

Mitch McVey *Curriculum Vitae*

EDUCATION and TRAINING

University of North Carolina at Chapel Hill SPIRE postdoctoral fellow	Chapel Hill, NC 2001-2005
Massachusetts Institute of Technology Doctor of Philosophy, Biology	Cambridge, MA 1996-2001
University of Texas Pan-American Teaching certificate in secondary school science	Edinburg, TX 1995-1996
University of Colorado at Boulder Bachelor of Arts, Molecular, Cellular, and Developmental Biology	Boulder, CO 1990-1994

ACADEMIC APPOINTMENTS

Associate professor	Tufts University, Medford MA	2011-present
Associate professor	Tufts Sackler School of Graduate Biomedical Sciences, Boston MA	2011-present
Assistant professor	Tufts Sackler School of Graduate Biomedical Sciences, Boston MA	2008-2010
Assistant professor	Tufts University, Medford MA	2005-2010
Visiting assistant professor	Johnson C. Smith University, Charlotte NC	2003-2004

RESEARCH EXPERIENCE

Postdoctoral Fellowship UNC-Chapel Hill, Department of Biology Advisor: Dr. Jeff Sekelsky <ul style="list-style-type: none">Used <i>Drosophila melanogaster</i> to study the function of RecQ DNA helicases in preventing genomic instability.Applied forward and reverse genetics, gene targeting technology, and molecular, cellular, and genomic techniques to characterize pathways of DNA repair and recombination in <i>Drosophila</i>.	2001-2005
Doctoral Research M.I.T., Department of Biology Advisor: Dr. Leonard Guarente <ul style="list-style-type: none">Thesis title: The relationship between genomic stability and replicative aging in yeast	1996-2001
Undergraduate Research University of Colorado at Boulder Advisor: Dr. Lorraine Pillus <ul style="list-style-type: none">Senior honors thesis title: Screening for enhancers of the <i>sir1</i> mutation in <i>Saccharomyces cerevisiae</i>	1993-1994

TEACHING EXPERIENCE

University of Pavia, Italy (2015)

- 12-hour seminar course in Advanced Molecular Biology (~65 students)
Fall 2015

Tufts University (2005-2015)

- Molecular Biology (upper level undergraduate/graduate lecture course, ~60 students)
Spring 2006-2008, 2010-2012, 2014-2015
- Introductory Biology with Lab (~400 students)
Fall 2008-2013
- Biology of Aging (~50 students)
Fall 2014
- Topics in Molecular and Cellular Biology (graduate level seminar course, ~10 students)
Fall 2006
- Teaching Biology: Pedagogy and Practice (seminar course, ~10 students)
Fall 2008-2015

Johnson C. Smith University (2003-2004)

- Upper-level genetics lecture and lab course, Spring 2004
- Introductory zoology lecture and lab courses, Fall 2003 and Spring 2004

Woods Hole Marine Biological Lab - Laboratory Instructor for Molecular Biology of Aging (Summer 2000)

- Designed lab experiments, obtained equipment and supplies, and implemented curriculum for a three-week course for professors, postdocs, and graduate students

Mary Hoge Academy - High School Biology Teacher

- Taught ninth-grade biology at Mary Hoge Academy, Weslaco, TX, 1994-1996

TEACHING AWARDS

- Undergraduate Initiative in Teaching (UNITE) Award, 2011
- Outstanding Contribution to Graduate Education, 2010

PROFESSIONAL SERVICE

- TEACRS postdoctoral training program, Co-Director, 2010-present
- NSF grant review panel, Mechanisms of Inheritance, Fall 2010 and Spring 2013
- NSF ad-hoc grant reviewer, 2009-present
- Executive Committee, TEACRS postdoctoral training program, Tufts University, 2006-present
- Reviewer for Nature, Science, Nature Structural and Molecular Biology, Genes and Development, PNAS, Nucleic Acids Research, Genetics, Molecular and Cellular Biology, PLoS Genetics, Genetics Research, Journal of Molecular Biology, Aging Cell, Chemistry and Biology, FEBS Journal, Genetica, PLoS One
- Member of SPIRE Distinguished Scholar Symposium Committee, UNC-Chapel Hill, 2002-2005
- Member of Genetics Society of America, 2001-present

GRANTS and AWARDS

National Institutes of Health, 1 P01 GM10547 Mutations arising during DNA repair Total direct costs: \$189,075 Total indirect costs: \$98,343 Role: co-PI	5/10/14-4/30/19
National Institutes of Health, 2K12 GM074869 Training in education and critical research skills. Current year direct costs: \$786,718 Current year indirect costs: \$61,539 Role: co-director	9/1/12-8/31/17
National Institutes of Health, 1 R01GM092866 Mechanisms and consequences of inaccurate double-strand break repair. Total direct costs: \$416,301 Total indirect costs: \$167,810 Role: PI	9/1/11-8/31/16
American Cancer Society, Research Scholar Grant Roles of translesion polymerases in DNA double-strand break repair. Total direct costs: \$100,000 Total indirect costs: \$20,000 Role: PI	1/1/11-8/31/11
National Science Foundation CAREER Award Interactions between error-prone and error-free DNA double-strand break repair pathways in <i>Drosophila melanogaster</i> . Total direct costs: \$575,529 Total indirect costs: \$308,296 Role: PI	8/1/07-7/31/13
Ellison Medical Foundation New Scholar Award in Aging Error-prone repair of double-strand breaks and aging in <i>Drosophila</i> . Total direct costs: \$184,000 Total indirect costs: \$16,000 Role: PI	7/15/06-7/14/10
SPIRE postdoctoral fellowship, National Institute of General Medical Sciences	9/1/01-8/15/05

PEER-REVIEWED PUBLICATIONS (* denotes undergraduate author)

Beagan K and **McVey M.** (2016). DNA polymerase structure and function in health and disease. *Cell Mol Life Sci* 73: 603-15.

Rodgers K and **McVey M.** (2016). Error-prone repair of DNA double-strand breaks. *J Cell Physiol* 231: 15-24.

Kloosterman WP, Francioli LC, Fereydoun H, Marschall T, Hehir-Kwa JY, Abdellaoui A, Lameijer E, Moed MH, Koval V, Renkens I, van Roosmalen MJ, Arp P, Karssen LC, Coe BP, Handsaker RE, Suchiman ED, Cuppen E, Thung DT, **McVey M.**, Wendl MC, Genome of the Netherlands Consortium, Uitterlinden A, van Duijn CM, Swertz M, Wijmenga C, van Ommen G, Slagboom PE, Boomsma DI, Schönhuth A, Eichler EE, de Bakker PIW, Ye K, Guryev V. (2015). Characteristics of *de novo* structural changes in the human genome. *Genome Research* 25: 792-801.

McVey M. (2014). RPA puts the brakes on MMEJ. *Nature Structural & Molecular Biology* 21: 348-349.

Bolterstein E, Rivero R*, Marquez M*, **McVey M.** (2014). The *Drosophila* Werner Exonuclease participates in an exonuclease-independent response to replication stress. *Genetics* 197:243-252.

Medina CO*, Lattin CR, **McVey M.**, Romero LM. (2013). There is no correlation between glucocorticoid receptor mRNA expression and protein binding in the brains of house sparrows (*Passer domesticus*). *Gen Comp Endocrinol* 193: 27-36.

Thomas AM, Hui C*, South A, **McVey M.** (2013). Common variants of *Drosophila melanogaster* Cyp6d2 cause camptothecin sensitivity and synergize with loss of Brca2. *G3 (Bethesda)*. Jan;3(1):91-9.

Kane DP, Shusterman M*, Rong Y, **McVey M.** (2012). Competition between replicative and translesion polymerases during homologous recombination repair in *Drosophila*. *PLoS Genetics* 8:e1002659.

Garcia AM, Salomon RN, Witsell A, Lee M, Liepkalns J, Calder RB, Lundell M, Vijg J, **McVey M.** (2011). Loss of the Bloom Syndrome helicase increases DNA ligase 4-independent genome rearrangements and tumorigenesis in aging *Drosophila*. *Genome Biology*, Dec. 19; 12(12):R121.

Yu AM and **McVey M.** (2010). Synthesis-dependent microhomology-mediated end joining accounts for multiple types of end-joining repair junctions. *Nucleic Acids Research* 38: 5706-5717.

Chan SH*, Yu AM, **McVey M.** (2010). Dual roles for *Drosophila* DNA polymerase theta in alternative end joining of double-strand breaks. *PLoS Genetics* 6:e1001005.

McVey M. (2010). Strategies for DNA interstrand crosslink repair: insights from worms, flies, frogs, and slime molds. *Environmental and Molecular Mutagenesis* 51:646-658.

Witsell A, Kane DP, **McVey M.** (2010). Super-sized deletions: Improved transposon excision screens using a *mus309* mutant background. *Fly (Austin)* 4: 137-140.

McVey M. (2010). *In vivo* analysis of *Drosophila* BLM helicase function during DNA double-strand gap repair. *Methods Mol Biol* 587: 185-94.

Witsell A, Kane DP, Rubin S*, and **McVey M.** (2009). Removal of the Bloom Syndrome DNA helicase extends the utility of imprecise transposon excision for making null mutations in *Drosophila*. *Genetics* 183: 1187-1193.

McVey M and Lee SE. (2008). MMEJ repair of double-strand breaks (director's cut): deleted sequences and alternative endings. *Trends in Genetics* 24: 529-38.

McVey M., Andersen S, Broze, GJ III*, Sekelsky JJ. (2007). Multiple functions of *Drosophila* BLM helicase in maintenance of genome stability. *Genetics* 176: 1979-1992.

Peer-Reviewed Publications (continued)

McVey M, Radut D*, Sekelsky JJ. (2004). End-joining repair of double-strand breaks in *Drosophila* is largely DNA ligase IV independent. *Genetics* 168: 2067-2076.

McVey M, LaRocque JR, Adams MD, Sekelsky JJ. (2004). Formation of deletions during double strand break repair in *Drosophila* DmBlm mutants occurs after strand invasion. *Proc. Natl. Acad. Sci.* 101: 15694-15699.

McVey M, Adams MD, Staeva-Vieira E, Sekelsky JJ. (2004). Evidence for multiple cycles of strand invasion during repair of double-strand gaps in *Drosophila*. *Genetics* 167: 699-705.

Adams MD, **McVey M** (co-first author), Sekelsky JJ. (2003). *Drosophila* BLM in double-strand break repair by synthesis-dependent strand annealing. *Science* 299: 265-267.

Park PU, **McVey M**, Guarente L. (2002). Separation of mother and daughter cells. *Methods in Enzymology* 351:468-77.

Kaerberlein M, Jeagalin B, **McVey M**. (2002). AGEID: a database of aging genes and interventions. *Mechanisms of Ageing and Development* 123: 1115-1119.

McVey M., Kaerberlein M, Tissenbaum HA, Guarente L. (2001). The short life span of *Saccharomyces cerevisiae* *sgs1* and *srs2* mutants is a composite of normal aging processes and mitotic arrest due to defective recombination. *Genetics* 157: 1531-1542.

Johnson FB, Marciniak RA, **McVey M**, Stewart SA, Hahn WC, Guarente L. (2001). The *Saccharomyces cerevisiae* WRN homologue Sgs1p participates in telomere maintenance in cells lacking telomerase. *EMBO Journal* 20: 905-913.

Stone EM, Reifsnnyder C, **McVey M**, Gazo B, Pillus L. (2000). Two classes of *sir3* mutants enhance the *sir1* mutant mating defect and abolish telomeric silencing in *Saccharomyces cerevisiae*. *Genetics* 155: 509-522.

Kaerberlein M, **McVey M** (co-first author), Guarente L. (1999). The *SIR2/3/4* complex and *SIR2* alone promote longevity in *Saccharomyces cerevisiae* by two different mechanisms. *Genes and Development* 13: 2570-80.

EDUCATION PUBLICATIONS

Rybarczyk B, Baines AT, **McVey M**, Thompson JT, Wilkins HR. (2007). A case-based approach increases student learning outcomes and comprehension of cellular respiration concepts. *Biochemistry and Molecular Biology Education* 35: 181-186.

Baines AT, **McVey M**, Rybarczyk B, Thompson JT, Wilkins HR. (2004). The mystery of the toxic flea dip: an interactive approach to teaching aerobic cellular respiration. *Cell Biology Education* 3: 62-68.

INVITED TALKS

- **University of Pavia**, Pavia, Italy. "Utilizing sloppy copiers during DNA double-strand break repair," November 2015.
- **University of California**, Davis, CA. "Utilizing sloppy copiers during DNA double-strand break repair," November 2014.
- **Jackson Laboratories**, Bar Harbor, Maine. "A role for sloppy copiers in the initiation of homologous recombination," March 2013.
- **Massachusetts Institute of Technology**, Department of Biology. "Dynamic endings: keys to DNA break repair and genome stability," August 2012.

- **University of Toronto**, Department of Biochemistry. “DNA double-strand break repair: T-nucleotides to tumors,” May 2012.
- **University of Texas Health Sciences Center, San Antonio**, Greeley Children’s Cancer Research Institute. “Alternative end joining of DNA breaks: T-nucleotides to tumors,” January 2012.
- **Boston College**, Department of Biology. “Translesion polymerases and DNA double-strand break repair: roles for sloppy copiers,” November 2011.
- **Dana Farber Cancer Institute**, Harvard Medical School. “Mechanisms of alternative end joining in *Drosophila*,” January 2011.
- **Albert Einstein College of Medicine**, Department of Genetics. “Understanding alternative end joining: bridging the gap with *Drosophila*,” January 2011.
- **IRACDA conference**, Tufts University. “Designing a Course from Scratch,” June 2010.
- **University of Massachusetts at Boston**, Department of Biology. “Alternative end joining goes mainstream in *Drosophila*,” February 2010.
- **University of Rochester**, Department of Biology. “Alternative end-joining repair of DNA double-strand breaks in *Drosophila*,” November 2009.
- **Brandeis University**, Department of Biology. “Many ways to tie the knot: DNA double-strand break repair in *Drosophila*,” March 2009
- **University of Texas Health Sciences Center, San Antonio**. Department of Molecular Medicine, “Evidence for non-processive DNA double strand gap repair in *Drosophila*,” November 2007
- **Mt. Holyoke College**, Department of Biology. “Fickle Fixing of Fruit Fly DNA,” October 2007
- **Assumption College**, Department of Natural Sciences. “Broken chromosomes, DNA repair, and disease: a fruit fly perspective,” March 2006

CONFERENCE PRESENTATIONS (platform) (* denotes undergraduate author)

McVey M, Thomas A, Cox J*, Hui C*, Williams H*. Distinct roles for the *Drosophila* HELQ, BLM, and FANCM helicases in homologous recombination. *FASEB Conference on Genetic Recombination and Genome Rearrangements*, Steamboat Springs, CO, July 2015.

McVey M. Alternative end-joining repair: a low-fidelity solution to prevent genomic catastrophe. *Barcelona BioMed Conference: Drosophila as a Model in Cancer*, Barcelona, Spain, June 2015.

McVey M, Khodaverdian V, Mak V*, Yu A. Sequence context matters for alternative end-joining repair. *FASEB Conference on Dynamic DNA Structures*, Itasca, IL, 2014.

McVey M, Khodaverdian V, Clairmont C*, LaRocque J. Mechanisms of break repair in *Drosophila*. *Radcliffe Conference on Chromothripsis*, Cambridge, MA, 2014.

McVey M, Khodaverdian V, Clairmont C*, Rodgers K. Error-prone repair of DNA double-strand breaks in *Drosophila*. *DNA Repair and Genome Instability Conference*, University of Massachusetts Medical Center, Worcester, MA, 2014.

McVey M, Beagan K, Armstrong R*. Domain-specific functions for DNA polymerase theta in DNA repair, *Gordon Conference on DNA Damage, Repair, and Cancer*, Ventura, CA, 2014.

McVey M, Kane DP, Shusterman M*. Multiple translesion polymerases are involved in mutagenic DNA double-strand break repair, *Gordon Conference on Mutagenesis*, Newport, RI, 2012.

Garcia AM, Salomon RN, Witsell A, Lee M, Liepkalns J, Calder RB, Lundell M, Vijg J, **McVey M**. The Bloom Syndrome helicase prevents spontaneous genome rearrangements and tumorigenesis during aging in *Drosophila*. *Keystone Symposium on DNA Replication and Recombination*, Keystone, CO, 2011.

McVey M. Error-prone repair of DNA double-strand breaks and aging in *Drosophila*. *Ellison Medical Foundation Colloquium on the Biology of Aging*, Woods Hole, MA, 2010.

McVey M. Mechanisms of alternative end joining in *Drosophila melanogaster*. *Dartmouth Symposium on Genome Instability*, Dartmouth College, 2010.

McVey M, Chan SH*, Garcia AM, Lundell M, Vijg J. DNA double-strand break repair in *Drosophila*: alternative pathways, aging, and cancer. *39th Annual Environmental Mutagen Society Symposium*, Puerto Rico, 2008.

McVey M and Chan SH.* DNA polymerase theta functions in an alternative double-strand break repair pathway in *Drosophila melanogaster*. *DNA Replication and Recombination Keystone Conference*, Santa Fe, NM, 2008.

Kane DP and McVey M. Use of DNA polymerases eta and zeta in homologous recombination and repair following DNA damage in *Drosophila*. *DNA Replication and Recombination Keystone Conference*, Santa Fe, NM, 2008.

McVey M, Adams MD, Sekelsky JJ. *Drosophila BLM* is required for double-strand break repair by synthesis-dependent strand annealing. *44th Annual Drosophila Research Conference*, Chicago, IL, 2003.

MENTORING at TUFTS

Postdoctoral fellows: 2 total

Elyse Bolterstein, 2010-2014

Currently an Assistant Professor at Northeastern Illinois State University

Sarah Dykstra, 2015-

Graduate trainees: 7 total

Amy Yu, Ph.D. , 2005-11

Currently a postdoc at Tufts Sackler School

Dan Kane, Ph.D., 2006-12

Currently a lecturer at Ball State University

Adam Thomas, Ph.D., 2007-13

Currently a postdoc at the NIH

Kasey Rodgers, M.S., 2012-2015

Currently in biotech

Kelly Beagan, Ph.D. candidate , 2009-

Varandt Khodaverdian, Ph.D. candidate, 2011-

Barbara Sands-Marcinkowski, Ph.D. candidate, 2014-

Undergraduate/postbac students mentored at Tufts: 46 total