

**MARY FELLER DAVIS, PH.D., M.S., MLS(ASCP)<sup>CM</sup>**

Assistant Professor  
 Department of Microbiology and Molecular Biology  
 Brigham Young University  
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**EDUCATION**

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Vanderbilt University	2008-2013
<i>Ph.D. in Human Genetics</i>	
<i>Advisor: Jonathan L. Haines</i>	
<i>Dissertation: Determining the Use of Electronic Medical Records in Genetic Studies of Multiple Sclerosis</i>	
<i>M.S. in Applied Statistics</i>	
<i>Thesis: Parkinson Disease Loci in the mid-Western Amish</i>	
Brigham Young University	2004-2008
<i>B.S. in Clinical Laboratory Science</i>	

**PROFESSIONAL EXPERIENCE**

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Assistant Professor, Brigham Young University Department of Microbiology and Molecular Biology	2014-present
Adjoint Assistant Professor, Vanderbilt University Department of Biomedical Informatics	2019-present

**INVITED SEMINARS**

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Pharmacogenomics of Multiple Sclerosis in an EHR Dataset. University of Colorado Anschutz Medical Campus. Aurora, CO. October 7, 2020.

Practical Guide to Cancer Diagnosis and Treatment Coding in Cancer Risk and Treatment Outcome Studies Using Administrative Claims and EHRs. International Conference of Pharmacoepidemiology. Philadelphia, PA. August 24, 2019.

Genetic Associations to Microphenotypes in Electronic Health Records: Identifying Causes of Multiple Sclerosis Progression. University of Utah Department of Biomedical Informatics Invited Seminar. Salt Lake City, UT. March 2, 2016.

Microphenotypes in Electronic Health Records: Mining the Way for Personalized Medicine. BYU Department of Plant and Wildlife Science Seminar. Provo, UT. October 22, 2015.

Extraction and analysis of clinical traits of multiple sclerosis using electronic medical records. American Society for Human Genetics Annual Meeting. October 23, 2013.

Genetic analysis of MS using EMR and BioVU—A template for clinical research. Vanderbilt Neurology Grand Rounds. October 4, 2013.

Family-specific linkage analysis of multiple sclerosis. Vanderbilt University Graduate Student Research Symposium. March 26, 2010.

## PUBLICATIONS

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A. Gosch, M. D. Montierth, J. M. Miller, J. Norris, D. Charles, J. C. Denny, **M. F. Davis**. “Essential Tremor Raises the Risk of Parkinson’s Disease in Electronic Health Records.” *Movement Disorders*. In preparation

J. T. Beales, M. R. Rimmasch, K. M. Reynolds, J. C. Denny, **M. F. Davis**. “Automated extraction of multiple sclerosis treatment timeliness: preparing free-text electronic health record data for use in pharmacogenomic analyses.” *American Medical Informatics Association Annual Symposium*. In Review

S. W. Brugger, M. C. Gardner, J. T. Beales, F. B. Briggs, **M. F. Davis**. “Depression in multiple sclerosis patients associated with risk variant near NEGR1.” *Multiple Sclerosis and Related Disorders*. Accepted Sept 2020

D. K. Johnson, K. M. Reynolds, M. D. Montierth, V. M. Todd, A. Barnado, B. D. Poole, **M. F. Davis**. “Contribution of viral infection to risk for cancer in systemic lupus erythematosus and multiple sclerosis.” *PLOS One*. In Review

F. M. Wang, **M. F. Davis**, F. B. Briggs. “Predicting self-reported depression after the onset of multiple sclerosis using genetic and non-genetic factors.” *Multiple Sclerosis Journal*. May 2020.

International Multiple Sclerosis Genetics Consortium. “Multiple sclerosis genomic map implicates peripheral immune cells and microglia in susceptibility.” *Science*. Sept. 2019.

F. B. Briggs, J. C. Yu, **M. F. Davis**, J. Jiangyang, S. Fu, E. Parrotta, D. D. Gunzler, D. Ontaneda. “Multiple sclerosis risk factors contribute to onset heterogeneity.” *Multiple Sclerosis and Related Disorders*. Feb. 2019.

International Multiple Sclerosis Genetics Consortium. “Low-Frequency and Rare-Coding Variation Contributes to Multiple Sclerosis Risk. *Cell*. Nov. 2018.

K. Kowalec...**M.F. Davis**, C.J. Ross, H. Tremlett, B.C. Carleton. “Common variation near IRF6 is associated with IFN-beta-induced liver injury in multiple sclerosis.” *Nature Genetics*. Aug. 2018.

R. Barr, **M. F. Davis**. “Reproducing Clinically Significant Multi-organism Cultures to Improve Clinical Microbiology Education and Practice.” *Journal of Microbiology and Biology Education*. Feb. 2018.

K. B. Pallister, S. Mason, T. K. Nygaard, B. Liu, S. Griffith, J. Jones, S. Linderman, M. Hughes, D. Erickson, J. M. Voyich, **M. F. Davis**, E. Wilson. “Bovine CCL28 Mediates Chemotaxis via CCR10

and Demonstrates Direct Antimicrobial Activity against Mastitis Causing Bacteria." *PLoS One*. Sep. 2015.

**M. F. Davis**, J. L. Haines. "The intelligent use and clinical benefits of electronic medical records in multiple sclerosis." *Expert Rev Clin Immunol*. Feb. 2015.

**M. F. Davis**, S. Sriram, W. S. Bush, J. C. Denny, and J. L. Haines. "Automated extraction of clinical traits of multiple sclerosis in electronic medical records." *JAMIA*. Dec. 2013.

**M. F. Davis**, A. C. Cummings, L. N. D'Aoust, L. Jiang, D. R. Velez Edwards, R. Laux, L. Reinhart-Mercer, D. Fuzzell, W. K. Scott, M. A. Pericak-Vance, S. L. Lee, and J. L. Haines, "Parkinson disease loci in the mid-western Amish," *Hum. Genet*. Nov. 2013.

A. H. Beecham, N. A. Patsopoulos, D. K. Xifara, **M. F. Davis**, A. Kempainen, C. Cotsapas, T. S. Shah, C. Spencer, D. Booth, A. Goris, A. Oturai, J. Saarela, B. Fontaine, B. Hemmer, C. Martin, F. Zipp, S. D'Alfonso, F. Martinelli-Boneschi, B. Taylor, H. F. Harbo, I. Kockum, J. Hillert, T. Olsson, M. Ban, J. R. Oksenberg, R. Hintzen, L. F. Barcellos, C. Agliardi, L. Alfredsson, M. Alizadeh, C. Anderson, R. Andrews, H. B. Sondergaard, A. Baker, G. Band, S. E. Baranzini, N. Barizzone, J. Barrett, C. Bellenguez, L. Bergamaschi, L. Bernardinelli, A. Berthele, V. Biberacher, T. M. Binder, H. Blackburn, I. L. Bomfim, P. Brambilla, S. Broadley, B. Brochet, L. Brundin, D. Buck, H. Butzkueven, S. J. Caillier, W. Camu, W. Carpentier, P. Cavalla, E. G. Celius, I. Coman, G. Comi, L. Corrado, L. Cosemans, I. Cournu-Rebeix, B. A. Cree, D. Cusi, V. Damotte, G. Defer, S. R. Delgado, P. Deloukas, S. A. di, A. T. Dilthey, P. Donnelly, B. Dubois, M. Duddy, S. Edkins, I. Elovaara, F. Esposito, N. Evangelou, B. Fiddes, J. Field, A. Franke, C. Freeman, I. Y. Frohlich, D. Galimberti, C. Gieger, P. A. Gourraud, C. Graetz, A. Graham, V. Grummel, C. Guaschino, A. Hadjixenofontos, H. Hakonarson, C. Halfpenny, G. Hall, P. Hall, A. Hamsten, J. Harley, T. Harrower, C. Hawkins, G. Hellenthal, C. Hillier, J. Hobart, M. Hoshi, S. E. Hunt, M. Jagodic, I. Jelcic, A. Jochim, B. Kendall, A. Kermodé, T. Kilpatrick, K. Koivisto, I. Konidari, T. Korn, H. Kronsbein, C. Langford, M. Larsson, M. Lathrop, C. Lebrun-Frenay, J. Lechner-Scott, M. H. Lee, M. A. Leone, V. Leppa, G. Liberatore, B. A. Lie, C. M. Lill, M. Linden, J. Link, F. Luessi, J. Lycke, F. Macciardi, S. Mannisto, C. P. Manrique, R. Martin, V. Martinelli, D. Mason, G. Mazibrada, C. McCabe, I. L. Mero, J. Mescheriakova, L. Moutsianas, K. M. Myhr, G. Nagels, R. Nicholas, P. Nilsson, F. Piehl, M. Pirinen, S. E. Price, H. Quach, M. Reunanen, W. Robberecht, N. P. Robertson, M. Rodegher, D. Rog, M. Salvetti, N. C. Schnetz-Boutaud, F. Sellebjerg, R. C. Selter, C. Schaefer, S. Shaunak, L. Shen, S. Shields, V. Siffrin, M. Slee, P. S. Sorensen, M. Sorosina, M. Sospedra, A. Spurkland, A. Strange, E. Sundqvist, V. Thijs, J. Thorpe, A. Ticca, P. Tienari, D. C. van, E. M. Visser, S. Vucic, H. Westerlind, J. S. Wiley, A. Wilkins, J. F. Wilson, J. Winkelmann, J. Zajicek, E. Zindler, J. L. Haines, M. A. Pericak-Vance, A. J. Iverson, G. Stewart, D. Hafler, S. L. Hauser, A. Compston, G. McVean, J. P. De, S. J. Sawcer, and J. L. McCauley, "Analysis of immune-related loci identifies 48 new susceptibility variants for multiple sclerosis," *Nat. Genet.*, Nov. 2013.

A. C. Cummings, E. Torstenson, **M. F. Davis**, L. N. D'Aoust, W. K. Scott, M. A. Pericak-Vance, W. S. Bush, and J. L. Haines, "Evaluating power and type 1 error in large pedigree analyses of binary traits," *PLoS. One*. May 2013.

#### PRESENTATIONS AT LOCAL, REGIONAL, AND NATIONAL MEETINGS

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\*undergraduate student, ^graduate student

J. T. Beales\*, M. R. Rimmasch\*, K. M. Reynolds\*, **M. F. Davis**. “Automated extraction of multiple sclerosis treatment timelines: preparing free-text electronic health record data for use in pharmacogenomics analyses.” 8<sup>th</sup> Joint ACTRIMS-ECTRIMS Meeting. Virtual. September 2020.

K. M. Reynolds\*, J. T. Beales\*, M. Rimmasch\*, J. C. Denny, **M. F. Davis**. “Pharmacogenetic analysis of rs2205986 associated with glatiramer acetate-induced liver injury in multiple sclerosis patients.” Annual Meeting of the American Society of Human Genetics. Houston, TX. October 2019.

S. W. Brugger\*, X. Niu, J. C. Denny, **M. F. Davis**. “Pharmacogenetic analysis of known variant associated with IFN- $\beta$ -induced liver injury replicated in African Americans with multiple sclerosis.” Annual Meeting of the American Society of Human Genetics. Houston, TX. October 2019.

M. Rimmasch\*, J. T. Beales\*, J. C. Denny, **M. F. Davis**. “Automating the extraction of Multiple Sclerosis treatment data for future pharmacogenetic studies.” Americans Committee for Treatment and Research in Multiple Sclerosis Forum. Dallas, TX. February 2019.

**M. F. Davis**, M. D. Montierth\*, J. C. Denny. “The Role of Uric Acid in Multiple Sclerosis Risk.” Americans Committee for Treatment and Research in Multiple Sclerosis Forum. Dallas, TX. February 2019.

**M. F. Davis**. “iPads in the Laboratory.” Utah/Idaho Medical Laboratory Educators’ Network Symposium. Provo, UT. November 2018.

**M. F. Davis**. “Promotion of Medical Laboratory Sciences.” Utah/Idaho Medical Laboratory Educators’ Network Symposium. Provo, UT. November 2018.

J. T. Beales\*, J. C. Denny, **M. F. Davis**. “Automated extraction of multiple sclerosis treatment timelines: preparing free-text electronic health record data for use in pharmacogenetic analyses.” Annual Meeting of the American Society of Human Genetics. San Diego, CA. October 2018.

S. W. Brugger\*, J. C. Denny, **M. F. Davis**. “Searching for a common cause: Analysis of APOE and known depression SNPs in patients with multiple sclerosis.” Annual Meeting of the American Society of Human Genetics. San Diego, CA. October 2018.

J. M. Miller\*, J. C. Denny, **M. F. Davis**. “Associations between hematologic laboratory values and multiple sclerosis subtype.” Annual Meeting of the American Society of Human Genetics. San Diego, CA. October 2018.

M. D. Montierth\*, J. C. Denny, **M. F. Davis**. “Role of Uric Acid in Multiple Sclerosis Risk and Progression.” Annual Meeting of the American Society of Human Genetics. San Diego, CA. October 2018.

M. D. Montierth\*, J. C. Denny, **M. F. Davis**. “Role of Uric Acid in Multiple Sclerosis Risk and Progression.” American Society of Microbiology. Durango, CO. April 2018.

A. Gosch\*, J.C. Denny, **M. F. Davis**. “Relationship between Essential Tremor and Parkinson’s Disease.” Annual Meeting of the American Society of Human Genetics. Orlando, FL. October 2017.

M. C. Gardner\*, J.C. Denny, **M. F. Davis**. “Depression and Mental Illness Affect Pre and Post Multiple Sclerosis Diagnosis.” Annual Meeting of the American Society of Human Genetics. Orlando, FL. October 2017.

M. Montierth\*, J.C. Denny, **M. F. Davis**. “Effect of Genetic Variants Associated with Uric Acid on Multiple Sclerosis: A Mendelian Randomization Study.” Annual Meeting of the American Society of Human Genetics. Orlando, FL. October 2017.

J. Adams\*, **M. F. Davis**, R. D. Cordner. “Evaluating the Gap between Training Programs and Hospitals in Medical Laboratory Science Chemistry Testing.” Annual Meeting of the American Society of Clinical Laboratory Science. San Diego, CA. July 2017.

H. Jensen\*, J. C. Denny, **M. F. Davis**. “The Relationship between the Presence of Oligoclonal Bands and the Multiple Sclerosis Severity Score.” Annual Meeting of the American Society of Clinical Laboratory Science. San Diego, CA. July 2017.

R. D. Cordner, C. Dunn, **M. F. Davis**. “The Education Gap in Clinical Microbiology.” Annual Meeting of the American Society of Clinical Laboratory Science. San Diego, CA. July 2017.

A. Gosch \*, J. C. Denny, **M. F. Davis**. “Uric Acid Levels in Relation to Progression of Multiple Sclerosis.” Biotechnology and Bioinformatics Symposium. Provo, UT. December 2016.

H. Jensen\*, J. C. Denny, **M. F. Davis**. “Effects of HLA Types on Multiple Sclerosis Risk and Age of Onset.” Biotechnology and Bioinformatics Symposium. Provo, UT. December 2016.

M. C. Gardner\*, J. C. Denny, **M. F. Davis**. “Depression and Mental Illness Affect Pre and Post Multiple Sclerosis Diagnosis.” Biotechnology and Bioinformatics Symposium. Provo, UT. December 2016.

S. Frodsham\*, J. C. Denny, **M. F. Davis**. “Characterizing Multiple Sclerosis Subtypes Using the Comprehensive Metabolic Panel-Albumin.” Biotechnology and Bioinformatics Symposium. Provo, UT. December 2016.

D. Rowe\*, S. Sutton^, S. Draper\*, J. L. Haines, J. C. Denny, **M. F. Davis**. “Algorithmic Extractions of a Database for Multiple Sclerosis Medication History.” Biotechnology and Bioinformatics Symposium. Provo, UT. December 2016.

**M. F. Davis**, S. Sutton^, L. Bastarache, R. Carroll, J. C. Denny. “EHR data extraction shows utility for microphenotypes in genetic studies.” American Society for Human Genetics Annual Meeting, Vancouver, Canada. October 2016.

S. Frodsham\*, **M. F. Davis**. “Statistical Analysis of Multiple Sclerosis Patient Electronic Health Record Data in Correlating Liver Damage in Response to Interferon Beta Treatments.” Utah Conference for Undergraduate Research. Salt Lake City, UT. February 2016.

**M. F. Davis**, B. Peaden\*, S. Sriram, J. L. Haines, J. C. Denny. “Genetic involvement in progression of MS disease course.” American Society for Human Genetics Annual Meeting. Baltimore, MD. October 2015.

S. Frodsham\*, J. C. Denny, **M. F. Davis**. “Analysis of Comorbidities of Multiple Sclerosis Patients using an Electronic Medical Record-linked DNA Biobank.” American Society for Human Genetics Annual Meeting. Baltimore, MD. October 2015.

M. G. Durrant\*, J. C. Denny, **M. F. Davis**. “Analysis of pathways associated with Body Mass Index in individuals with multiple sclerosis.” American Society for Human Genetics Annual Meeting. Baltimore, MD. October 2015.

T. Gallion\*, J. C. Denny, **M. F. Davis**. “Relapsing-Remitting Multiple Sclerosis Genotypes Correlated with Copaxone-Induced Hepatotoxicity.” American Society of Clinical Laboratory Science Annual Meeting. Atlanta, GA. July 2015.

**M. F. Davis**. “Using iPads to Document Work in a Clinical Microbiology Course.” American Society of Microbiology Conference for Undergraduate Research. Austin, TX. May 2015.

P. Teixeira, **M. F. Davis**, L. Wiley, L. Bastarache, J. Smith, R. Carroll, D. Fabbri, D. Roden, J. Denny. “Improving Phenotypic Granularity with NLP-PheWAS in Multiple Sclerosis.” Joint Summits on Translational Science. San Francisco, CA. March 2015.

T. Gallion\*, J. C. Denny, **M. F. Davis**. “RRMS Patient Genotype Correlated with Copaxone-Induced Hepatotoxicity.” Utah Conference for Undergraduate Research. St. George, UT. February 2015.

S. Frodsham\*, J. C. Denny, **M. F. Davis**. “A Genetic Analysis of the Multiple Sclerosis Disease Course as Influenced by Rheumatoid Arthritis.” Utah Conference for Undergraduate Research. St. George, UT. February 2015.

Genetic enrichment of multiple sclerosis risk loci in multiple sclerosis patients with co-morbid diseases. American Society for Human Genetics Annual Meeting. San Diego, CA. October 2014.

**M. F. Davis**, J. L. Haines. Reported values for oligoclonal bands in an electronic medical record system. American Society for Clinical Laboratory Science. Houston, TX. July 2013.

Defining the use of electronic medical records in genetic studies of multiple sclerosis. American Society for Human Genetics Annual Meeting. San Francisco, CA. November 2012.

Genome-wide association study for Parkinson’s disease in the mid-western US Amish. International Congress for Human Genetics Meeting. Montreal, CA. October 2011.

Defining the use of electronic medical records in genetic studies of multiple sclerosis. Genetics, Immunology and Repair in Multiple Sclerosis--Keystone Symposium. Taos, NM. February 2011.

## GRANT FUNDING

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National Multiple Sclerosis Society	2017-2018
Co-Investigator	\$60,000
Quantifying the genetic burden of multiple sclerosis age of onset	
BYU College of Life Sciences Teaching Enhancement Grant	2016

Principal Investigator iPads for MLS students to document skills and learning experiences	\$9,600
BYU College of Life Sciences Teaching Enhancement Grant Principal Investigator MMBio 407: 12 iPad minis to take pictures of plates and biochemical tubes and funds to develop a mixed cultures protocol	2015 \$9,300
National Institutes of Health Pre-doctoral Training Grant Fellow T32	2009-2011

### COURSES TAUGHT

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MMBio 102 Introduction to Medical Laboratory Science	2019-present
MMBio 411 Molecular Diagnostics	2018-present
MMBio 407 Clinical Microbiology	2015-present
MMBio 422 Clinical Chemistry	2014-2016
MMBio 423 Clinical Chemistry and Molecular Diagnostics	2014-2015
MMBio 424 Clinical Chemistry Laboratory Techniques	2014-2016
MMBio 425 Clinical Chemistry and Molecular Diagnostics Laboratory Techniques	2014-2015
MMBio 494R/694R Mentored Research	2014-present
MMBio 496R Clinical Experience	2014-present

### INVITED LECTURES

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PWS 188 Introduction to Genetics, Genomics, and Biotechnology	2015-2019
Bio 465 Bioinformatics	2016
MMBio 661	2015, 2016
LS 101 Life Sciences 101	2016, 2019
WS 370 Women in Science	2015, 2019
MMBio 422 Clinical Chemistry	2014

### UNDERGRADUATE STUDENTS MENTORED

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1. Tyler Daley
2. Rebecca Koch
3. Joel Masopeh
4. Amy Hernandez
5. Matthew Porter
6. Kristen Watabe
7. Sumin Hwang
8. Kaylia Reynolds
9. Braden Eberhard
10. Renee Koth
11. Jacob Miller
12. Megan Rimmasch
13. Steven Brugger

14. Jeremy Beales
15. Caisa Blau
16. Mekeli Nelson
17. Jesse Norris
18. Joshua Adams
19. Celeste Dunn
20. Matthew Montierth
21. Shayla Draper
22. Benjamin Rowland
23. Megan Soelberg
24. Holly Jensen
25. Dylan Rowe
26. Alex Gosch
27. Cannon Gardner
28. Rebecca Barr
29. Scott Frodsham
30. Mackenzie Olsen
31. Virginia Rodriguez
32. Spencer Sutton
33. Benjamin Peaden
34. Matt Durrant
35. Tielle Gallion
36. Derek Nielsen

#### **GRADUATE STUDENTS MENTORED**

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Marcus Stucki (M.S.) 2015-2016

Pharmacogenetics of drug-induced liver injury by glatiramer acetate

#### **GRADUATE STUDENT COMMITTEES**

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Daniel Arens (Ph.D. – Grose lab)	2017-present
John Carter (M.S. – Johnson lab)	2016-present
Alex Erikson (M.S. – Griffiths lab)	2016-2018
Jeralyn Franson (M.S. – Bridgewater lab)	2015-2019
Ann-Aubrey Reid (M.S. – Robison lab)	2014-2019

#### **HONORS AND AWARDS**

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ASMCUE Early-Career Faculty Travel Award	2015
College of Life Sciences Teaching Enhancement Grant	2014, 2015
Vanderbilt Graduate School Travel Grant	2013
Magna Cum Laude, Brigham Young University	2008
Dade Behring-Emil von Behring Scholarship	2008
ASCP National Student Honor Award	2007



Garth L. Lee Teaching Assistant Award	2006, 2007
Brigham Young University Biology Dean's Honor Roll	2004-2006
Brigham Young University Heritage Scholarship <i>Full tuition, four years</i>	2004-2008
Brigham Young University Summer Scholarships	2005, 2007
Wal-Mart Scholarship	2004
ELKS Lodge Utah State Scholarship	2004

#### MEMBERSHIPS

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American Society of Clinical Pathology	2015-present
American Society for Clinical Laboratory Science	2013-present
American Society of Human Genetics	2009-present

#### CITIZENSHIP/SERVICE

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AMIA 2021 Informatics Summit Abstract Reviewer	2021
ASHG 2020 Annual Meeting Abstract Reviewer	2020
BYU Healthcare Industry Initiative Committee	2020-present
BYU Healthcare Industry Network Conference Committee	2019
ASCLS Region IX Educators' Network Symposium Organizer	2018, 2019
ASCLS Region IX Educators' Network Coordinator	2018-present
Medical Laboratory Science Scholarship Committee	2017-present
MMBio Department Faculty Search Committee	2015-2016
Journal of Biochemical and Molecular Toxicology Editorial Review Board	2015-2018
College of Life Sciences MEG Review Panel	2014-2016
Medical Laboratory Sciences Program	2014-present
MMBio Department Undergraduate Curriculum Committee	2014-present
EvoBio Conference Program Committee Member	2014