

Revised: 08/27/2020

NAME M. Wayne Davis	POSITION TITLE Research Associate Faculty		
CURRENT ADDRESS University of Utah Department of Biology 257 South 1400 East Salt Lake City UT 84112	EMAIL wdavis@biology.utah.edu		
	PHONE (801) 585-3692		
EDUCATION			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
California Institute of Technology	B S	1992	Biology
University of Texas Southwestern	PhD	1999	Genetics and Development
U. Utah	Post-doc	1999-2004	Genetics

Honors

1999-2002	National Institutes of Health NRSA postdoctoral fellowship
1999	Platform talk at the International <i>C. elegans</i> meeting
1997	Platform talk at the International <i>C. elegans</i> meeting
1996-1998	Department of cell and molecular biology training program fellowship
1995	Sigma Xi graduate research award
1993-1996	National Science Foundation predoctoral fellowship

Research and Professional Experience

2015-present	<i>Caenorhabditis elegans</i> neurodevelopment, transposons and DNA repair Research Associate Faculty, School of Biological Sciences, University of Utah
2004-2015	<i>Caenorhabditis elegans</i> neurodevelopment and DNA repair Research Assistant Faculty, Department of Biology, University of Utah
1999-2004	<i>Caenorhabditis elegans</i> neurodevelopment and DNA repair Postdoctoral fellow, University of Utah Advisor: Erik Jorgensen
1993-1999	<i>Caenorhabditis elegans</i> neurogenetics Graduate student, UT Southwestern Advisor: Leon Avery
1993	X-ray crystallography of carboxypeptidase Graduate first year rotation, UT Southwestern Advisor: Betsy Goldsmith
1992	<i>D melanogaster</i> neurogenetics Graduate first year rotation, UT Southwestern Advisor: Flora Katz
1992	<i>S cerevisiae</i> chromatin structure Graduate first year rotation, UT Southwestern Advisor: William Garrard
1991	<i>C elegans</i> neurogenetics Undergraduate Summer Fellowship, UT Southwestern Advisor: Leon Avery
1990	<i>C elegans</i> neurogenetics Undergraduate Summer Fellowship, UT Southwestern Advisor: Leon Avery
1990-1991	DNA structure chemistry Undergraduate, Caltech Advisor: Jaqueline Barton

Grants

PI or co-PI

- 2006-2007 *University of Utah Interdisciplinary Teaching Grant for "Genetics & Society"*
Co-designed and co-taught BIOL/PHIL 2510 with Dr. Bryan Benham, Assistant Professor, Lecturer, Department of Philosophy. The class provided an overview of genetics and applications of genetic technology that intersect everyday life in order to better prepare students to make decisions about the use of genetic technologies. The class is aimed at students who have no background in the fundamental concepts of genetics or philosophy. The class presented both the science of genetics and the ethical/social issues, and thus fulfills core science and humanities course requirements.
- 2002-2003 co-PI with Erik Jorgensen, University of Utah Research Foundation Funding Incentive Seed Grant: Homologous recombination in *C. elegans*
- 1999-2002 NIH NRSA fellowship 5F32NS010966 "Genetics of Growth Cone Behavior in *C. elegans*".^[SEP]

Senior Personnel

- 2020-2021 NIH NIGMS 2R01GM095817 (PI: Erik Jorgensen) "Engineering the *C. elegans* Genome"
- 2015-2020 NIH NINDS 5R01NS034307 (PI: Erik Jorgensen)^[SEP] "Synaptic Function in the Nematode *C. elegans*."
- 2015-2019 NIH NIGMS 2R01GM095817 (PI: Erik Jorgensen) "Engineering the *C. elegans* Genome"
- 2010-2015 NIH NINDS 5R01NS034307 (PI: Erik Jorgensen)^[SEP] "Synaptic Function in the Nematode *C. elegans*."
- 2011-2014 NIH NIGMS 1R01GM095817-01 (PI: Erik Jorgensen) "Engineering the *C. elegans* Genome"

Open Source Software

- 2003-present Author of ApE- A plasmid Editor, a free DNA analysis program.
2019 calendar year: 104,000 page views
Tried and True Favorite, Bite Size Bio. November 18, 2013. <https://bitesizebio.com/10827/a-brief-survey-of-plasmid-mapping-and-dna-annotation-software/>
Best of the Web award, Genetic Engineering and Technology News. September 15, 2011 (Vol. 31, No. 16). <https://www.genengnews.com/resources/best-of-the-web/ape-a-plasmid-editor/>

Patent Applications

2011

- Methods and Compositions Related to Universal Insertion Sites (#). Status: Expired (full term ends). Type: Provisional. Inventors: M. Wayne Davis, Christian Froekjaer-Jensen, Erik M. Jorgensen. File date 12/31/2011. Assignee: The University of Utah. Country: United States.
- Methods and Compositions for Measuring High Affinity Interactions With Kinetic Imaging of Single Molecule Interaction (KISMI) (#). Status: Abandoned. Type: Nationalized PCT-US. Inventors: Joel M. Harris, M. Wayne Davis, Christopher E. Hopkins, Erik M. Jorgensen, Eric Peterson, Joshua R. Wayment. File date 11/01/2011. Assignee: The University of Utah. Country: United States.
- Stable Genomic Insertion of Transgenic DNA Fragments with a Mariner Transposon (#). Status: Expired (full term ends). Type: Provisional. Inventors: Erik M. Jorgensen, M. Wayne Davis, Christian Froekjaer-Jensen. File date 04/29/2011. Assignee: The University of Utah. Country: United States.

2010

- Gene Targeting in *Caenorhabditis elegans* (#). Status: Expired (full term ends). Type: Provisional. Inventors: Erik M. Jorgensen, Christian Froekjaer-Jensen, M. Wayne Davis. File date 12/14/2010. Assignee: The University of Utah. Country: United States.

Methods and Compositions for Measuring High Affinity Interactions with Kinetic Imaging of Single Molecule Interaction (KISMI) (#). Status: Nationalized PCT. Type: PCT/Provisional Priority. Inventors: Joel M. Harris, Erik M. Jorgensen, Joshua R. Wayment, Christopher E. Hopkins, M. Wayne Davis, Eric Peterson. File date 04/30/2010. Assignee: The University of Utah. Country: PCT.

- Methods and Compositions For Measuring High Affinity Interactions With Kinetic Imaging of Single Molecule

Interaction (KISMI) (#). Status: Abandoned. Type: Nationalized PCT. Inventors: Joel M. Harris, M. Wayne Davis, Christopher E. Hopkins, Erik M. Jorgensen, Eric Peterson, Joshua R. Wayment. File date 04/30/2010. Assignee: The University of Utah. Country: Eur Patent Ofc.

2009

Methods and Compositions for Measuring High Affinity Interactions with Kinetic Imaging of Single Molecule Interaction (KISMI) (#). Status: Expired (full term ends). Type: Provisional. Inventors: M. Wayne Davis, Erik M. Jorgensen, Joel M. Harris, Christopher E. Hopkins, Joshua R. Wayment, Eric Peterson. File date 07/20/2009. Assignee: The University of Utah. Country: United States.

Kinetic Imaging of Single-Molecule Interactions (#). Status: Expired (full term ends). Type: Provisional. Inventors: M. Wayne Davis, Erik M. Jorgensen, Joel M. Harris, Christopher E. Hopkins, Joshua R. Wayment, Eric Peterson. File date 05/01/2009. Assignee: The University of Utah. Country: United States.

Publications

- Kusick, G.F., Chin, M., Lippmann, K., Adula, K.P., Davis, M.W., Jorgensen, E.M., and Watanabe, S. (2018). Synaptic vesicles undock and then transiently dock after an action potential. *BioRxiv*. <https://doi.org/10.1101/509216>.
- Geisler, F., Gerhardus, H., Carberry, K., Davis, W., Erik, J., Christine, R., Olaf, B., and Rudolf E., L. (2016). A novel function for the MAP kinase SMA-5 in intestinal tube stability. *Molecular Biology of the Cell*. doi:10.1091/mbc.E16-02-0099
- Frøkjær-Jensen, C., Jain, N., Hansen, L., Davis, M.W., Li, Y., Zhao, D., Reborá, K., Millet, J.R., Liu, X., and Kim, S.K. (2016). An Abundant Class of Non-coding DNA Can Prevent Stochastic Gene Silencing in the *C. elegans* Germline. *Cell* 166, 343–357. <http://dx.doi.org/10.1016/j.cell.2016.05.072>
- Mansouri, M., Bellon-Echeverria, I., Rizk, A., Ehsaei, Z., Cianciolo Cosentino, C., Silva, C.S., Xie, Y., Boyce, F.M., Davis, M.W., Neuhauss, S.C.F., et al. (2016). Highly efficient baculovirus-mediated multigene delivery in primary cells. *Nat Commun* 7.
- Watanabe, S., Trimbuch, T., Camacho-Pérez, M., Rost, B.R., Brokowski, B., Söhl-Kielczynski, B., Felies, A., Davis, M.W., Rosenmund, C., and Jorgensen, E.M. (2014). Clathrin regenerates synaptic vesicles from endosomes. *Nature* 515, 228–233.
- Frøkjær-Jensen, C., Davis, M.W., Sarov, M., Taylor, J., Flibotte, S., LaBella, M., Pozniakovsky, A., Moerman, D.G., and Jorgensen, E.M. (2014). Random and targeted transgene insertion in *Caenorhabditis elegans* using a modified *Mos1* transposon. *Nat. Methods* 11, 529–534.
- Watanabe, S., Davis, M.W., and Jorgensen, E.M. (2014). Flash-and-Freeze Electron Microscopy: Coupling Optogenetics with High-Pressure Freezing. In *Nanoscale Imaging of Synapses*, (Springer New York), pp. 43–57.
- Watanabe, S., Rost, B.R., Camacho-Pérez, M., Davis, M.W., Söhl-Kielczynski, B., Rosenmund, C., and Jorgensen, E.M. (2013). Ultrafast endocytosis at mouse hippocampal synapses. *Nature* 504, 242–247.
- Watanabe, S., Liu, Q., Davis, M.W., Hollopeter, G., Thomas, N., Jorgensen, N.B., and Jorgensen, E.M. (2013). Ultrafast endocytosis at *Caenorhabditis elegans* neuromuscular junctions. *eLife* 2.
- Frøkjær-Jensen C., Davis M. W., Ailion M., Jorgensen E. M. (2012) Improved *Mos1*-mediated transgenesis in *C. elegans*. *Nat Methods*. 9(2):117-8. doi: 10.1038/nmeth.1865. PMID: 22290181
- Carberry, K., Wiesenfahrt, T., Geisler, F., Stöcker, S., Gerhardus, H., Überbach, D., Davis, W., Jorgensen, E., Leube, R.E., and Bossinger, O. (2012). The novel intestinal filament organizer IFO-1 contributes to epithelial integrity in concert with ERM-1 and DLG-1. *Development* 139, 1851–1862.
- Zhang H., Constantine R., Vorobiev S., Chen Y., Seetharaman J., Huang Y. J., Xiao R., Montelione G. T., Gerstner C. D., Davis M. W., Inana G., Whitby F. G., Jorgensen E. M., Hill C. P., Tong L., Baehr W. (2011). UNC119 is required for G protein trafficking in sensory neurons. *Nat Neurosci*. 14(7):874-80. doi: 10.1038/nn.2835. PMID: 21642972
- Watanabe S., Punge A., Hollopeter G., Willig K. I., Hobson R. J., Davis M. W., Hell S. W., Jorgensen E. M. (2011). Protein localization in electron micrographs using fluorescence nanoscopy. *Nat Methods*.

8(1):80-4. PMID: 21102453

- Frøkjær-Jensen, C., Davis M. W., Hollopeter G., Taylor J., Harris T. W., Nix P., Lofgren R., Prestgard-Duke M., Bastiani M., Moerman D. G., Jorgensen E. M. (2010). Targeted gene deletions in *C. elegans* using transposon excision. *Nat. Methods* 7, 451-453.
- Zhang, H., Constantine, R., Davis, M., Inana, G., Jorgensen, E., and Baehr, W. (2010). Unc119/RG4 Regulates G Protein Trafficking in Sensory Neurons by Recognizing the Acylated G N-Terminus. *Investigative Ophthalmology & Visual Science* 51, 1083–1083.
- Frøkjær-Jensen, C., Davis, M. W., Hopkins, C. E., Newman, B. J., Thummel, J. M., Olesen, S., Grunnet, M., and Jorgensen, E. M. (2008). Single-copy insertion of transgenes in *Caenorhabditis elegans*. *Nat Genet* 40, 1375-83.
- Robert, V. J., Davis, M. W., Jorgensen, E. M., and Bessereau, J. (2008). Gene conversion and end-joining-repair double-strand breaks in the *Caenorhabditis elegans* germline. *Genetics* 180, 673-679.
- Davis, M. W., Morton, J. J., Carroll, D., and Jorgensen, E. M. (2008). Gene activation using FLP recombinase in *C. elegans*. *PLoS Genetics* 4(3): e1000028.
- Beg, A. A., Ernstrom, G. G., Nix, P., Davis, M. W., and Jorgensen, E. M. (2008). Protons act as a transmitter for muscle contraction in *C. elegans*. *Cell* 132, 149-160.
- Morton, J. J., Davis, M. W., Jorgensen, E. M., and Carroll, D. (2006). Induction and repair of zinc-finger nuclease-targeted double-strand breaks in *Caenorhabditis elegans* somatic cells. *PNAS*, 103(44):16370-5.
- Davis, M. W., Hammarlund, M. (2006). “SNP Mapping.”, in *C. elegans Methods and Applications* Kevin Strange, ed. (Totowa NJ Humana Press), 2006.
- Davis, M. W.*, Hammarlund, M.*, Harrach, T., Hullett, P., Olsen, S., and Jorgensen, E. M. (2005). Rapid Single Nucleotide Polymorphism Mapping in *C. elegans*. *BMC Genomics*, 6, 118.
- Hammarlund, M.*, Davis, M. W.*, Nguyen, H., Dayton, D., and Jorgensen, E. M. (2005). Heterozygous insertions alter crossover distribution but allow crossover interference in *C. elegans*. *Genetics*, 171(3): 1047-56.
- Davis, M. W., Birnie, A. J., Chan, A. C., Page, A. P., and Jorgensen, E. M. (2004). A conserved metalloprotease mediates ecdysis in *Caenorhabditis elegans*. *Development*, 131: 6001-6008.
- de Bono M., Tobin D.M., Davis M.W., Avery L., and Bargmann C.I. (2002), Social feeding in *Caenorhabditis elegans* is induced by neurons that detect aversive stimuli, *Nature*, 419(6910): 899-903 .
- Bessereau, J.L., Wright, A., Williams, D.C., Schuske, K., Davis, M.W., Jorgensen, E.M. (2001), Mobilization of a *Drosophila* transposon in the *Caenorhabditis elegans* germ line, *Nature*, 413(6851): 70-4.
- Fleischhauer, R., Davis, M.W., Dzhura, I., Neely, A., Avery, L., Joho, R.H. (2000), Ultrafast inactivation causes inward rectification in a voltage-gated K⁺ channel from *Caenorhabditis elegans*, *J Neuroscience*, 20(2):511-20.
- Davis, M.W., Fleischhauer, R., Dent, J.A., Joho, R.H., Avery, L. (1999), A mutation in the *C. elegans* EXP-2 potassium channel that alters feeding behavior, *Science* 286(5449):2501-4.
- Dent, Joseph A., Davis, M. Wayne, and Avery, Leon (1997), *avr-15* encodes a chloride channel subunit that mediates inhibitory glutamatergic neurotransmission and ivermectin sensitivity in *Caenorhabditis elegans*, *EMBO J*, 16: 5867-5879
- Davis, M. Wayne, Somerville, Delores, Lee, Raymond Y. N., Lockery, Shawn, Avery, Leon, and Fambrough Douglas M. (1995), Mutations in the *Caenorhabditis elegans* Na,K- ATPase α -subunit gene, *eat-6*, disrupt excitable cell function, *J Neuroscience*, 15(12): 8408-8418.

*co-first author

Teaching

Spring 2009 Genetics and Society (Biol/Phil 2510), co-taught with Bryan Benham PhD, Assistant Professor, Dept. of Philosophy

- Spring 2008 Genetics and Society (Biol/Phil 2510), co-taught with Bryan Benham PhD, Assistant Professor, Dept. of Philosophy
- Spring 2007 Genetics and Society (Biol/Phil 2510), co-taught with Bryan Benham PhD, Assistant Professor, Dept. of Philosophy
- Fall 2006 Genetics and Society (Hon 3215), co-taught with Bryan Benham PhD, Assistant Professor, Dept. of Philosophy

Student Training

Graduate rotation students in the Jorgensen lab:

- 3/11-5/11 Edward Hujber, molecular biology graduate student.
- 1/11-3/11 Susie Choi, Oncological Sciences graduate student.
- 8/07-10/07 Shaili Johri, molecular biology graduate student.
- 1/07-3/07 Patrick McEachern, molecular biology graduate student.
- 1/06-3/06 Matt Sieber, molecular biology graduate student.
- 9/05-10/05 Samantha Covington, neurosciences graduate student.
- 3/03-6/03 Meghan Jobson, neurosciences graduate student.
- 1/01-2/01 Jayson Punwani, molecular biology graduate student.
- 10/00-12/00 Chris Sans, molecular biology graduate student.
- 1/00-3/00 Mark Palfreyman, molecular biology graduate student.

Undergraduate researchers in the Jorgensen lab:

- 9/17-7/20 Jackson Hartvigsen, undergraduate
- 8/18-present Alex Cherry, undergraduate, advisor Sean Merrill (4/14-8/18)
- 5/16-6/18 Tate Matthews, undergraduate
Subsequent: TA, Chemistry Department, University of Utah
- 1/16-5/16 Jenna Gardner, undergraduate
- 6/12-9/12 Rong Huang, undergraduate, Peking University
Subsequent: PhD, Statistics, UC San Diego
- 4/11-4/12 Rosalie Griffin Waller, undergraduate
- 5/10-6/13 Zach Stevenson, undergraduate
Subsequent: Technician , Knu-Dra Tech.
Current: PhD, University of Oregon, Institute of Ecology & Evolution
- 12/08-5/10 Maggie Reid, undergraduate ACCESS
Current: Sr. Statistical Analyst, Ctr of Innovative Design & Analysis, Dept of Biostatistics, Uof Colorado, Denver
- 6/07-7/08 Jason Thummel, Colorado College undergraduate
Subsequent: University of Utah, Computer Science; Current: Software Engineer II EA Capital Games
- 6/07-8/07 Chino Okuro, University of Maryland Baltimore, underrepresented, undergraduate, Meyerhoff Scholar.
Current: Medical Resident, Department of Urology, University of Washington.
- 1/06-3/06 Sami Geng, Biology undergraduate
- 6/04-6/07 Blake Newman, Bioeng undergraduate ^[L]_[SEP]
Subsequent: Medical School, Wash University, St. Louis;
Current: Assistant Professor (Clinical), Department of Neurology, University of Utah
- 3/03-7/05 Dustin Dayton, undergraduate.
Subsequent: MD Student, Univ Utah.
Current: MD, Intermountain Healthcare, Anesthesiology
- 5/02 – 9/02 Nadja Makki, undergraduate U. Kiel, Germany. ^[L]_[SEP]
Subsequent: PhD Stud, Univ Utah., Postdoc at Stanford

4/01-6/04 Current: Assistant Professor, Department of Anatomy & Cell Biology, University of Florida
Aubrey Chan, undergraduate.
Subsequent: MD/PhD Student, Univ Utah.

3/01-9/02 Current: Medical Resident, Internal Medicine-Psychiatry, University of Iowa Hospitals and Clinics, Iowa City IA
Jeff Gritton, undergraduate.
Subsequent: Graduate Student, MIT PhD., Law School at Harvard.
Current: Senior Associate, Intellectual Property, BakerBotts

Consulting

2018-2020 Synthetic Biodesign Inc.
2014-2016 Leica Microsystems GmbH
2010-2019 Vutara Corp.
2009-2010 Scintalla Corp.

Other

Jan 2009 Invited speaker Humanists of Utah
2008-2014 Intermountain Junior Science and Humanities Symposium (<http://www.jshs.org/>)
Executive committee