinical and Translational Science (ACTS) Conference
- 1st Place winner of the Nathan Solomon & Irene Oransky-Solomon Medical Student Award of the 2024 Southern Society for Clinical Investigation Southern Regional Meeting
- Best Presentation Runner Up Award, William Schnaper Visiting Scientist TL1 Minisymposium 2024
- 2024 LSUHSC Medical Student Travel Award
- 2023-2024 NIH Ruth L. Kirschstein National Research Service Award (NRSA) Pre-doctoral Research Training Program (TL1) Award, University of Alabama Birmingham Center for Clinical and Translational Sciences
- 1st Place winner of 2023 Louisiana State University Health Sciences Center MD/PhD 3 Minute Thesis (3MT)
- Winner of 2023 University of Alabama Birmingham Clinical and Translational Science Training Symposium 3MT

Professional Service

American Association for Cancer Research

- 2026 AACR Early-career Hill Day Participant
- Member, 2026-Present

American Association of Immunologists

- 2025-2026 Clinical Immunology Committee Trainee Liaison
- Member, 2022-Present

Seminar Talks

- Pulmonology Seminar, 2024, “Utilizing Translational and Clinical Informatics to Examine COVID-19 Clinical Severity Outcomes”

2025-2026 University of Alabama Birmingham CTSA T32 Selection Committee

- Interviewer for final round “Chalk Talks” in T32 Cohort Selection Committee

University of Alabama Birmingham CTSA TL1/T32 Summer Jamboree Committee

- Planning Committee Member, 2024
- Networking and Closing Session Leader

American Physician Scientist Association

- Undergraduate Mentor, 2019-2024

American Physician Scientist Association – LSUHSC New Orleans Local Chapter

- Founding Vice President, 2023-2024
- Planning Committee for 2024 Greater New Orleans American Physician Scientist Association Poster Session
- Organized the inaugural poster session with LSUHSC, Tulane School of Medicine, and several undergraduate intuitions (Xavier, Tulane, and Dillard)
- Secretary, 2024-2025

Peer Advocate Liaison Program (PAL)

- Department of Genetics Graduate Student Representative, 2021-Present

Graduate Studies Social Media Committee

- Department of Genetics Representative, 2022-2023

Students Advocating for Equity in Medicine

- Vice President of Social Climate, 2020-2021
- Member, 2020-Present

Teaching and Mentorship

Teaching Assistant

Fall 2024

Course: Techniques and Trends in Biomedical Sciences I - BIOMED130

Department of Graduate Studies

- Synthesized and taught a lecture titled “Introducing Sequencing Methods”
- Generated and graded 3 exam questions and a homework prompt

Mentor

Summer 2024

Medical Student Summer Research Mentor

- Mentored four medical students participating in the Robert A. Winn Diversity In Clinical Trials Award Program (WINN CIPP)
- Assisted each student in developing an All of Us Research Project and IRB Protocol

Teaching Assistant

Summer 2024

Course: Clinical Genetics – PYAS 6574

Department of Physician Assistant Studies, LSUHSC New Orleans

- Taught a lecture on Population Genetics
- Selected exam questions

Mentor

Summer 2023

Medical Student Summer Research Mentor

- Mentored one medical student and one undergraduate student to conduct data revalidation, resulting in both students co-authorship of in our Frontiers in Immunology manuscript

Tutor

Aug 2017 – Jun 2023

Wyzant Private Tutor

AP Biology, ACT Science, Biostatistics, Cell Biology, and Genetics

- Tutored a broad range of students, including: high school and graduate level (Master, Doctoral, and Medical).

Teaching Assistant

Jun 2017 – May 2019

Course: AP Biology

New Orleans Science and Math Charter High School

- Mentored students for the regional Science Fair
- assisted with lesson planning, lecturing, grading, and tutoring

Hobbies

- Needle point (Cross-stitching, embroidery)
- Traveling with my daughter and husband
- Gardening, Cooking, Flower arrangement