

Loren Gragert, Ph.D.

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Education

2014 Ph.D., Biomedical Informatics and Computational Biology, University of Minnesota, Minneapolis, MN
2001 B.S., Biochemistry, University of St. Thomas, Saint Paul, MN
B.A., Quantitative Methods / Computer Science, University of St. Thomas, Saint Paul, MN

Academic Appointments

2015- Assistant Professor, Department of Pathology and Laboratory Medicine
Tulane University School of Medicine, New Orleans, LA
2020- Histocompatibility Lab Director-In-Training
Section of Clinical Immunology, Allergy, and Rheumatology, Department of Medicine
Tulane University School of Medicine, New Orleans, LA

Professional Training and Experience

2003-15 Senior Bioinformatics Scientist, National Marrow Donor Program / Be The Match, Minneapolis, MN
2001-03 Software Engineer, Lockheed Martin Tactical Systems, Eagan, MN

Professional Organizations

2004- American Society for Histocompatibility and Immunogenetics (ASHI)
2007- European Federation of Immunogenetics (EFI)
2018- American Society of Transplantation (AST)
2008-15 World Marrow Donor Association (WMDA)
2006-12 American Society of Human Genetics (ASHG)

Professional Activities

Institutional Service

2020- Social Media Recruiting Committee, Tulane SOM Biomedical Sciences PhD and MS Programs
2018- Associate Director, Tulane Cancer Crusaders Next Generation Sequencing Analysis Core
2018- Faculty Advisor, Computational Biology at Tulane student organization

Teaching

2020- Tulane SOM GBCH 7240, Advanced Bioinformatics | Graphics and Deep Learning units
2018- Tulane SOM MCPB 6070, Molecular and Cellular Pathobiology | Bioinformatics unit
2018- Tulane SOM GBCH 7230, Intro to Bioinformatics | Python and Sequence Alignment units
2016- Tulane SOM Pathology Resident Training Program | Pathology Informatics unit

Current Trainees

2020- D. Giovanni Biagini, PhD program in Biomedical Sciences
2020- Marian Dribus, PhD program in Biomedical Sciences
2020- Grace Wager, PhD program in Biomedical Sciences
2020- Muhammad Azeem Khan, MS program in Clinical Research (MSCR)

Trainee Alumni

2016-19 Navchetan Kaur (Postdoctoral Fellow | Postdoctoral Fellow, Atul Butte Lab, UCSF)
2016-17 Richard Davis (MD/MPH Practicum and Culminating Experience | Pathology Resident, Duke)

Extramural Services

2021 Instructor, Population Genetics and Bioinformatics, AFDT Histocompatibility Specialist Course
2020- Editorial Board, *Human Immunology*
2019 Local Organizer, 2nd Immune Polymorphism and Population Dynamics Workshop, New Orleans, LA
2019- Immunobiology Working Committee, Center for International Blood and Marrow Transplant Research
2019- Project Leader, HLA Dictionary, 18th International HLA and Immunogenetics Workshop
2018 Co-Organizer, 1st Immune Polymorphism and Population Dynamics Workshop, Ramat Gan, Israel
2015- Editorial Board, *HLA* (formerly *Tissue Antigens*)

Journal Reviewing

American Journal of Transplantation | Transplantation | Cancer Research | Bioinformatics | Human Immunology (Editorial Board) | HLA (Editorial Board) | PLoS ONE | PLoS Neglected Tropical Diseases | Cytotherapy | BMC Bioinformatics | International Journal of Immunogenetics

Grant Reviewing

NIH PBKD Study Section (ECR Program) | UK MRC Fellowship

Invited Talks

National & International

04/2021 European Federation for Immunogenetics Virtual Conference
10/2020 Georgetown University, Current Topics in Histocompatibility and Transplantation Teleconference
10/2020 American Society for Histocompatibility and Immunogenetics (ASHI) Virtual Conference
03/2020 One Lambda Technical Workshop, Rancho Mirage, CA
09/2019 American Society for Histocompatibility and Immunogenetics (ASHI) Conference, Pittsburgh
09/2019 Georgetown University, Current Topics in Histocompatibility and Transplantation Teleconference
05/2019 Georgetown University, Current Topics in Histocompatibility and Transplantation Teleconference
07/2018 University of Pennsylvania, Dept. of Pathology, Histocompatibility Laboratory
01/2015 American Association of Blood Bankers (AABB) Audioconference
09/2014 Georgetown University, Current Topics in Histocompatibility and Transplantation Teleconference
09/2012 Georgetown University, Current Topics in Histocompatibility and Transplantation Teleconference
10/2011 American Association of Blood Bankers (AABB) Conference, San Diego
06/2011 Cord Blood Symposium, Plenary Session, San Francisco

Regional & Institutional

12/2018 Tulane University, Primate Research Center seminar series
10/2018 Tulane University, Computer Science Department seminar series
07/2018 University of Alabama-Birmingham, Informatics Institute seminar series
01/2018 Tulane University School of Medicine, Biochemistry and Molecular Biology Department seminar series
04/2017 LSU Health Sciences Center, Epidemiology Department seminar series
03/2017 Tulane University School of Medicine, Structural and Cellular Biology Department seminar series
11/2014 National Marrow Donor Program Council Meeting

Research Support

Ongoing

2020-2025 NIAID HLA/KIR Region Genomics 1U01AI152960-01 - (Co-I; 22.5% effort)
"MHC and KIR Sequencing and Association Analyses in the iGeneTRAIIn Studies"
2015- National Marrow Donor Program (NMDP) Sponsored Project - (PI; 25% effort)
"HLA Bioinformatics Research"

Awards

2010 World Marrow Donor Association (WMDA) International Donor Registries Conference (IDRC), Best Abstract
2009 British Society of Histocompatibility and Immunogenetics (BSHI) Meeting, Best Abstract
2009 European Federation of Immunogenetics (EFI) Conference, Best Abstract

Publications

Original Investigations

1. Sullivan, H, **Gragert L**, Smith G, Lindblad K, Gebel H, Bray R. (2020) A simple electronic tool for comparing amino acid sequences of HLA-DPB1 alleles. Human Immunology DOI: 10.1016/j.humimm.2020.06.011.
2. Kransdorf E, Pando M, Stewart D, Lindblad K, Patel J, Kim I, Zhang X, Maiers M, Kobashigawa J, **Gragert L**. (2020) Stem Cell Donor HLA Typing Improves CPRA in Kidney Allocation. American Journal of Transplantation DOI: 10.1111/ajt.16156.
3. Kaur N, Pinelli D, Kransdorf E, Pando M, Smith G, Murphey C, Kamoun M, Bray R, Tambur A, **Gragert L**. (2020) A blueprint for electronic utilization of ambiguous molecular HLA typing data in organ allocation systems and virtual crossmatch. Human Immunology 81(2-3) 65-72.
4. Lobkovsky A, Levi L, Wolf Y, Maiers M, **Gragert L**, Alter I, Louzoun Y, Koonin E. (2019) Multiplicative fitness, rapid haplotype discovery and fitness decay explain evolution of human MHC. Proceedings of the National Academy of Sciences 116(28): 14098-14104.
5. Zhong C, **Gragert L**, Maiers M, Hill BT, Garcia-Gomez J, Gendzekhadze K, Senitzer D, Song J, Weisenburger D, Goldstein L, Wang S. (2019) The association between HLA and non-Hodgkin lymphoma subtypes, among a transplant-indicated population. Leukemia & Lymphoma 60(12): 2899-2908.
6. Allan D, Kiernan J, **Gragert L**, Dibdin M, Bartlett D, Campbell T, Mostert K, Halpenny M, Ganz K, Maiers M, Petraszko T, Elmoazzen H. (2019) Reducing ethnic disparity in access to high quality HLA-matched cord blood units for transplantation: analysis of the Canadian Blood Services' Cord Blood Bank inventory. Transfusion 59(7): 2382-2388.
7. Maiers M, Halagan M, **Gragert L**, Bashyal P, Schneider J, Lutsker P, Louzoun Y. (2019) GRIMM : GGraph IMputation and Matching for HLA Genotypes. Bioinformatics 35(18): 3520–3523.
8. Kaur N, Kransdorf EP, Pando MJ, Maiers M, Ray B, Lee JH, Lalli P, Murphey C, Bray R, **Gragert L**. (2018) Mapping molecular HLA typing data to UNOS antigen equivalents. Human Immunology 79: 781–789.
9. Louzoun Y, Alter I, **Gragert L**, Albrecht M, Maiers M. (2018) Modeling Coverage Gaps in Haplotype Frequencies via Bayesian Inference to Improve Stem Cell Donor Selection. Immunogenetics 70: 279–292.
10. Alter I, **Gragert L**, Fingerson S, Maiers M, Louzoun Y. (2017) HLA Class I Haplotype Diversity Is Consistent with Selection for Frequent Existent Haplotypes. PLoS Computational Biology 13(8): e1005693.
11. Dehn J, Setterholm M, Buck K, Kempenich J, Beduhn B, **Gragert L**, Madbouly A, Fingerson S, Maiers M (2016) A Predictive HLA Matching Algorithm to Enhance Rapid Identification of the Optimal Unrelated Hematopoietic Stem Cell Sources for Transplant. Biology of Blood and Marrow Transplantation 22(11): 2038-2046.
12. Bochtler W, **Gragert L**, Patel ZI, Robinson J, Steiner D, Hofmann JA, Plngel J, Baouz A, Melis A, Schneider J, Eberhard HP, Oudshoorn M, Marsh SGE, Maiers M, Muller CR (2016) A comparative reference study for the validation of HLA-matching algorithms in the search for allogeneic hematopoietic stem cell donors and cord blood units. HLA 87(6): 439-48.
13. Beksac M*, **Gragert L***, Fingerson S, Maiers M, Zhang MJ, Albrecht M, Zhong X, Cozen W, Dispenzeiri A, Lonial S, Hari P. (2016) HLA Polymorphism and Risk of Multiple Myeloma. Leukemia 30, 2260-2264. *Equal Contributions
14. Paunić V, **Gragert L**, Schneider J, Müller C, Maiers M. (2016) Charting Improvements in US Registry HLA Typing Ambiguity Using a Typing Resolution Score. Human Immunology 77(7): 542-9.
15. Torikai H, Mi L, **Gragert L**, Maiers M, Najjar A, Ang S, Maiti S, Dai J, Switzer K, Huis H, Dulay G, Reik A, Rebar E, Holmes M, Gregory P, Champlin R, Shpall E, Cooper LJM. (2016) Genetic editing of HLA expression in hematopoietic stem cells to broaden their human application. Scientific Reports 6, 21757.
16. Petz LD, Burnett JC, Li H, Li S, Tonai R, Bakalinskaya M, Shpall S, Armitage S, Kurtzberg J, Regan D, Clark P, Querol S, Gutman J, Spellman S, **Gragert L**, Rossi J. (2015) Progress toward curing HIV infection with hematopoietic cell transplantation. Stem Cells Cloning 8: 109–16.
17. Slater N, Louzoun Y, **Gragert L**, Maiers M, Chatterjee A, Albrecht M. (2015) Power Laws for Heavy-Tailed Distributions: Modeling Allele and Haplotype Diversity for the National Marrow Donor Program. PLoS Computational Biology 11(4), e1004204s.
18. **Gragert L**, Eapen M, Williams E, Freeman J, Spellman S, Baitty R, Hartzman R, Rizzo JD, Horowitz M, Confer D, Maiers M. (2014) HLA Match Likelihoods for Hematopoietic Stem-Cell Grafts in the U.S. Registry. The New England Journal of Medicine 371, 339–348.
19. **Gragert L**, Fingerson S, Albrecht M, Maiers M, Kalaycio M, Hill BT. (2014) Fine-Mapping of HLA Associations with Chronic Lymphocytic Leukemia in US Populations. Blood 124(17), 2657-65.
20. Madbouly A, **Gragert L**, Freeman J, Leahy N, Gourraud PA, Hollenbach JA, Kamoun M, Fernandez-Vina M, Maiers, M.

(2014) Validation of statistical imputation of allele-level multilocus phased genotypes from ambiguous HLA assignments. *Tissue Antigens* 84(3), 285–92.

21. **Grager L**, Madbouly A, Freeman J, Maiers M. (2013) Six-locus high resolution HLA haplotype frequencies derived from mixed-resolution DNA typing for the entire US donor registry. *Human Immunology* 74, 1313–1320.
22. Eberhard HP, Madbouly AS, Gourraud PA, Balere MA, **Grager L**, Torres HM, Pingel J, Schmidt AH, Steiner D, van der Zanden HG, Oudshoorn M, Marsh SG, Maiers M, Muller CR. (2013) Comparative validation of computer programs for haplotype frequency estimation from donor registry data. *Tissue Antigens* 82(2), 93-105.
23. Milius RP, Mack SJ, Hollenbach JA, Pollack J, Heuer ML, **Grager L**, Spellman S, Guethlein LA, Cooley S, Bochtler W, Mueller CR, Robinson J, Marsh SG, Maiers M (2013) Genotype List String: a grammar for describing HLA and KIR genotyping results in a text string. *Tissue Antigens* 82, 106–12.
24. Petz LD, Redei I, Bryson Y, Regan D, Kurtzberg J, Shpall E, Gutman J, Querol S, Clark P, Tonai R, Santos S, Bravo A, Spellman S, **Grager L**, Rossi J, Li S, Li H, Senitzer D, Zaia J, Rosenthal J, Forman S, Chow R. (2013) Hematopoietic Cell Transplantation with Cord Blood for Cure of HIV Infections. *Biology of Blood Marrow Transplantation* 19, 393–7.
25. Maiers M, **Grager L**, Madbouly A, Steiner D, Marsh SGE, Gourraud PA, Oudshoorn M, Zanden H, Schmidt AH, Pingel J, Hofmann J, Muller C, Eberhard HP (2013) 16(th) IHIW: Global analysis of registry HLA haplotypes from 20 Million individuals: Report from the IHIW Registry Diversity Group. *International Journal of Immunogenetics* 40(1):66–71.
26. Hollenbach JA, Madbouly A, **Grager L**, Vierra-Green C, Flesch S, Spellman S, Begovich A, Noreen H, Trachtenberg E, Williams T, Yu N, Shaw B, Fleischhauer K, Fernandez-Vina M, Maiers, M (2012) A combined DPA1~DPB1 amino acid epitope is the primary unit of selection on the HLA-DP heterodimer. *Immunogenetics* 64(8):559–69.
27. Paunić V*, **Grager L***, Madbouly A, Freeman J, Maiers M. (2012) Measuring Ambiguity in HLA Typing Methods. *PLoS ONE* 7(8):e43585. *Equal Contributions
28. Klitz W, **Grager L**, Trachtenberg E. (2012) Spectrum of HLA associations: the case of medically refractory pediatric acute lymphoblastic leukemia. *Immunogenetics* 64(6):409–19.
29. Abi-Rached L, Jobin M, Kulkarni S, McWhinnie, A, Dalva K, **Grager L**, Babrzadeh F, Gharizadeh B, Luo M, Plummer F, Kimani J, Carrington M, Middleton D, Rajalingam R, Beksac M, Marsh SGE, Maiers M, Guethlein L, Tavoularis S, Little AM, Green RE, Norman PJ, Parham P (2011) The Shaping of Modern Human Immune Systems by Multiregional Admixture with Archaic Humans. *Science* 334(6052), 89-94.
30. Klitz W, **Grager L**, Maiers M, Fernandez-Viña M, Ben-Naeh Y, Benedek G, Brautbar C, Israel S (2010). Genetic differentiation of Jewish populations. *Tissue Antigens* 76(6), 442-58.
31. Klitz W, **Grager L**, Maiers M, Tu B, Lazaro A, Yang R, Xu Q, Masaberg C, Ng J, Hurley CK (2009) Four-locus high-resolution HLA typing in a sample of Mexican Americans. *Tissue Antigens* 74: 508-513.
32. Klitz W, Maiers M, **Grager L** (2008) Re-creation of the genetic composition of a founder population. *Human Genetics* 124: 417-421.
33. Howard DH, Meltzer D, Kollman C, Maiers M, Logan B, **Grager L**, Setterholm M, Horowitz MM (2008) Use of cost-effectiveness analysis to determine inventory size for a national cord blood bank. *Medical Decision Making* 28: 243-253.
34. Kollman C, Maiers M, **Grager L**, Muller C, Setterholm M, Oudshoorn M, Hurley CK (2007) Estimation of HLA-A, -B, -DRB1 haplotype frequencies using mixed resolution data from a national registry with selective retyping of volunteers. *Human Immunology* 68: 950-958.
35. Maiers M, **Grager L**, Klitz W (2007) High-resolution HLA alleles and haplotypes in the United States population. *Human Immunology* 68: 779-788.

Reviews and Commentary

1. **Grager L**. A New Tool for Interpreting Molecular HLA Typing Data for Entry into UNet. (2019) *ASHI Quarterly* 42(4) 30-31.
2. Kransdorf E, Pando M, **Grager L**, Kaplan B. (2017) HLA Population Genetics in Solid Organ Transplantation. *Transplantation* 101(9):1971-1976.

Book Chapters and Government Reports

1. Petz LD, Spellman S, **Grager L**. *Cord Blood: Biology, Transplantation, Banking, and Regulation*. Broxmeyer H, editor. Bethesda, MD: AABB Press; 2011. Chapter 32, The Underutilization of Cord Blood Transplantation: Extent of the Problem, Causes, and Methods of Improvement; p.557-584. 714p.
2. Howard DH, Maiers M, Kollman C, Logan B, **Grager L**, Setterholm, M. *Cord Blood - Establishing a National Hematopoietic Stem Cell Bank Program*. Meyer EA, Hanna K, Gebbie K, editors. Washington, DC: Institute of Medicine of the National Academies: The National Academies Press; 2005. Chapter Appendix E, A Cost-Benefit Analysis of Increasing Cord Blood

Inventory Levels; p.221-241. 314p. <https://www.nap.edu/read/11269/chapter/14>

Preprints and/or Manuscripts Under Review

1. Maiers M, Simanovsky A, **Gragert L**, Lutsker P, Louzoun Y. Excess homozygosity in HLA alleles and haplotypes at mating and population levels.
2. Israeli S, **Gragert L**, Maiers M, Louzoun Y. HLA Haplotype Frequency Estimation for Heterogeneous Populations Using a Graph-Based Imputation Algorithm.

Abstracts: (120 conference abstracts; available upon request)