

Curriculum Vitae

Name: Jennifer Jean Trowbridge, PhD

Office Address: The Jackson Laboratory
600 Main Street
Bar Harbor, ME 04609

Education:

1998-2002 B.Sc. The University of Western Ontario (Genetics)
2002-2006 Ph.D. The University of Western Ontario (Microbiology and Immunology)

Postdoctoral Training:

2006-2012 Postdoctoral Fellow (Hematology/Oncology) Dana-Farber Cancer Institute and Children's Hospital Boston

Positions and Academic Appointments:

2011-2012 Instructor in Pediatrics, Harvard Medical School
2012-2018 Assistant Professor, The Jackson Laboratory
2012-Present Adjunct Faculty, University of Maine
2012-Present Adjunct Faculty, Tufts University School of Medicine
2018-2023 Associate Professor, The Jackson Laboratory
2020-2021 Co-Program Leader, NCI-Designated Basic Cancer Center, The Jackson Laboratory
2021-Present Chair, Scientific Advisory Committee (faculty senate), The Jackson Laboratory
2023-Present Professor, The Jackson Laboratory

Awards and Honors:

2005-2007 National Cancer Institute of Canada Research Studentship
2006-2007 Poland Award (University of Western Ontario)
2007 Canadian Institutes of Health Research Postdoctoral Fellowship (declined)
2007-2010 Leukemia & Lymphoma Society Postdoctoral Fellowship
2011-2013 American Society of Hematology Scholar Award
2013-2017 The Ellison Medical Foundation New Scholar in Aging
2016-2018 The V Foundation for Cancer Research V Scholar Award
2020 International Society for Experimental Hematology (ISEH) Janet Rowley Award
2020-2025 Leukemia & Lymphoma Society Scholar Award
2021 Invited Introducer of Plenary Scientific Session, ASH Annual Meeting
2022-Present The Dattels Family Endowed Chair
2023 The Mark Foundation for Cancer Research Emerging Leader Award

Professional Memberships & External Committee Service:

2007-Present Member, American Society of Hematology (ASH)
2014-Present Member, American Association for Cancer Research (AACR)
2015 NIH Study Section- Molecular & Cellular Hematology, ad-hoc

2015-2016	Study Section, ASH Scholar Award
2017-Present	Member, International Society for Experimental Hematology (ISEH)
2019-2020	Member, ASH Awards Review Subcommittee
2020	NIH Study Section- Cancer and Molecular Pathogenesis, ad-hoc
2020-2022	Scientific Program Committee, ISEH Annual Meeting
2020-2022	Discovery Research Grant Review Panel, Edward P. Evans Foundation
2020-2025	Member, ASH Scientific Committee on Epigenetics and Genomics
2021	Vice-chair, ASH Scientific Committee on Epigenetics and Genomics
2021-2023	Director of the Americas (elected), ISEH Board of Directors
2022	Chair, ASH Scientific Committee on Epigenetics and Genomics
2022	Career Development Program Review Panel, Leukemia & Lymphoma Society
2022-2025	Elected Member, Promotions & Faculty Committee, Tufts University Graduate School of Biomedical Sciences

External Research Support (Current):

5 R01 DK118072-05, NIH/NIDDK 07/01/18-06/30/23
 Trowbridge (PI), Total (w/ indirect costs): \$2,384,108
Developing Effective Approaches to Extend Hematopoietic Healthspan by Targeting Cell-Extrinsic and Cell-Intrinsic Alterations at Middle Age

5 R01 AG069010-03, NIH/NIA 08/01/20-06/30/25
 Trowbridge (PI), Total (w/ indirect costs): \$2,391,672
Discovery of Aging-Associated Mechanisms Causing Expansion and Progression of Clonal Hematopoiesis of Indeterminant Potential (CHIP)

EvansMDS Foundation Discovery Research Grant 09/01/20-08/31/23
 Trowbridge (PI), Total: \$596,655
Discovery of Mechanisms by Which the Aging Bone Marrow Microenvironment Drives Progression of Clonal Hematopoiesis to MDS

Leukemia & Lymphoma Society Scholar Award 07/01/21-06/30/25
 Trowbridge (PI), Total: \$300,000
Discovery of Aging-Driven Mechanisms Causing Clonal Hematopoiesis (CH) and its Progression to Hematological Malignancy

5 U01 AG077925-02, NIH/NIA 09/15/21-06/30/26
 Trowbridge (PI), Levine (co-PI)
 Total (w/ indirect costs): \$518,079
Assessing the Interplay Between Inflammatory Signaling and Epigenetic Dysregulation in Age-Associated Clonal Hematopoiesis and Leukemia Initiation

The Mark Foundation for Cancer Research Emerging Leader Award 01/01/23-12/31/25
 Trowbridge (PI), Total: \$750,000
Uncovering Susceptibility and Resilience Mechanisms in Blood Cancer Development

External Research Support (Completed, past 5 years):

H3 Biomedicine Sponsored Research Agreement 02/02/21-08/02/22
Trowbridge (PI), Total: \$169,412
Epigenetic Regulation of Clonal Hematopoiesis

EvansMDS Foundation Discovery Research Grant 09/01/18-08/31/20
Trowbridge (PI)
Discovery of Mechanisms Driving Evolution of Clonal Hematopoiesis to Bone Marrow Failure from Dnmt3a-Mutant Stem Cells

V2016-005 JJT-01, V Foundation for Cancer Research 11/01/16-10/31/18
Trowbridge (PI)
Modeling Epigenome Evolution from Dnmt3A Mutation to the Development of Acute Myeloid Leukemia (AML)

Publication List:

Original Articles

Shojaei F, **Trowbridge J**, Gallacher L, Yuefei L, Goodale D, Karanu F, Levac K, Bhatia M. Hierarchical and ontogenic position serve to define the molecular basis of human hematopoietic stem cell behavior. Developmental Cell 2005; **8**: 651-663.

Rosu-Myles M, Stewart E, **Trowbridge J**, Ito CY, Zandstra P, Bhatia M. A unique population of bone marrow cells migrates to skeletal muscle via hepatocyte growth factor/c-Met axis. Journal of Cell Science 2005; **118**: 4343-4352.

Trowbridge JJ, Xenocostas A, Moon RT, Bhatia M. Glycogen synthase kinase-3 is an in vivo regulator of hematopoietic stem cell repopulation. Nature Medicine 2006; **12**: 89-98.

Trowbridge JJ, Scott MP, Bhatia M. Hedgehog modulates cell cycle regulators in stem cells to control hematopoietic regeneration. Proc. Natl. Acad. Sci. 2006; **103**: 14134-14139.

Trowbridge JJ, Snow JW, Kim J, Orkin SH. DNA methyltransferase 1 is essential for and uniquely regulates hematopoietic stem and progenitor cells. Cell Stem Cell 2009; **5**: 442-449.

Trowbridge JJ, Guezguez B, Moon RT, Bhatia M. Wnt3a activates dormant c-kit- bone marrow derived cells with short-term multilineage hematopoietic reconstitution capacity. Stem Cells 2010; **28**: 1379-1389.

Snow JW, **Trowbridge JJ**, Fujiwara T, Emambokus NE, Grass JA, Orkin SH, Bresnick EH. A single cis element maintains repression of the key developmental regulator Gata2. PLoS Genetics 2010; **6**: e1001103.

Snow JW, **Trowbridge JJ**, Johnson KD, Fujiwara T, Emambokus N, Grass JA, Orkin S, Bresnick EH. Context-dependent function of “GATA switch” sites in vivo. Blood 2011; **117**: 4769-4772.

Trowbridge JJ, Sinha AU, Li M, Armstrong SA, Orkin SH. Haploinsufficiency of Dnmt1 impairs leukemia stem cell function through derepression of bivalent chromatin domains. Genes & Development 2012; **26**: 344-349.

Bai X*, **Trowbridge JJ***, Riley E, Lee J, DiBiase A, Kaartinen V, Orkin SH, Zon LI. TIF1-gamma plays an essential role in murine hematopoiesis and regulates transcriptional elongation of erythroid genes. Developmental Biology 2013; **373**: 422-430. *Equal contribution

Xu J, Bauer DE, Kerényi MA, Vo TD, Hou S, Hsu Y-J, Yao H, **Trowbridge JJ**, Mandel G, Orkin SH. Corepressor-dependent silencing of fetal hemoglobin expression by BCL11A. Proc. Natl. Acad. Sci., 2013; **110**: 6518-6523.

George J, Uyar A, Young K, Kuffler L, Waldron-Francis K, Marquez E, Ucar D, **Trowbridge JJ**. Leukaemia cell-of-origin identified by chromatin landscape of bulk tumour cells. Nature Communications 2016; **7**: 12166. doi: 10.1038/ncomms12166.

Burberry A, Suzuki N, Wang J, Moccia R, Mordes DA, Stewart MH, Suzuki-Uematsu S, Ghosh S, Singh A, Merkle FT, Koszka K, Li Q, Zon L, Rossi DJ, **Trowbridge JJ**, Notarangelo LD, Eggen K. Loss-of-function mutations in the C9ORF72 mouse ortholog cause fatal autoimmune disease. Science Translational Medicine 2016; **8**: 347ra93. doi: 10.1126/scitranslmed.aaf6038.

Young K, Borikar S, Bell R, Kuffler L, Philip V, **Trowbridge JJ**. Progressive alterations in multipotent hematopoietic progenitors underlie lymphoid cell loss in aging. The Journal of Experimental Medicine 2016; **213**: 2259-2267.

Hsu JH, Hubbell-Engler B, Adelmant G, Huang J, Joyce CE, Vazquez F, Weir BA, Montgomery P, Tsherniak A, Giacomelli AO, Perry JA, **Trowbridge J**, Fujiwara Y, Cowley GS, Xie H, Kim W, Novina CD, Hahn WC, Marto JA, Orkin SH. Prmt1-mediated translation regulation is a crucial vulnerability of cancer. Cancer Research 2017; **77**: 4613-4625.

Loberg MA, Bell RK, Goodwin LO, Eudy E, Miles LA, SanMiguel JM, Young K, Bergstrom DE, Levine RL, Schneider RK, **Trowbridge JJ**. Sequentially induced mouse models reveal that Npm1 mutation causes malignant transformation of Dnmt3a-mutant clonal hematopoiesis. Leukemia 2019; **33**: 1635-1649.

Khokhar ES, Borikar S, Eudy E, Stearns T, Young K, **Trowbridge JJ**. Aging-associated decrease in the histone acetyltransferase KAT6B causes myeloid-biased hematopoietic stem cell differentiation. Experimental Hematology 2020; **82**: 43-52.

Young K, Loberg MA, Eudy E, Schwartz LS, Mujica KD, **Trowbridge JJ**. Heritable genetic background alters survival and phenotype of Mll-AF9-induced leukemias. Experimental Hematology 2020; **89**: 61-67.

Young K, Eudy E, Bell R, Loberg MA, Stearns T, Sharma D, Velten L, Haas S, Filippi MD, **Trowbridge JJ**. Decline in IGF1 in the bone marrow microenvironment initiates hematopoietic stem cell aging. Cell Stem Cell 2021; **28**: 1473-1482.

Wu HC, Rerolle D, Berthier C, Hleihel R, Sakamoto T, Quentin S, Benhenda S, Morganti C, Wu C, Conte L, Rimsky S, Sebert M, Clappier E, Souquere S, Gachet S, Soulier J, Durand S, **Trowbridge JJ**, Benit P, Rustin P, El Hajj H, Raffoux E, Ades L, Itzykson R, Dombret H, Fenaux P, Espeli O, Kroemer G, Brunetti L, Mak TW, Lallemand-Breitenbach V, Bazarbachi A, Falini B, Ito K, Martelli MP, de The H. Cancer Discovery 2021; **11**: 3198-3213.

SanMiguel JM, Eudy E, Loberg MA, Miles LA, Stearns T, Mistry JJ, Rauh MJ, Levine RL, **Trowbridge JJ**. Cell origin-dependent cooperativity of mutant Dnmt3a and Npm1 in clonal hematopoiesis and myeloid malignancy. Blood Advances 2022; **6**: 3666-3677.

SanMiguel JM, Eudy E, Loberg MA, Young KA, Mistry JJ, Mujica KD, Schwartz LS, Stearns TM, Challen GA, **Trowbridge JJ**. Distinct tumor necrosis factor alpha receptors dictate stem cell fitness versus lineage output in Dnmt3a-mutant clonal hematopoiesis. Cancer Discovery 2022; online ahead of print doi: 10.1158/2159-8290.CD-22-0086.

Bowman RL, Dunbar A, Mishra T, Xiao W, Waarts MR, Fernandez Maestre I, Eisman SE, Cai L, Cai SF, Sanchez Vela P, Mowla S, Martinez Benitez AR, Park Y, Csete IS, Krishnan A, Lee D, Boorady N, Potts CR, Jenkins MT, Carroll MP, Meyer SE, Miles LA, Ferrell Jr PB, **Trowbridge JJ**, Levine RL. Modeling clonal evolution and oncogenic dependency in vivo in the context of hematopoietic transformation. bioRxiv 2022; doi: 2022.05.18.492524

Colom Diaz PA, Mistry JJ, **Trowbridge JJ**. Hematopoietic Stem Cell Aging and Leukemia Transformation. Blood. 2023 Feb 17;blood.2022017933. doi:10.1182/blood.2022017933. Online ahead of print.

Reviews, Chapters and Editorials

Trowbridge JJ, Moon RT, Bhatia M. Hematopoietic stem cell biology: Too much of a Wnt thing. Nature Immunology 2006; **7**:1021-1023.

Wang J, **Trowbridge JJ**, Rao S, Orkin SH. Proteomic studies of stem cells. In D. Melton, & L. Girard (Eds.), StemBook (Internet). 2008 Cambridge, MA: Harvard Stem Cell Institute.

Trowbridge JJ, Orkin SH. DNA methylation in adult stem cells: new insights into self-renewal. Epigenetics 2010; **5**: 189-193.

Trowbridge JJ. Hematopoietic stem cells. In S. Li, N. L'Heureux, & J. Elisseeff (Eds.), Stem Cell and Tissue Engineering (pp.31-48). 2011 Singapore: World Scientific Publishing.

Trowbridge JJ, Orkin SH. Dnmt3a silences hematopoietic stem cell self-renewal. Nature Genetics 2011; **44**: 13-14.

Challen GA, **Trowbridge JJ**. Role of DNA methyltransferases and DNA methylation in cell fate decisions during blood cell development and leukemia. In C. Bonifer & P. Cockerill (Eds.), Transcriptional and Epigenetic Mechanisms Regulating Normal and Aberrant Blood Cell Development. 2014 Springer Publishing.

Young K, **Trowbridge JJ**. Open chromatin profiling as a novel strategy for identifying cancer cell-of-origin. Molecular & Cellular Oncology 2016; **3**:e1236770. doi:10.1080/23723556.2016.1236770.

Borikar S, **Trowbridge JJ**. The Mediator of hematopoietic stem cell homeostasis. Cell Stem Cell 2016; **19**: 677-678.

Trowbridge JJ. Context-specific tumor suppression by PHF6. Blood 2019; **133**: 1698-1700.

Marquez EJ, **Trowbridge J**, Kuchel GA, Banchereau J, Ucar D. The lethal sex gap: COVID-19. Immune Aging 2020; **17**: 13.

SanMiguel JM, Young K, **Trowbridge JJ**. Hand in Hand: Intrinsic and extrinsic drivers of aging and clonal hematopoiesis. Experimental Hematology 2020, **91**:1-9.

Trowbridge JJ, Starczynowski DT. Innate immune pathways and inflammation in hematopoietic aging, clonal hematopoiesis, and MDS. Journal of Experimental Medicine 2021, **218**:e20201544.

Patents:

Moon RT, Bhatia M, **Trowbridge JJ**, inventors; Methods for regulation of stem cells. US Patent no. 11/026399

Trowbridge JJ, Young KA, SanMiguel JM, Schwartz LS, inventors; Method to reduce aging-associated clonal hematopoiesis and reduce blood cancer risk by targeting Oncostatin M. US Provisional Patent D21-017-USPROV1, filed Nov. 3, 2021

Trowbridge JJ, Mistry JM, inventors; Methods and compositions for inhibiting clonal hematopoiesis. US Provisional Patent D22-012-USPROV1, filed August 31, 2022

Invited Lectures (past 5 years):

2019:

- Hematology Department Seminar Series, University of Washington, St. Louis, MO
- 28th Annual Short Course on Experimental Models of Human Cancer, JAX
- University of Florida Health Cancer Center Seminar Series, Gainesville, FL
- Tisch Cancer Institute Seminar Series, Mount Sinai, NY
- Ohio State University Cancer Center Leukemia Research Seminar Series, Columbus, OH
- Forbeck Forum ‘Leukemia stem cells, heterogeneity, & metabolism – new directions for AML therapy’, Denver, CO
- RegenAge Symposium “Defining the Interface Between Regeneration & Aging”, MDIBL, Bar Harbor, ME
- Colby Cancer Consortium Lecture Series, Colby College, Waterville, ME
- ASH Annual Meeting Scientific Program ‘Molecular Mechanisms of Bone Marrow Failure’, Orlando, FL
- Joint NIA/NCI Workshop ‘Transformation and Aging of Stem Cells’, Bethesda, MD

2020:

- Department of Toxicology & Cancer Biology Seminar Series, University of Kentucky, Lexington, KY
- Janet Rowley Award Lecture, Annual Meeting of the International Society for Experimental Hematology (virtual)
- European Hematology Association (EHA) Molecular Hemopoiesis Workshop (virtual)
- EvansMDS Foundation Summit 2020 (virtual)
- ASH Annual Meeting Friday Scientific Workshop, Aging and Hematology (virtual)
- 29th Annual Short Course on Experimental Models of Human Cancer, JAX (virtual)

2021:

- Keynote: Edward P. Evans Seminar in MDS; DFCI Hematologic Malignancies & Bone Marrow Transplant Grand Rounds (virtual)
- Keystone Symposia on Hematopoiesis (virtual); speaker and session chair
- Center for Epigenetics Seminar Series, Van Andel Institute (virtual)
- Hematology Research Seminar Series, St. Jude Children's Research Hospital (virtual)
- Children's Research Institute Seminar Series (selected by trainees), UT Southwestern (virtual)
- Division of Hematology/Oncology Seminar Series, Boston Children's Hospital (virtual)
- 30th Annual Short Course on Experimental Models of Human Cancer, JAX (virtual)
- Sanford Stem Cell Symposium, UC San Diego (virtual)
- 2021 AACR Virtual Meeting: Clonal Hematopoiesis (virtual)

2022:

- Memorial Sloan Kettering Center for Hematologic Malignancies Seminar Series (virtual)
- Joint NCI/NHLBI Workshop on Myelodysplastic Syndrome (virtual)
- Myeloid Working Group Seminar Series, Vanderbilt University School of Medicine (virtual)
- Pathology Seminar Series, NYU Langone Health, New York, NY
- 13th International Workshop on Molecular Aspects of Myeloid Stem Cell Development, Cincinnati, OH
- Flagship European Hematology Association (EHA) Research Conference "Extrinsic signals and perturbations in normal and malignant hematopoiesis", Palermo, Italy
- Systems Immunology in Aging and Complex Diseases Meeting, The Jackson Laboratory for Genomic Medicine, Farmington, CT
- The Normal and Malignant Hematopoiesis Research Affinity Group, The Children's Hospital of Philadelphia (CHOP) (virtual)
- Till & McCulloch Meeting, Vancouver, BC, Canada
- Keystone Lecture, Yale Stem Cell Center and Cancer Center retreat, New Haven, CT
- Meet-the-Experts, International Society for Experimental Hematology (ISEH) Annual Meeting, Edinburgh, Scotland
- 31st Annual Short Course on Experimental Models of Human Cancer, JAX (virtual)
- European Hematology Association Conference, Palermo, Italy
- ISEH Fall Webinar "Causes, Consequences and Correction of Hematopoietic Stem Cell Ageing" (virtual)

2023:

- European School of Hematology (ESH) 4th Scientific Workshop “The Haematological Tumour Microenvironment and its Therapeutic Targeting”, The Francis Crick Institute, London, UK
- Immunology Seminar Series (graduate student-led), Stanford University, Palo Alto, CA
- Japan-US Joint Leukemia Meeting, Waimea, Hawaii
- Age-Related Changes in Hematopoiesis (ARCH) Marie Sklodowska Curie European Training Network Conference “Molecular and Cellular Pathways of Aging in Hematopoiesis”, Crete, Greece
- Seminar Series, NCI-Designated Comprehensive Indiana University Simon Cancer Center, Indianapolis, IN
- Hematology Seminar Series, Department of Medicine, Washington University, St. Louis, MO
- FASEB Hematological Malignancies Conference, Southbridge, MA
- Cancer Research Seminar Series, Massachusetts General Hospital Cancer Center, Charlestown, MA
- Princess Margaret Cancer Center, University Health Network, Toronto, ON, Canada
- Basic and Translational Sciences Seminar Series, Department of Cell, Developmental & Cancer Biology, Oregon Health & Science University (OSHU), Portland, OR
- 2023 Acute Leukemia Forum (ALF) Meeting, San Diego, CA
- American Association for Cancer Research (AACR) Annual Meeting, Orlando, FL

Trainees:

Postdoctoral

Dates	Name	Awards	Current Position
2021-current	Jayna Mistry	JAX Scholar Award (2022-2024)	R&D Scientist (JAX)
2018-2022	Jennifer SanMiguel	ASH Scholar Award (2022-2024) NIH T32-HD007065 (2018-2020) NIH T32 PGAD (2020-2021)	
2014-2020	Kira Young	ASH Scholar Award (2018-2020) NIH T32-HD007065 (2015-2017) JAX Pyewacket Fund (2014-2016)	Associate Research Scientist (JAX)

PhD students

Dates	Name	Program	Awards	Current Position
2019-current	Logan Schwartz	Tufts	NIH F31-DK127573 (2020-2023)	
2015-2019	Eraj Khokhar	UMaine		Postdoctoral Fellow (UMass Worcester)
2013-2017	Sneha Borikar	Tufts		Principal Scientist I (Novartis)

JAX Summer Student Program

Year	Name	Current Position
2022	Hanna Kodama	undergraduate (Western Washington University)
2021	Brandon James	Research Assistant (JAX)
2019	Maximo Kesselhaut	undergraduate (Yale)
2017	Teniola Idowu	PhD candidate (NYU)

2016	Zollie Yavarow	PhD candidate (Duke)
2015	Matthew Loberg	MD/PhD candidate (Vanderbilt)
2013	Jennifer Ditano Hinds, PhD	Senior Scientist I (AbbVie)

Thesis Advisory Committees

Year	Name	University/Program
2019-current	Monique Mills	University of Maine GSBSE
2016-2021	Kate Foley	Tufts University
2020-2021	Teresa Easterbrooks	University of Maine GSBSE
2019-2020	Ashleigh Beaulieu	University of Maine GSBSE
2015-2019	Alexander Fine	Tufts University (committee chair)
2016-2019	Qiming Wang	Tufts University
2016-2017	Nicholas Cutter	University of Maine GSBSE

External PhD Thesis Examination Committees

Year	Name	University/Program
2022	Samuel Wattrus	Harvard University, Mentor: Dr. Len Zon